National Institute for Health and Care Excellence

Kidney cancer: diagnosis and management

[A] Evidence review for management of localised renal cell carcinoma using partial versus radical nephrectomy

NICE guideline NG256

Evidence underpinning recommendations 1.5.3 to 1.5.5 in the NICE guideline

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1.1 Review question

What is the clinical and cost effectiveness of partial compared with radical nephrectomy in adults with localised renal cell carcinoma and for whom and under what circumstances is partial or radical nephrectomy most suitable?

1.1.1 Introduction

There is variation in practice in the NHS for the management of renal cell carcinoma (RCC). Treatment options for early, localised RCC include surgical options comprising partial and radical nephrectomy, and non-surgical options comprising ablative therapies and stereotactic ablative radiotherapy (SABR), or active surveillance. This review question focuses on the surgical options.

Radical nephrectomy (also known as total nephrectomy) is surgery to remove an entire kidney, while partial nephrectomy removes the cancer while leaving as much of the kidney as possible. Radical nephrectomy has been the standard treatment for treating RCC, but partial nephrectomy presents an attractive alternative with potential benefits of preserving kidney function and reducing longer term complications. However, partial nephrectomy also has the potential to increase the risks of intraoperative and postoperative adverse events including retreatment if some cancer is left behind.

This review aims to evaluate the clinical and cost-effectiveness of partial versus radical nephrectomy to understand who may benefit from either procedure considering the trade-offs between benefits and harms in different circumstances.

1.1.2 Summary of the protocol

Table 1: PICO inclusion criteria

Population	Adults (18 years or over) with (histologically confirmed or suspected on imaging) localised RCC and where nephrectomy is indicated or planned. Exclusion: • Adults with localised RCC who are deemed unsuitable for nephrectomy • Adults with locally advanced and advanced RCC (inoperable or metastatic)
Interventions	Partial nephrectomy
Comparator	Radical nephrectomy

Outcomes	• Disease-free survival, including cancer-free survival or if not reported:
	  ○ Local recurrence
	  ○ Distant metastases
	• Overall survival or if not reported:

	○ Mortality • Severe adverse events and complications reported as: ○ observed in the intraoperative period ○ observed in postoperative period • Long-term severe adverse events ○ Renal function impairment ○ Cardiovascular events • Duration of hospital stay • Quality of life
Study type	• Randomised controlled trials (RCTs) • Any controlled, non-randomised studies • Cohort studies (prospective and retrospective observational studies) • Systematic reviews of the above studies

RCC: renal cell carcinoma

For the full protocol see appendix A.

1.1.3 Methods and process

This evidence review was developed using the methods and process described in Developing NICE guidelines: the manual. Methods specific to this review question are described in the review protocol in appendix A and the methods document.

Declarations of interest were recorded according to NICE's conflicts of interest policy.

Methods and technical decisions specific to this review are summarised below:

1. Four systematic reviews (SRs) were used as a source of data (Deng et al. 2019; Gu et al. 2016; Huang et al. 2019 and Ochoa-Arvizo et al. 2023). Of these, 2 were assessed as high risk of bias (Huang et al. 2019 and Ochoa-Arvizo et al. 2023) using the ROBIS tool. Usually, only SRs rated low risk of bias will be considered fully applicable for use as a source of data. However, the main reasons for high risk judgements related to full protocols or full search strategies not being available to fully assess whether there were post-hoc changes. For Ochoa-Arvizo et al. (2023), there appeared to be some post-hoc changes compared to the PROSPERO registration record. However, this record may not include the full protocol details. The apparent post-hoc changes were judged to be reasonable, without compromising the integrity of the review, and the SRs were therefore included in the review.

2. The included SRs used the Newcastle Ottawa scale to assess the bias of included studies, most of which were graded at low risk of bias. Because all non-randomised studies in reviews of effectiveness which are not assessed with ROBINS-I begin the GRADE assessment as low (essentially having been downgraded twice from high before the assessment starts), the decision was made to consider these studies at similar risk of bias to non-randomised studies which were at serious risk of bias according to ROBINS-I, as these would also be downgraded twice in GRADE.

3. The population for this review is people with localised RCC, defined as stage 1 or stage 2 (T1-T2) cancer according to the clinical or pathological TNM classification.

Some studies had broader eligibility criteria that included stage 3 (T3) and above. In this scenario, studies were excluded where ≥10% of the sample had clinical T3+ RCC and the outcomes could not be disaggregated. It was considered that most people undergoing partial or radical nephrectomy in practice would not have a confirmed (pathological) diagnosis prior to intervention, and therefore no restriction was placed on proportion of the study sample with pathological T3+ RCC providing the inclusion criteria was limited to clinical T1-T2.

4. Included studies used different definitions for each outcome. Therefore, the way the study described an outcome was compared to the outcomes agreed by the committee in the protocol to determine what each study was reporting. For consistency, outcomes were renamed in the analysis to match the protocol outcomes. This particularly applied to the following:

    a. Disease-free survival: time to event outcomes of disease-free survival, cancer-free survival, recurrence-free survival and relapse-free survival were combined in the analysis.

    b. Recurrence: event data reported as recurrence, local recurrence, and distant metastases. These three outcomes were analysed separately. Recurrence was interpreted as any recurrence, with local recurrence and distant metastases as subsets of these.

    c. Overall survival: time to event outcomes reported in studies as survival, mortality and all-cause mortality were combined in the analysis.

5. Mortality at timepoints of 90 days or less was not included in this review. This was considered to be within the postoperative period and therefore covered by the outcome of postoperative severe adverse events (PSAE). PSAE was required to be reported using the Clavien-Dindo classification in order to be included.

6. Where studies reported hazard ratios for relevant outcomes from both Kaplan-Meier analyses and multivariate models assessing association between surgery method and the outcome, the result considered to be at least risk of bias from confounding was preferred. Both types of results were combined in analyses.

7. Where more than 1 timepoint was reported we reported data at up to 5 years and 5 to 10 years. Where several time points were reported that could fit in the same category, the latest time point was used.

8. The search was limited to OECD countries only, because studies from these countries were considered to be more directly applicable to the UK healthcare setting.

For outcomes where the line of no effect was defined as the minimal important difference (MID), a power calculation from a robust RCT was used to determine the minimum sample size needed for consideration for the second downgrade criteria for the imprecision domain in GRADE. One RCT was identified (Scosyrev et al. 2017; Van Poppel et al. 2007) and also the PARTIAL trial protocol (Feb 2024). Both were used as a source to inform the minimum sample size needed. For overall survival, a sample size of 1300 was used. For all other outcomes, a sample size of 420 was used.

1.1.3.1 Search methods

The searches for the effectiveness evidence were run on 18/01/2024 and re-run on 14/02/2025. The following databases were searched: Central Register of Controlled Trials (Wiley), Cochrane Database of Systematic Reviews (Wiley), Embase (Ovid), Epistemonikos (Epistemonikos) and MEDLINE ALL (Ovid). Limits were applied to remove animal studies, conference abstracts, editorials, letters, news items and commentaries, as well as papers not published in the English language. Filters were used to limit to OECD countries, systematic reviews, randomised controlled trials and observational studies.

The searches for the cost effectiveness evidence were run between 05/01/2024 and 07/01/2024 and re-run on 06/05/2025. The following databases were searched: EconLit (Ovid), Embase (Ovid), HTA (CRD), International HTA database (INAHTA), MEDLINE ALL (Ovid) and NHS Economic Evaluations Database (CRD). Limits were applied to remove animal studies, conference abstracts, editorials, letters, news items and commentaries, as well as papers not published in the English language. Filters were used to limit to OECD countries and cost utility studies.

A NICE senior information specialist (SIS) conducted the searches. The MEDLINE strategy was quality assured by another NICE SIS. All translated search strategies were peer reviewed to ensure their accuracy. Both procedures were adapted from the 2015 PRESS Guideline Statement. Further details and full search strategies for each database are provided in appendix B.

1.1.4 Effectiveness evidence

1.1.4.1 Included studies

A single systematic search was carried out to identify potentially relevant studies for the current review (review A) and reviews B, C, H1 and H2 combined (review B: non-surgical interventions for localised RCC, review C: nephrectomy or stereotactic ablative radiotherapy for locally advanced RCC, reviews H1 and H2: non-pharmacological management of advanced RCC). This search found 19,882 references (see appendix B for the literature search strategy).

These 19,882 references were screened at title and abstract level against the review protocols, with 19,208 excluded at this level. 674 studies were taken forward for full text assessment for any of the four review questions listed above. Of these, 133 were relevant to review A. 10% of references were screened separately by two reviewers with 99.9% agreement. Discrepancies were resolved by discussion.

The full texts of 133 references were ordered for closer inspection. A total of 37 articles (4 systematic reviews [SRs] of cohort studies, 1 randomised controlled trial (RCT) reported in 3 publications and 30 cohort studies not included in the included systematic reviews) met the criteria specified in the review protocol (appendix A).

For a summary of the 37 articles included in this review see Table 2, Table 3 and Table 4.

The 4 included SRs reported different outcomes (see the full evidence tables in appendix D for a list of the included and excluded studies with reasons for exclusion):

- Ochoa-Arvizo et al. (2023) reported data on renal function impairment (30 studies) and cardiovascular events (9 studies).
- Huang et al. (2021) reported data on duration of hospital stay (5 studies).
- Deng et al. (2019) reported data on postoperative severe adverse events (5 studies).
- Gu et al. (2016) reported data on overall survival (6 studies) and recurrence-free survival (4 studies).

The clinical evidence study selection is presented as a PRISMA diagram in appendix C.

See section 1.1.14 References – included studies for the full references of the included studies.

1.1.4.2 Excluded studies

Details of studies excluded at full text, along with reasons for exclusion are given in appendix J.

1.1.5 Summary of studies included in the effectiveness evidence

Table 2 Summary of characteristics of the systematic reviews

Author (year)	Primary studies included from this review	Population	Interventions	Outcomes	Risk of bias
Deng (2019) Search date: Oct 2018 N=1610	• Breau (2010) • Chebbi (2017) • de S Aubert (2018) • Janssen (2018) • Kopp (2014)	Adults who underwent PN or RN for large (≥7 cm) renal lesions	Partial nephrectomy (N=248) Radical nephrectomy (N=653)	• Postoperative severe adverse events	Moderate
Gu (2016) Search date: March 2016 N=21330	• Ha (2013) • Lai (2016) • Mashni (2015) • Milonas (2013) • Nayak (2016) • Oh (2014) • O'Malley (2015) • Roos (2014) • Shim (2015) • Weight (2011)	Adults diagnosed with localised RCC (T1a to T2N0M0) on MRI/CT who underwent PN or RN Exclusions: • Paediatric patients, hereditary renal cancer syndromes and Wilm's tumours. • Lymphatic or distant metastases or venous tumour thrombus • Benign lesions • Multifocal or bilateral lesions • Solitary kidneys	Partial nephrectomy (N=6803) Radical nephrectomy (N=16529)	• Overall survival • Recurrence-free survival	Moderate

Huang (2021) Search date: Sept 2020 N=1534	• Brewer (2012) • De Saint Aubert (2018) • Kopp (2015) • Margulis (2007) • Shum (2017)	Adults who underwent PN or RN for T2 renal lesions	Partial nephrectomy (N=735) Radical nephrectomy (N=1405)	• Duration of hospital stay	High
Ochoa-Arvizo (2023) Search date: Sept 2021 N=45567	• Ahn (2018) • Bradshaw (2020) • Capitano (2020) • Choi (2014) • Chung (2016) • Chung (2018) • Cotta (2021) • Gershman (2018) • Huang (2009) • Hutchinson (2017) • Jang (2016) • Jeon (2009) • Jeon (2013) • Kambara (2018) • Kim (2014) • Kong (2013) • Kyung (2014) • Lai (2016) • Leppert (2018) • Lin (2015)	Adults with renal cell carcinoma that underwent either PN or RN with at least three months of follow-up Exclusions: • Metastatic renal disease • Bilateral kidney lesions • Solitary kidney	Partial nephrectomy (N=59874) Radical nephrectomy (N=93670)	• Renal function impairment • Cardiovascular events	High

	• Malcom (2009) • Mariusdottir (2013) • Mashni (2015) • Mir (2020) • Miyamoto (2012) • Mühlbauer (2020) • Nayan (2020) • O'Malley (2015) • Roos (2012) • Scosyrev (2017) • Shah (2019) • Süer (2011) • Sun (2012) • Weight (2010) • Wenzel (2021) • Yap (2015) • Yoo (2017)				

Table 3 Summary of characteristics of the included RCT

Study details	Population	Intervention	Comparison	Outcomes	Risk of bias
Scosyrev (2017) Multicentre (Belgium, Italy, Austria, Russia, Poland, France, Turkey, Spain, Canada, The Netherlands,	N=541 People with a solitary renal lesion suspicious for renal cell carcinoma. A WHO performance status of 0-2.	Partial nephrectomy (n=268)	Radical nephrectomy (n=273)	• Local recurrence • Distant metastases • Overall survival • Long-term severe adverse events (eGFR)	Moderate

Study details	Population	Intervention	Comparison	Outcomes	Risk of bias
Hungary, Germany, UK, Switzerland, Rep of Georgia, US) Follow up time: median 6.7 years (eGFR outcomes) and 9.3 years (survival and recurrence)	Key exclusion criteria: solitary kidney, T3 or T4 lesions.				

Table 4 Summary of characteristics of the included non-randomised studies

Study details	Population	Intervention	Comparator	Confounders the study adjusted for	Outcomes	Risk of bias
Amparore (2021) Italy Study dates: 2009 - 2019 Median follow-up: 46 months Retrospective cohort study	N=116 People with cT2 renal lesions Key exclusion criteria: single kidney.	Minimally invasive partial nephrectomy (n=52)	Minimally invasive radical nephrectomy (n=64)	Unadjusted analysis	• Local recurrence • Postoperative severe adverse events • Duration of stay	Serious
An (2017) US Study dates: 2003 to 2015	N=787 People aged 65 and older with cT1-T2 renal masses.	Partial nephrectomy (n=437)	Radical nephrectomy (n=350)	Patient age, tumour diameter, ASA score, pathological stage.	• Overall survival • Postoperative severe adverse events	Serious

Study details	Population	Intervention	Comparator	Confounders the study adjusted for	Outcomes	Risk of bias
Median follow-up: 36 months Retrospective cohort study	Key exclusion criteria: single kidney, bilateral lesions.					
Bradshaw (2020) Analysis utilizing the ROSULA (RObotic SUrgery for LArge) renal mass consortium - Location of participants not specified Study dates: 2007 to 2017 Median follow-up: 33-36 months Retrospective cohort study	N=648 People with renal mass suspicious for malignancy. Key exclusion criteria: cN1+, suspected metastasis, cTb or higher.	Robot-assisted partial nephrectomy (n=216)	Minimally invasive radical nephrectomy (n=432)	Propensity score matching using age, sex, BMI, ASA, tumour size, R.E.N.A.L score.	• Overall survival • Disease free survival • Postoperative severe adverse events • Long-term severe adverse events • Duration of stay	Moderate
Breau (2020) Canada	N=1065	Partial nephrectomy (n=575)	Radical nephrectomy (n=490)	Propensity score matching using age, sex, tumour size, hospital centre, surgery	• Overall survival • Postoperative severe adverse events	Moderate (all-cause mortality >5 years,

Study details	Population	Intervention	Comparator	Confounders the study adjusted for	Outcomes	Risk of bias
Study dates: 2002 to 2010 Median follow-up: 6.9 years Retrospective cohort study	People with a renal lesion<7cm. Key exclusion criteria: metastatic cancer, dialysis in the previous year or previous kidney transplant, tumour thrombus.			type, surgery year, preoperative eGFR, ADG score, previous carotid ultrasound, previous prescription for nitrates, and previous prescription for statins.	• Cardiovascular events • Duration of stay	hospitalisation, duration of hospital stay, renal function) to serious (all-cause mortality <5 years)
Cerrato (2021) Analysis utilizing the ROSULA (RObotic SUrgery for LArge) renal mass consortium - Location of participants not specified Study dates: 2011 to 2021 Median follow-up: 24 months Retrospective cohort study	N=926 People with complex renal masses. Key exclusion criteria: cN1+, suspected metastasis, renal score <10.	Robot-assisted partial nephrectomy (n=489)	Minimally invasive radical nephrectomy (n=437)	Patient age, sex, BMI, transfusions, nuclear grade, and tumour size.	• All-cause mortality	Serious

Study details	Population	Intervention	Comparator	Confounders the study adjusted for	Outcomes	Risk of bias
Chong (2018) US Study dates: 2004 to 2013 Median follow-up: 44.5-46 months Retrospective cohort study	N=51018 People with T1a and T1b renal lesions. Key exclusion criteria: N1+ lesions, metastatic disease, any prior cancer diagnosis.	T1a: Partial nephrectomy (n=22695) T1b: Partial nephrectomy ;T1a (n=4419)	T1a: Radical nephrectomy (n=11248) T1b: Radical nephrectomy (n=12656)	Inverse probability of treatment weightings analysis to remove confounding effects of age, sex, race, Charlson score, primary insurer, income/education based on zip code, residence type (metropolitan, urban, or rural), distance to the hospital, treatment facility type (academic, community, or integrated network), tumour size (cm), and tumour laterality.	• Overall survival	Serious
Forbes (2016) Canada Study dates: 2000 to 2015 Median follow-up: 1.99 to 2.87 years Retrospective cohort study	N=2358 People with pT1 kidney cancer. Key exclusion criteria: history of RCC.	Partial nephrectomy, open, laparoscopic and robot-assisted (n=1615)	Radical nephrectomy, open, laparoscopic and robot-assisted (n=743)	Patient age, sex, pathological T stage, diagnosis year, histopathology, grade and province.	• Disease free survival • All-cause mortality	Serious

Study details	Population	Intervention	Comparator	Confounders the study adjusted for	Outcomes	Risk of bias
Gershman (2018) US Study dates: 1990 and 2011 Median follow-up: 11.1 years Retrospective cohort study	N=1953 People with cT1 renal lesions and without metastases.	Partial nephrectomy (n=808)	Radical nephrectomy (n=1145)	Propensity score matching used incorporating preoperative clinical and radiographic features (further information not reported).	• Metastases free survival • Local recurrence • Long-term severe adverse events	Moderate
Hadjipavlou (2016) UK Study dates: Dec 2012 to Jan 2021 Median follow-up: Not reported Prospective cohort study	N=1768 People with a renal lesion<7cm and confirmed malignant histology.	Partial nephrectomy, open, laparoscopic and robot-assisted (n=686)	Radical nephrectomy, open, laparoscopic and robot-assisted (n=1082)	Surgical technique	• Postoperative severe adverse events	Serious
Hamilton (2019) US and Italy Study dates: 2001 to 2015	N=1213	Partial nephrectomy (n=677)	Radical nephrectomy (n=536)	Age, BMI, medical comorbidities, tumour size, year of treatment, type of surgery,	• All-cause mortality • Postoperative severe adverse events	Serious

Study details	Population	Intervention	Comparator	Confounders the study adjusted for	Outcomes	Risk of bias
Median follow-up: 51.5 months Retrospective cohort study	People with cT1 or T2 lesions and CKD stage 2. Key exclusion criteria: T3 or T4 disease.			malignancy, de novo eGFR <45.	• Duration of stay	
Hori (2021) Japan Study dates: 1980 to 2008 Median follow-up: 95 months Retrospective cohort study	N=937 People with cT1 or T2 lesions.	Partial nephrectomy (n=157)	Radical nephrectomy (n=780)	Unadjusted analysis	• Overall survival	Serious
Janssen (2018) Germany Study dates: 1980 to 2010 Median follow-up: 93-163 months	N=123 People with clear cell renal carcinoma and renal masses ≥7cm. Key exclusion criteria: T3 or higher, non-malignant histology, laparoscopic / robotic surgery, imperative indication for partial	Open partial nephrectomy (n=18)	Open radical nephrectomy (n=105)	Age	• All-cause mortality • Recurrence • Postoperative severe adverse events	Serious

Study details	Population	Intervention	Comparator	Confounders the study adjusted for	Outcomes	Risk of bias
Retrospective cohort study	nephrectomy (e.g. single kidney).					
Kambara (2018) Japan Study dates: 1990 to 2009 Median follow-up: 54-59 months Retrospective cohort study	N=570 People with localised renal cell carcinoma where postoperative chemotherapy was not performed.	Open or laparoscopic partial nephrectomy (n=171)	Open or laparoscopic radical nephrectomy (n=399)	Demographic and clinical characteristics (further information not reported).	• Overall survival • Cardiovascular events	Serious
Klett (2021) US Study dates: 2000 to 2016 Median follow-up: 7.1 years Retrospective cohort study	N=451 People with cT2 renal lesions and baseline eGFR ≥15. Key exclusion criteria: single kidney, bilateral renal mass.	Partial nephrectomy (n=72)	Radical nephrectomy (n=379)	Propensity score matching used incorporating year of surgery, age, sex, local and constitutional symptoms, eGFR, ECOG performance status, Charlson Comorbidity Score, BMI and surgical approach, multifocality, tumour size, evidence of lymphadenopathy and cT classification.	• Metastases free survival • Overall survival • Postoperative severe adverse events	Moderate to serious

Study details	Population	Intervention	Comparator	Confounders the study adjusted for	Outcomes	Risk of bias
Kopp (2015) US Study dates: 2002 to 2012 Median follow-up: 41.5 months Retrospective cohort study	N=202 People with cT2 renal masses.	Open or laparoscopic partial nephrectomy (n=80)	Open or laparoscopic radical nephrectomy (n=122)	Unadjusted analysis	• Postoperative severe adverse events • Duration of stay	Serious
Lambertini (2024) Italy Study dates: 2013 to 2016 Median follow-up: 36 (IQR 24-48) months Prospective cohort study	N=388 People with body mass index (BMI) ≥30 kg/m^2, treated with transperitoneal approach, clinical T1 renal lesions, and preoperative eGFR >60 mL/min	Laparoscopic partial nephrectomy = 120 Robot-assisted partial nephrectomy = 145	Laparoscopic radical nephrectomy = 123	Unadjusted analysis	• Postoperative severe adverse events •	Serious
Luis-Cardo (2022) Spain	N=372 People with 2 kidneys, a single cT1 lesion and preoperative GFR of	Laparoscopic partial nephrectomy (n=216)	Radical nephrectomy (n=156)	Unadjusted analysis	• Disease free survival • All-cause mortality	Serious

Study details	Population	Intervention	Comparator	Confounders the study adjusted for	Outcomes	Risk of bias
Study dates: 2005 to 2018 Median follow-up: 57 months Retrospective cohort study	at least 60 mL/min/1.72m2.				• Postoperative severe adverse events	
Maurice (2016) US Study dates: 2003 to 2006 Median follow-up: 67 to 69 months Retrospective cohort study	N=1680 People with cT1 and T2 renal lesions, with high grade or unfavourable histology. Key exclusion criteria: pathological T3b or higher.	Partial nephrectomy (n=840)	Radical nephrectomy (n=840)	Propensity matching used. Further adjustments for age and sex.	• Overall survival	Serious
Mercimek (2021) Turkey Study dates: 2009 to 2018	N=78 Not fully reported. People undergoing laparoscopic surgery.	Laparoscopic partial nephrectomy (n=39)	Laparoscopic radical nephrectomy (n=39)	Propensity matching used, incorporating gender, clinical tumour stage, tumour size, baseline renal function, ASA score, diabetes mellitus, hypertension, coronary artery disease, and final	• Recurrence • All-cause mortality • Postoperative severe adverse events • Long-term severe adverse events	Moderate

Study details	Population	Intervention	Comparator	Confounders the study adjusted for	Outcomes	Risk of bias
Median follow-up: 28.43 to 56.05 months Retrospective cohort study				tumour pathology of renal cell carcinoma.	• Duration of stay	
Mir (2020) REnal SURgery in the Elderly - RESURGE project. 24 institutions from North America, Europe and Asia Study dates: 2000 to 2016 Median follow-up: 35 months Retrospective cohort study	N=1226 People with cT1 and T2 renal lesions, above 75 years old. Key exclusion criteria: metastatic cancer, non-malignant histology, cN1+, single kidney.	Partial nephrectomy (n=613)	Radical nephrectomy (n=613)	Propensity matching used, incorporating age at surgery, clinical T stage, Charlson score, and preoperative eGFR.	• Recurrence • Overall survival • Long-term severe adverse events	Serious
Nayan (2020) Canada Study dates: 1995 to 2014	N=5670 People with T1a renal lesions.	Partial nephrectomy (n=2503)	Radical nephrectomy (n=3167)	Age, income quintile, Charlson score, year of surgery, tumour size and histology.	• Overall survival • Cardiovascular events • Long-term severe adverse events	Serious

Study details	Population	Intervention	Comparator	Confounders the study adjusted for	Outcomes	Risk of bias
Median follow-up: 77 months Retrospective cohort study	Key exclusion criteria: people with prior nephrectomy.					
O'Malley (2015) US Study dates: 1997 to 2010 Median follow-up: 32 months Retrospective cohort study	N=108 People with high risk localised renal cell carcinoma: a localized, solitary lesion ≤7 cm in size with a normal contralateral kidney. High risk defined as pathologic stage ≥pT3 and/or Fuhrman grade ≥3. Key exclusion criteria: single kidney.	Partial nephrectomy (n=52)	Radical nephrectomy (n=56)	Propensity matching used, incorporating age, gender, smoking status, race, body mass index, Charlson index, tumour size and preoperative creatinine.	• Overall survival • Postoperative severe adverse events • Long-term severe adverse events	Serious
Reix (2018) France, US, Japan, Turkey Study dates: 2000 to 2014	N=267 People with malignant kidney lesions of pathological stage 3a or lower.	Open, robot-assisted or laparoscopic partial nephrectomy (n=91)	Robot-assisted or laparoscopic radical nephrectomy (n=176)	Age, gender, histological type, tumour size, stage pathological T stage and ASA score.	• Disease free survival • Overall survival	Moderate

Study details	Population	Intervention	Comparator	Confounders the study adjusted for	Outcomes	Risk of bias
Median follow-up: 24 months Retrospective cohort study	Key exclusion criteria: cN1+ or metastatic disease.					
Ren (2024) China (using data from USA) Study dates: 2010 to 2019 Median follow-up: 49 (95%CI: 47-50) months in the partial nephrectomy group and 54 (95%CI: 52-56) months in the radical nephrectomy group Retrospective cohort study	N=7634 People histologically confirmed with renal cell carcinoma (T1bN0M0)	Partial nephrectomy = 3817	Radical nephrectomy = 3817	Propensity score matching matched patients to the partial nephrectomy or radical nephrectomy group in a 1:1 ratio with a calibre of 0.05.	• Overall survival	Serious
Rinott (2018) Israel	N=29 People with cT2 renal lesions of at least 7cm diameter	Laparoscopic partial nephrectomy (n=13)	Laparoscopic radical nephrectomy (n=16)	Unadjusted analysis	• Local recurrence • Distant metastases	Serious

Study details	Population	Intervention	Comparator	Confounders the study adjusted for	Outcomes	Risk of bias
Study dates: 2012 to 2017 Median follow-up: 44.5 months Retrospective cohort study	undergoing laparoscopic surgery.					
Ristau (2018) US Study dates: 2004 to 2014 Median follow-up: Not reported Retrospective cohort study	N=212016 People with T1 and T2 renal cell carcinoma. Key exclusion criteria: non-malignant histology.	Partial nephrectomy (n=90076)	Radical nephrectomy (n=121940)	Age, sex, race, ethnicity, year of diagnosis, comorbidities, urban/rural hospital, tumour (T)-classification, tumour histology, tumour grade, facility location, facility type, income, education, and payer group.	• Overall survival	Serious
Takagi (2023) Japan Study dates: 2001 to 2020 Median follow-up: 34 months in the robot-	N=304 People over 70 years with sporadic renal cell carcinoma who underwent robot-assisted laparoscopic partial nephrectomy	Robot-assisted laparoscopic partial nephrectomy=260	Laparoscopic radical nephrectomy=44	Age, sex, body mass index (BMI), preoperative eGFR, tumour size, and the presence of diabetes mellitus, hypertension, and cardiovascular disease	• Overall survival • Disease-free survival • Complications (Clavien-Dindo)	Serious

Study details	Population	Intervention	Comparator	Confounders the study adjusted for	Outcomes	Risk of bias
assisted laparoscopic partial nephrectomy group and 70 months in the laparoscopic radical nephrectomy group Retrospective cohort study	or laparoscopic radical nephrectomy for stage 1 renal cell carcinoma					
Tappero (2024) 23 high-volume institutions including different countries in Europe such as Italy, France, Spain, Belgium, Austria, Netherlands, and the UK Study dates: 2010 to 2021 Median follow-up: 1 year Retrospective cohort study	N=1293 People with a single, unilateral primary renal mass, who had a cT1b-2 renal mass with no evidence of systemic disease	Partial nephrectomy=968	Radical nephrectomy=325	Age at surgery, Charlson Comorbidity Index, preoperative serum creatinine, cT stage, and PADUA score	• Renal function change (estimated glomerular filtration rate (eGFR)	Serious

Study details	Population	Intervention	Comparator	Confounders the study adjusted for	Outcomes	Risk of bias
Van den Brink (2024) Netherlands and the UK Study dates: 2010 to 2022 Median follow-up:38 months (95%CI: 17–66) in the radical nephrectomy group and 42 months (95%CI: 14-74) in the partial nephrectomy group Retrospective cohort study	N=200	Radical nephrectomy=100	Partial nephrectomy=100	A propensity score was generated including age, sex, BMI, RENAL-score, PADUA-score, ASA classification, Charlson Comorbidity Index age-adjusted (CCI-A) and preoperative eGFR	• Disease-free survival • Complications (Clavien-Dindo) • Mortality	Serious
Wang (2021) US Study dates: 2000 to 2015 Median follow-up: Not reported	N=68612 People with T1N0M0 renal cell carcinoma	Partial nephrectomy (n=27985)	Radical nephrectomy (n=40627)	Treatment- and time interval-adjusted standardised mortality ratios were calculated to assess the effects on the analysed outcomes	• Overall survival	Serious

Study details	Population	Intervention	Comparator	Confounders the study adjusted for	Outcomes	Risk of bias
Retrospective cohort study						

ASA score: American Society of Anaesthesiologists score

ADG score: John Hopkins' aggregated diagnostic group score

Risk of bias: risk of bias of reported outcomes

See appendix D for full evidence tables.

1.1.6 Summary of the effectiveness evidence

Clinical decision thresholds for minimally important differences (MIDs) were used to interpret the evidence. The line of no effect (in this case represented by 1.0) was used as a clinical decision threshold for the outcomes of disease-free survival and recurrence, overall survival and mortality, post-operative severe adverse events, renal function impairment, cardiovascular events and duration of hospital stay as detailed in the protocol. No data was identified for quality of life.

The following criteria were used to interpret the effect (column of 'Interpretation of effect' below) in the summary GRADE tables:

For outcomes without a defined MID or where the MID is set as the line of no effect evidence statements are divided into 2 groups as follows:

- We state that the evidence showed that there is an effect if the 95% CI does not cross the line of no effect.

- It is not possible from the evidence to differentiate between comparators if the 95% CI crosses the line of no effect.

Further details on GRADE assessment are described in appendix F.

Table 5 Disease-free survival and recurrence

Number of studies	Outcome	Sample size	Effect estimate	Certainty	Interpretation of effect
10 (Bradshaw 2020, Forbes 2016, Gershman 2018, Ha 2013, Luis-Cardo 2022, Nayak 2016, Oh 2014, Reix 2018, Shim 2015, Takagi 2023)	Disease-free survival	9611	HR 0.87 (0.59 to 1.26)	Very low	Could not differentiate
2 (Gershman 2018, Klett 2021)	Metastases-free survival	2404	HR 0.54 (0.39 to 0.76)	Moderate	Effect favours partial
2 (Mercimek 2023, Mir 2020)	Recurrence ≤5 years	1304	RR 0.48 (0.31 to 0.76)	Low	Effect favours partial
1 (Janssen 2018)	Recurrence >5-10 years	123	RR 0.28 (0.07 to 1.05)	Very low	Could not differentiate
1 (Scosyrev 2017)	Local recurrence - RCT	541	RR 6.11 (0.74 to 50.43)	Very low	Could not differentiate
2 (Amparore 2021, Rinott 2018)	Local recurrence - non-randomised evidence	145	RR 3.66 (0.39 to 33.98)	Very low	Could not differentiate
1 (Scosyrev 2017)	Distant metastases - RCT	541	RR 0.87 (0.30 to 2.56)	Very low	Could not differentiate
1 (Rinott 2018)	Distant metastases - non-randomised evidence	29	RR 0.24 (0.01 to 4.65)	Very low	Could not differentiate

Reasons for downgrading can be found in the full GRADE tables in appendix F.

Table 6 Overall survival and mortality

Number of studies	Outcome	Sample size	Effect estimate	Certainty	Interpretation of effect
19 (An 2017, Bradshaw 2020, Breau 2020,	Overall survival ≤5 years	296752	HR 0.75 (0.69 to 0.82)	Very low	Effect favours partial

Chong 2018 (a), Chong 2018 (b), Kambara 2018, Lai 2016, Mashni 2015, Maurice 2016, Milonas 2013, Mir 2020, O'Malley 2015, Reix 2018, Ren 2024, Ristau 2018, Ristau 2018 (d), Roos 2014, Takagi 2024, Weight 2011)					
6 (Breau 2020, Hori 2021, Klett 2021, Nayan 2020, Ristau 2018 (c), Wang 2021)	Overall survival >5-10 years non-randomised evidence	37530	HR 0.83 (0.70 to 0.99)	Very low	Effect favours partial
1 (Scosyrev 2017)	Overall survival >5-10 years RCT – All adults	541	HR 1.50 (1.04 to 2.17)	Very low	Effect favours radical
6 (Cerrato 2023, Cerrato 2023 (b), Forbes 2016, Hamilton 2019, Luis-Cardo 2022, Mercimek 2023)	All-cause mortality ≤5 years	4598	OR 0.46 (0.26 to 0.80)	Very low	Effect favours partial
3 (Janssen 2018, Luis-Cardo 2022, Van den Brink 2024)	All-cause mortality >5-10 years	695	RR 0.59 (0.45 to 0.77)	Very low	Effect favours partial

Reasons for downgrading can be found in the full GRADE tables in appendix F.

Table 7 Postoperative severe adverse events (Clavien-Dindo)

Number of studies	Outcome	Sample size	Effect estimate	Certainty	Interpretation of effect

11 (Amparore 2021, An 2017, Breau 2020, Chebbi 2017, De Saint Aubert 2018, Janssen 2018 (b), Klett 2021, Kopp 2014, Mercimek 2023, Luis-Cardo 2022, Takagi 2024)	Postoperative severe adverse events - Clavien-Dindo I-V	3718	OR 2.63 (1.45 to 4.78)	Very low	Effect favours radical
5 (Amparore 2021, An 2017, Luis-Cardo 2022, Mercimek 2023, Van den Brink 2024)	Postoperative severe adverse events - Clavien-Dindo I-II	1553	RR 1.46 (0.94 to 2.28	Very low	Could not differentiate
12 (Amparore 2021, An 2017, Bradshaw 2020, Hadjipavlou 2016, Hamilton 2019, Klett 2021, Kopp 2014, Lambertini 2024, Luis-Cardo 2022, Mercimek 2023, O'Malley 2015, Van den Brink 2024)	Postoperative severe adverse events - Clavien-Dindo III-V	6331	OR 1.84 (1.43 to 2.37)	Very low	Effect favours radical

Reasons for downgrading can be found in the full GRADE tables in appendix F.

Table 8 Renal functional impairment

Number of studies	Outcome	Sample size	Effect estimate	Certainty	Interpretation of effect
14 (Bradshaw 2020, Choi 2014, Cotta 2020, Jang 2016, Jeon 2009, Lai 2016, Mashni 2015, Mir 2020, Muhlbauer 2020, Nayan 2020, Suer	New onset eGFR <60 mL/min/1.73 m2 non-randomised evidence (HR)	29682	HR 0.30 (0.21 to 0.41)	Very low	Effect favours partial

2011, Sun 2012, Yap 2015, Yoo 2017)					
11 (Ahh 2018, Jeon 2013, Kim 2014, Kong 2013, Malcolm 2019, Mariusdottir 2013, Miyamoto 2012, O'Malley 2015, Roos 2012, Weight 2010, Wenzel 2021)	New onset eGFR <60 mL/min/1.73 m2 non-randomised evidence (OR)	3549	OR 0.12 (0.07 to 0.21)	Very low	Effect favours partial
1 (Scosyrev 2017)	New onset eGFR <60 mL/min/1.73 m2 - RCT - all adults	541	OR 0.31 (0.20 to 0.48)	Low	Effect favours partial
6 (Bradshaw 2020, Cotta 2020, Gershman 2018, Leppert 2018, Mashni 2015, Suer 2011)	New onset eGFR <45 mL/min/1.73 m2 non-randomised evidence	12750	HR 0.21 (0.10 to 0.44)	Very low	Effect favours partial
1 (Tappero 2024)	Renal function impairment: eGFR decline ≤45 ml/ min/1.73 m2 non-randomised evidence	1293	OR 0.42 (0.25 to 0.71	Very low	Effect favours partial
1 (Scosyrev 2017)	New onset eGFR <45 mL/min/1.73 m2 – RCT – all adults	541	OR 0.39 (0.27 to 0.56)	Low	Effect favours partial
3 (Chung 2018, Cotta 2020, Leppert 2018)	New onset eGFR <30 mL/min/1.73 m2 - non-randomised evidence	8500	HR 0.54 (0.22 to 1.34)	Very low	Could not differentiate

1 (Scosyrev 2017)	New onset eGFR <30 mL/min/1.73 m2 - RCT - all adults	541	OR 0.60 (0.31 to 1.16)	Very low	Could not differentiate
4 (Lin 2015, Nayan 2020, Sun 2012, Yap 2015)	New onset eGFR <15 mL/min/1.73 m2 - non-randomised evidence	22917	HR 0.85 (0.66 to 1.09)	Very low	Could not differentiate

Reasons for downgrading can be found in the full GRADE tables in appendix F.

Table 9 Cardiovascular events

Number of studies	Outcome	Sample size	Effect estimate	Certainty	Interpretation of effect
14 (Capitanio 2020, Capitanio 2019 (b), Chung 2016, Huang 2009, Hutchinson 2017, Kambara 2018, Kyung 2014, Shah 2019 (a), Shah 2019 (b), Shah 2019 (c), Shah 2019 (d), Shah 2019 (e), Shah 2019 (f), Yap 2015)	Cardiovascular events ≤5 years	28933	HR 0.80 (0.69 to 0.93)	Very low	Effect favours partial
1 (Nayan 2020)	Cardiovascular events >5-≤10 years	5670	HR 0.91 (0.62 to 1.34)	Very low	Could not differentiate

Reasons for downgrading can be found in the full GRADE tables in appendix F.

Table 10 Duration of hospital stay

Number of studies	Outcome	Sample size	Effect estimate	Certainty	Interpretation of effect
10 (Amparore 2021, Bradshaw 2020, Breau 2020, Brewer 2012, De Saint Aubert 2018,	Duration of hospital stay (days)	4525	MD -0.02 (-0.20 to 0.15)	Very low	Could not differentiate

Hamilton 2019, Kopp 2015, Margulis 2007, Mercimek 2023, Shum 2017)					

Reasons for downgrading can be found in the full GRADE tables in appendix F.

No studies reported on severe adverse events in the intraoperative period (measured according to Intraoperative Adverse Incident Classification – EAUiaiC) or quality of life (measured using EORTC Core Quality of Life Questionnaire or EuroQol-5 dimensions).

See appendix F for full GRADE tables.

1.1.7 Economic evidence

A single literature search was conducted to identify published economic evaluations of relevance to the review questions on management in this guideline (see appendix B), which includes the present review A for partial and radical nephrectomy for localised RCC, as well as reviews for non-surgical interventions for localised RCC (evidence review B), the management of locally advanced RCC (evidence review C) and the management of advanced RCC (evidence reviews H1 and H2).

This search retrieved 326 studies, and based on title and abstract screening four studies were identified as potentially relevant for any of the evidence reviews covered by the search. On review of the full text, two studies were included for evidence review B, and two studies were excluded. For details on study selection, see economic study selection flow chart in appendix G.

1.1.7.1 Summary of included economic evidence

No economic evidence was identified for the present review A on partial and radical nephrectomy for localised RCC. Two economic studies were included for evidence review B on non-surgical interventions or active surveillance in adults with localised RCC (see evidence review B for details).

1.1.7.2 Excluded studies

Two studies were excluded at full text review (see appendix J for a list of studies and reason for exclusion).

1.1.8 Economic model

No original economic modelling was conducted for this review question. However, a costing analysis was conducted to aid in recommendation making for this review question and give context of how costly each treatment option is, weighed against the outcomes in the clinical review and their potential downstream costs across the management pathway. Full details of the analysis are included in the accompanying costing report.

Cost of the procedures

To estimate the costs of partial and radical nephrectomy, there are no specific HRG codes for the procedures. Either of the procedures can be undertaken as either a laparoscopic, robot-assisted or open procedure. A weighted average cost was estimated using the relative proportion receiving each of the three surgical approaches as reported in the National Kidney Cancer Audit (2024) and the corresponding episode cost from NHS Cost Collection. Unit costs are included in Table 13. There is also not a specific HRG code for robotic surgery, and so the additional cost of this procedure relative to laparoscopic nephrectomy was estimated from Camp (2018). The cost of an appointment with a consultant following surgery is also included in these costs.

The summary results are presented in Table 11. The results suggest that the treatment cost associated with partial nephrectomy is higher than that of radical nephrectomy, although they are very similar.

Table 11: Summary of procedure costs

Surgery procedure	Type of procedure	Total cost of the procedure
Partial nephrectomy	Open: 9% Laparoscopic: 4% Robotic: 87%	£10,319
Radical nephrectomy	Open: 20% Laparoscopic: 48% Robotic: 31%	£10,226

Cost of downstream events

Monitoring of patients after treatment comprises imaging, namely CT scans, at regular intervals. Complete blood counts are taken prior to imaging. The follow-up schedule over 5 years is based on the GIRFT guidance and committee opinion, with costs of scans taken from NHS Cost Collection. Costs were estimated for each risk category, with their risk score indicating their risk of future recurrence and is based on risk scoring systems for their RCC subtype (e.g. Leibovich score for clear cell RCC).

The cost of a year of adjuvant pembrolizumab treatment was also included for people at increased risk of recurrence, which the committee suggested would be 30% of people who have had surgery. Pembrolizumab does have a confidential price which has not been included here, and so this cost after surgery is an overestimate of the true cost.

Downstream costs associated with recurrences are estimated using the distribution of treatments for stages III and IV RCC as reported by Rossi et al. (2021) for local and distant recurrences, respectively. The committee suggested that 85% of distant recurrences would be treated with systemic therapies, with costs of the systemic therapy pathway extracted from the recent NICE appraisal TA962.

Table 12: Estimated cost of downstream events

Downstream resource	Costing approach	Total cost
Adjuvant treatment	Assume 30% receive adjuvant pembrolizumab. Cost per vial: £2,630. Administration cost per dose: £398. Dose given every 3 weeks.	Total 1-year cost: £29,522
Follow up	CT scan with contrast of three areas.	Total 5-year cost: Low risk: £378 Intermediate risk: £757 High risk: £1,009

	Low risk: 3 total scans Intermediate risk: 6 total scans High risk: 8 total scans	
Recurrence	Local recurrence: 51% managed by open nephrectomy, 49% by laparoscopic nephrectomy. Distant recurrence: 85% systemic therapy, 37% cytoreductive nephrectomy, 12% radiotherapy, 17% metastasectomy.	Cost per local recurrence (5-year cost): £14,649 Cost per distant recurrence (1-year cost): £77,342 Note that these costs apply onto to those who experience recurrence, see Section 1.1.6 for relative effectiveness evidence.

1.1.9 Unit costs

Unit costs of interventions are listed in Table 13.

Table 13: Unit costs of interventions

Resource	Unit cost	Source
Open nephrectomy	£10,142.10	NHS Cost Collection (2024). Weighted average of codes LB61C-G, Major, Open or Percutaneous, Kidney or Ureter Procedures, 19 years and over
Laparoscopic nephrectomy	£9,970.10	NHS Cost Collection (2024). Weighted average of codes LB62C-D, Major Laparoscopic, Kidney or Ureter Procedures, 19 years and over
Robot-assisted nephrectomy	£10,172.87	Ratio of robotic to laparoscopic partial nephrectomy cost estimated from Camp et al. (2018), calculated as £4,444 / £4,356 = 1.02. Ratio applied to the laparoscopic nephrectomy unit cost to estimate the robotic nephrectomy unit cost.

1.1.10 The committee's discussion and interpretation of the evidence

Evidence review A (the current review) and evidence review B which compares surgical and non-surgical treatments are linked. The committee's discussion about the evidence for the two reviews contains some overlapping content which is reproduced in both reviews for completeness.

The committee discussed the terminology around nephrectomy and that whilst the evidence identified refers to "radical nephrectomy", the committee preferred to use the term "total nephrectomy" as it is generally more acceptable to people with renal cell carcinoma (RCC). So, the term "total nephrectomy" has been used in the committee's discussion and interpretation of the evidence and in the recommendations. The term "radical nephrectomy" is still used in other sections of this evidence review to reflect the evidence.

1.1.10.1. The outcomes that matter most

The committee discussed the outcomes specified in the protocol. They agreed that the most important outcomes for this review were survival, recurrence, and quality of life. In their experience, concerns about survival, how likely the cancer is to recur (locally or distant), and the likely quality of their life after surgery are usually at the forefront of people's minds in conversations about treatment options for localised kidney cancer.

Of importance, but less so than the outcomes above, are severe adverse events in the intraoperative and postoperative period, and long term severe adverse events. These outcomes may inform people's quality of life and health status in the short and long term and may still play an important role in deciding which treatment option is best for individuals. Duration of hospital stay is also important both for individuals, and also as an indicator of resource impact of the treatment.

1.1.10.2 The certainty in the evidence

Overall, the outcomes ranged from moderate (for one outcome) to very low certainty, with the majority being very low certainty. Some evidence, particularly survival outcomes, duration of hospital stay and outcomes with lower numbers of participants, was rated as imprecise as the 95% confidence interval crossed the line of no effect. Meta-analyses with fewer than 1,300 participants for survival or 420 participants for other outcomes were also downgraded for imprecision as there were likely to be too few participants to reliably detect an effect.

The majority of the evidence for this review comes from non-randomised studies, with only one RCT included. Outcomes from the included RCT ranged from moderate to very low certainty mainly due to risk of bias (insufficient information on outcome assessor blinding) and inconsistency (as the study could not be combined with others in meta-analysis). The study also had poor accrual and therefore closed early, leading to low power to detect a treatment effect. The committee outlined minor concerns about applicability to current practice, acknowledging that more partial nephrectomies are carried out for treating localised renal cell carcinoma now than when the RCT was recruiting between 1992 and 2003. They acknowledged that developments to current practice may also affect the applicability of older cohort studies but agreed that there was not a clear cut-off date to use for study inclusion. The committee agreed that the indirectness was insufficient to downgrade for, and that the RCT was likely to be at much lower risk of bias than the included cohort studies due to reduced confounding as a result of randomisation.

The committee agreed that, although the systematic reviews (SRs) were judged to be at moderate or high risk of bias, they should still be used for this review as the risk of bias came mainly from a lack of clarity in reporting rather than evidence of methodological flaws (see the methods and process section for more information about risk of bias of included studies and how this was managed).

Outcomes from the included cohort studies ranged from moderate (one outcome only – metastases-free survival) to very low certainty. The committee were concerned about confounding, as selection for partial or total nephrectomy is based on characteristics of the individual and the lesion which will also impact on outcomes. Total nephrectomy may be more likely when lesions are larger, more complex and more aggressive. Partial nephrectomy may be more likely when people already have or are likely to develop reduced renal function or have smaller or more well-defined lesions. These factors lead to systematic differences between arms, which the committee agreed meant the partial nephrectomy group would be more likely to have better outcomes than the total nephrectomy group. However, they noted that the cohort studies often included far larger numbers of participants than

would be possible in an RCT, and that most cohort studies had made attempts to control for confounding where adjusted effect measures were presented. The inclusion of patients treated in routine clinical practice in these cohort studies also reflects the diversity of patients treated in real-world settings.

The committee noted that some of the included studies conducted in North America performed surgery for very small lesions ≤2cm. Although more recent guidance suggests active surveillance rather than surgery for lesions of this size (Urology: Towards better care for patients with kidney cancer, GIRFT 2023), the committee agreed that some people preferred to have surgery to remove the mass. They therefore agreed that these studies were still relevant, despite being published before the GIRFT guidance.

It was not possible to carry out most of the pre-planned subgroup analysis due to most studies including participants from all subgroups or providing insufficient detail to categorise participants. Studies did not report the outcomes by any of the characteristics identified in the equalities and health inequalities assessment. Most studies did not limit participants by age, with only two studies limiting to older adults (Mir et al. 2020 to adults aged 75 and over; An et al. 2017 to adults aged 65 and over). However, the mean age of participants in the other studies was not dissimilar, ranging from 57 to 65 years old. Several studies included only laparoscopic surgery (Luis-Cardo et al. 2022, Rinott et al. 2018 and Mercimek et al. 2023) while others included laparoscopic and robot-assisted (Amparore et al. 2021, Bradshaw et al. 2020, Cerrato et al. 2023, Lambertini et al. 2024 and Takagi et al. 2024) or open surgery only (Janssen et al. 2018), but the majority used registry data which did not report data on specific surgical techniques and is likely to include all techniques. While technique-specific results would have been useful, particularly for postoperative complications, the committee indicated that in England and Wales, laparoscopic procedures are now much more common than open procedures, and that a large proportion of partial nephrectomies are robot-assisted. Subgrouping by TNM stage was undertaken for meta-analyses with a sufficient number of studies spread across the groups (see benefits and harms section for detail).

The committee noted that there were important gaps in the evidence. As well as a lack of evidence about intraoperative serious adverse events, no studies reported on quality of life using the questionnaires specified in the review protocol. However, the committee agreed that there was enough available evidence and experience to draw on to make recommendations about surgery for localised RCC, and so they chose not to make a research recommendation in this area. Studies did not specify whether the participants had lesions which were solid or cystic, although as participants had either suspected or confirmed RCC, the committee agreed it was unlikely that many participants had Bosniak 1, 2 or 2F cysts. For further discussion about Bosniak 3 and 4 cysts, see the section on drafting the recommendations.

1.1.10.3 Benefits and harms

For most of the evidence for disease recurrence it was not possible to differentiate between partial and total nephrectomy. The committee agreed that although this is not proof of equivalence, this evidence reflected their experience and current clinical understanding. They agreed that the two outcomes for which partial nephrectomy had better results than total nephrectomy (metastases-free survival [MFS]: HR 0.54, 95% CI 0.39, 0.76, and recurrence ≤5 years: RR 0.48, 95% CI 0.31, 0.76) were likely to be biased towards partial nephrectomy:

- Both studies contributing to MFS (Klett et al. 2021, Gershman et al. 2018) displayed an imbalance in benign lesions between groups, with more benign lesions in the

partial nephrectomy arms. Supplementary information presented in Gershman et al. (2018) showed that when benign lesions were excluded from the analysis, there was no statistical difference between the two arms for development of distant metastasis. The committee also agreed that the total nephrectomy arm may have had higher numbers of metastases at follow up because higher grade cancer is more likely to be selected for total nephrectomy.

- The partial nephrectomy group in Mir et al. (2020), contributing to recurrence ≤5 years, had fewer participants with a high American Society of Anaesthesiologists (ASA) score, indicating that they may have been healthier overall than the total nephrectomy arm.

The committee heard evidence that survival, the outcomes for which were all of very low certainty mainly due to risk of bias and inconsistency, was generally increased after partial nephrectomy compared to total nephrectomy. This was with the exception of overall survival as reported in the RCT, which was increased after total nephrectomy (HR 1.50, 95% CI 1.04, 2.17 for partial nephrectomy compared to total nephrectomy). The committee noted that the RCT presented a sensitivity analysis including only people with confirmed RCC, and that there were no statistically significant differences between arms for overall survival in this subgroup (HR 1.43, CI not reported but test for superiority was not significant $p = 0.07$), although this may have been due to low sample size and an effect not reaching statistical significance. They also noted that all survival outcomes were of very low certainty. Taking all this information into account and using their clinical experience, they agreed that there was unlikely to be a meaningful difference in survival between the two interventions.

Evidence about postoperative severe adverse events was of very low certainty mainly due to risk of bias and inconsistency. Total nephrectomy had fewer postoperative complications overall (OR 2.63, 95% CI 1.45, 4.78), and also fewer major postoperative complications, compared with partial nephrectomy (OR 1.84, 95% CI 1.43, 2.37). The committee noted that partial nephrectomy is usually considered to be a more complex surgery which may take longer to complete and is associated with higher rates of complications. They acknowledged that across the included studies, 3.65% of participants in the total nephrectomy arm experienced a major postoperative adverse event, compared with 8.15% of participants in the partial nephrectomy arm. They expressed the importance of taking into account risk of postoperative serious adverse events alongside the potential benefits of partial nephrectomy when discussing treatment choices with individuals, as risk of complications may depend on the individual's baseline health status, comorbidities and other factors.

Evidence on renal functional impairment ranged from low certainty (for RCT evidence) to very low certainty (for cohort evidence), due mainly to risk of bias and inconsistency. The committee agreed that although statistical heterogeneity was high, all results were in the same direction of effect for new onset eGFR <60 and <45 mL/min/1.73 m2, increasing their confidence in the evidence. The committee agreed that the evidence indicated better renal functional outcomes for people who had partial nephrectomy relative to total nephrectomy. They noted that the lower thresholds (eGFR <30 and <15 mL/min/1.73 m^2) were of greater clinical importance than the higher (eGFR <60 and <45) thresholds, as they reflected a more meaningful and life-changing level of kidney disease. They agreed that although it was not possible from the results to differentiate between the two types of surgery for new onset eGFR of <30 (cohort evidence: HR 0.54, 95% CI 0.22, 1.34, RCT evidence: 0.60, 9% CI 0.31, 1.16) or <15 mL/min/1.73 m^2 (cohort evidence: HR 0.85, 95% CI 0.66, 1.09), this may be due to bias in the included studies. People with new onset <30 or <15 mL/min/1.73 m^2 eGFR were likely to have had low eGFR at baseline, and therefore would be more likely to be selected for partial nephrectomy with the intent of retaining as much kidney function as

possible. They therefore agreed that where preservation of renal function was a priority, partial nephrectomy would be preferred.

The evidence on cardiovascular events was of very low certainty due mainly to risk of bias and inconsistency. Studies reporting timepoints up to 5 years suggested better outcomes for partial nephrectomy compared with total nephrectomy (HR 0.80, 95% CI 0.69, 0.93) but it was not possible to differentiate between the interventions between 5 and 10 years (HR 0.91, 95% CI 0.62, 1.34). The committee noted that the outcomes combined in meta-analysis were heterogeneous and included new onset hypertension, myocardial infarction, stroke, and requirement for new or additional hypertensive medication. Heterogeneity, combined with very low certainty evidence and uncertain biological mechanisms for any effect, contributed to the committee's decision not to base recommendations on this evidence.

It was not possible from the very low certainty evidence on duration of hospital stay in days to differentiate between partial and total nephrectomy (MD -0.02, 95% CI -0.20, 0.15). The committee agreed that length of hospital stay was likely to be affected more by surgery technique (open vs laparoscopic) than type of nephrectomy.

The following subgroup data were discussed by the committee:

- Disease-free survival, overall survival and major postoperative complications showed no subgroup differences.

- All-cause mortality ≤5 years demonstrated subgroup differences (p=0.006), but this is likely to have been driven by the T1 and T2 combined subgroup, rather than differences between the T1 and T2 subgroups (see appendix E for forest plots).

- Overall postoperative complications (Clavien-Dindo I-V) and minor postoperative complications (Clavien-Dindo I-II) demonstrated subgroup differences (p=0.02 and p=0.002 respectively). Both analyses showed statistically significantly fewer postoperative complications with total nephrectomy compared with partial nephrectomy in the T2 subgroup. There was a non-statistically significant result in the T1 subgroup for Clavien-Dindo I-V but statistically significantly fewer postoperative complications with total nephrectomy compared with partial nephrectomy in the T1 subgroup for Clavien-Dindo I-II. However, in both these cases there was overlap between the confidence interval for the T1 and T2 subgroups. For overall postoperative complications, statistical heterogeneity within the T2 subgroup shows that heterogeneity in the overall analysis is not explained by TNM stage. For minor postoperative complications the T2 subgroup was contributed to by a single study. These factors all contributed to the committee's doubt about the robustness of the subgroup results.

In the absence of data on quality of life and due to partial and total nephrectomy having different benefits and harms, the committee considered it vital to discuss patient experience and quality of life. The committee noted that the PARTIAL trial, which is currently recruiting, will report on quality-of-life measures. The committee included lay members who were able to bring their own and others' personal experiences, from patient networks they are involved in, into the discussion. They agreed that survival and recurrence outcomes were usually of greatest importance to people with RCC, who may want to prioritise removing all the cancer as soon as possible and may place less importance on risks of complications or longer-term renal function as these sometimes feel secondary. They reported concern among people with RCC that partial nephrectomy is more likely to leave cancer behind, but the committee noted that the evidence indicates that partial and total nephrectomy are likely to be similarly

effective in terms of survival and recurrence, despite the higher risk of positive lesions margins in partial nephrectomy, bearing in mind that most of the included studies reflected real world selection of participants into partial and total nephrectomy.

Although it was noted that people with RCC sometimes place less importance on risks of complications or longer-term renal function, lay members reminded the committee how life altering some impacts of surgery could be, particularly if the person needs dialysis because of reduced kidney function. The committee agreed that different people will make different decisions about what is important to them, and that clearly communicating the benefits and harms of both partial and total nephrectomy in a balanced way was important to support shared decision making.

Drafting the recommendations

The included studies did not specify whether the participants had lesions which were solid or cystic. The committee agreed that people with Bosniak 3 and 4 cysts have an increased chance of malignancy compared with Bosniak 1 and 2 cysts. They agreed that, for Bosniak 4 cysts, management should be similar to management of solid masses. Bosniak 3 cysts should be managed differently because they lack a solid component and have a lower chance than Bosniak 4 cysts of being malignant. The committee's discussion about management options for Bosniak 3 cysts can be found in evidence review B. Due to the lack of published evidence, the committee used their own experience to include people with Bosniak 4 cysts in these recommendations.

Based on the evidence discussed above and in review B, and their clinical expertise and experience, the committee agreed that surgery is the most effective option for people with suspected or confirmed RCC where they have a lesion that is resectable. (See review B on non-pharmacological interventions and active surveillance, which looks at these management options compared to each other and surgery, for information about the committee's ranking of these options.) They therefore made a strong recommendation that surgery should be offered to all people with solid renal masses, and Bosniak 4 cysts, 2 cm and larger. They also noted that although 4 cm in diameter is often the maximum size cut off used for partial nephrectomy, there is little evidence to support this, and the decision should be driven by the renal lesion's complexity. They agreed that the decision to perform surgery should only be made after the person has had imaging for staging and diagnosis and discussions with the multidisciplinary team. They noted that, where possible, people should also have had a biopsy to confirm malignancy before surgery, but surgery can be carried out without this information if the person declines the biopsy. Information about biopsy, and the recommendations the committee made in this area, is available in evidence review J.

The committee noted that partial nephrectomy is almost always performed using minimally invasive approaches, particularly robot-assisted, in current practice. Based on their experience and expertise, they recommended that the partial nephrectomy is preferably robot assisted because this allows the intracorporeal dexterity for resection and suturing that are needed in a partial nephrectomy. For total nephrectomy, minimally invasive techniques are less invasive than open nephrectomy and result in lower blood loss and more rapid recovery. These include laparoscopic or robotic-assisted laparoscopic approaches.

In the absence of clear evidence on how to choose between the procedures, the committee agreed that the decision between a partial and total nephrectomy would depend on the lesion and person's clinical characteristics, as well as the person's circumstances and preferences (see the section on other factors the committee took into account for more about circumstances and preferences). They decided to highlight the main points that needed to be

taken into account when making this decision in a table. They agreed that partial nephrectomy is usually carried out where the lesion can be entirely removed using this procedure, and where there are no significant concerns about the higher risk of complications arising from partial nephrectomy compared with total nephrectomy. They also noted that the use of partial nephrectomy is particularly important to retain kidney function and avoid the need for dialysis where the person has only one functioning kidney, lesions on both kidneys, or reduced kidney function. They therefore agreed that partial nephrectomy is preferable where these conditions are met. In contrast total nephrectomy would be the preferred option where a partial nephrectomy is not possible or in situations where reducing the risk of complications is more important than preserving kidney function. The committee agreed that complexity may affect decisions about whether partial or total nephrectomy are offered but decided not to mention specific tumour complexity scores (such as the RENAL nephrometry score or the PADUA score) as they are mainly used in research.

The committee agreed that although it was rare for a need for dialysis to be expected after interventions for localised RCC, liaising with local renal services if this was the case would be important to enable renal services to initiate vascular access planning and pre-dialysis counselling. They made a recommendation on this topic based on their expertise and experience. The committee also included a cross reference to the NICE guideline on perioperative care which provides guidance on preparing for surgery, keeping people safe during surgery and pain relief during recovery and enhanced recovery programmes.

Based on the evidence discussed above, and evidence in review B, the committee also made recommendations for managing lesions under 2 cm that include surgery as an option but ranked below active surveillance. They acknowledged that, due to the small size of the lesions, surgery is not always possible and that other management options such as active surveillance may be more suitable. The committee included some factors to take into account when making the decision between surgery and other types of non-pharmacological management options in an overarching recommendation that applies to all lesion sizes. These factors included the lesion and person's clinical characteristics as well as issues relating to specific treatment options. (See the committee discussion section in evidence review B on non-pharmacological interventions and active surveillance, which looks at these management options compared to each other and surgery for more details.)

1.1.10.4 Cost effectiveness and resource use

No economic evaluations were identified which addressed the cost effectiveness of partial nephrectomy compared with total nephrectomy.

Given this lack of formal economic evidence, the committee used their expertise to discuss the relative resource use associated with each type of procedure and the associated impact on downstream events, such as managing recurrence or poor kidney function. This discussion was informed by a costing analysis conducted by NICE.

In the committee's experience, partial nephrectomies may take longer, there are more intraoperative complications, and they require more specialised staff than total nephrectomies. They noted that partial nephrectomy is only done in specialist multidisciplinary team (SMDT) referral centres. There may also be increased resource use associated with the higher risk of postoperative adverse events for partial nephrectomies. The costing analysis estimated that the costs of partial and total nephrectomy were very similar, but the committee noted that the way in which costs are recorded for these procedures may mean that differences in cost are not possible to be captured.

NHS Cost Collection reports the cost of laparoscopic and open nephrectomies rather than partial and total nephrectomies, and so it is not possible to capture whether a laparoscopic partial nephrectomy has a different cost to a laparoscopic total nephrectomy.

The committee noted that there were challenges with assigning costs to robotic surgery procedures, and that they would expect a larger difference in total episode cost between robot-assisted nephrectomy and other surgical approaches given the number of staff required and cost of consumables (e.g. acquiring and maintaining the robot). Currently, nephrectomies are usually implemented robotically, which is supported by data collected in the latest National Kidney Cancer Audit (NKCA) report showing that in England, robotic procedures accounted for 87% of partial nephrectomies and 31% of total nephrectomies. A recently published NICE health technology evaluation of robot-assisted surgery for soft tissue procedures estimated that the additional staff time cost for these procedures is £389, however the other costs and resource use such as the amount of additional staff time required associated with robot-assisted procedures were not publicly available. The analysis also applied to all soft tissue procedures not just nephrectomy, and the costs used for laparoscopic and open procedures were not comparable to the NHS reference costs we identified for nephrectomies, so we did not incorporate these findings into our estimate for cost of robot-assisted nephrectomy.

While partial nephrectomies may be associated with higher short term costs and potentially greater resource use, there may be reduced longer term costs and improved patient outcomes for partial nephrectomies compared with total nephrectomies, if more kidney function is retained to delay or prevent the need for dialysis or kidney transplant.

These recommendations may result in an increase in use of partial nephrectomy in place of total nephrectomy. While there may be an impact on resource requirements in the short term, some of this may be offset by potential cost savings associated with preserving kidney function over time.

1.1.10.5 Other factors the committee took into account

The committee was aware of and contributed to the Equality and Health Inequalities Impact Assessment for this guideline. They noted that health inequalities impact on the prevalence and incidence of kidney cancer, and also on people’s access to and choice of treatment for localised RCC.

The committee agreed that partial nephrectomy, including robot-assisted partial nephrectomy, should currently be accessible to everyone who is eligible and choosing partial nephrectomy should not result in delays to treatment. However, they acknowledged that choosing partial nephrectomy would likely mean travelling to specialist or tertiary care centres and that this may present difficulties for some people due to mobility issues, caring responsibilities, and the cost and availability of transport. Although the committee noted the short hospital stays and low risk of complications in specialist centre, they agreed it may also make it difficult to be accompanied or visited by a carer, spouse or family and that this may negatively impact the patient’s experience in the immediate post-operative recovery period. These factors may effectively limit the available treatments for some individuals, and particularly those who are older or disabled.

The committee agreed that information about the benefits and harms of partial and total nephrectomy need to be presented in a way that is accessible for people with a range of needs. They acknowledged that some people would need additional support to assess their treatment options and decide which is right for them. For example, people with learning

disabilities may need information to be provided in an easy read format and to have an advocate involved in these discussions. To help people with RCC to make informed decisions about their own health, the committee included cross references to particularly relevant sections of some core NICE guidelines (the NICE guideline on Patient experience in adult NHS services and the NICE guideline on shared decision making) in the information section of the guideline. In addition, as part of review B on non-pharmacological interventions and active surveillance, the committee also drafted a recommendation to support shared decision making when deciding between surgery and non-surgical management options (see review B for more details).

As part of evidence review D, the committee drafted a recommendation listing things to be discussed with the person with a renal lesion before surgery for RCC. (See evidence review D on information needs for more discussion about the contents of this recommendation and the supporting evidence.) They also included cross references to information developed by the NHS and Kidney Cancer UK for before and after surgery, and the section of the GIFT guideline with an example of patient information:

- section 7.4 (example patient information) in the Getting It Right First Time (GIRFT) guide Urology: Towards better care for patients with kidney cancer
- Kidney Cancer UK and GIRFT resource Kidney Cancer Fact Sheet: Consent Consultation General Information – Planning for Surgery and Beyond
- Kidney Cancer UK and GIRFT resource Kidney Cancer Fact Sheet: Post Nephrectomy and Follow Up.

The committee were aware of the National Kidney Cancer audit that will report information about what treatments are being conducted for localised RCC and where there is variation in practice in the UK. They also referenced the Getting it Right First Time (GIRFT) report (Urology: Towards better care for patients with kidney cancer), which recommends partial nephrectomy over total nephrectomy if technically and oncologically safe for people with T1a and T1b lesions (other management options are also recommended for people with T1a lesions, and these are covered in review B on non-pharmacological interventions and active surveillance). The committee chose not to specify stage in their recommendations because this is only one of several factors informing the choice of treatment. Instead, the focus was on lesion and patient characteristics, but the committee agreed that their recommendations were aligned with the GIRFT guidance, which is NHS approved.

1.1.11 Recommendations supported by this evidence review

This evidence review supports recommendations 1.5.3 to 1.5.5. Other evidence related to these recommendations can be found in the evidence review on management of localised renal cell carcinoma using non-surgical interventions or active surveillance (evidence review B) and information needs (evidence review D).

1.1.12 References – included studies

1.1.12.1 Effectiveness

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Van Poppel, Hendrik, Da Pozzo, Luigi, Albrecht, Walter et al. (2007) A prospective randomized EORTC intergroup phase 3 study comparing the complications of elective nephron-sparing surgery and radical nephrectomy for low-stage renal cell carcinoma. European urology 51(6): 1606-15

1.1.12.2 Economic

No economic evidence was identified for this review.

1.1.12.3 Other

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Appendices

Appendix A – Review protocol

Effectiveness review protocol

ID	Field	Content
1.	Review title	Clinical and cost-effectiveness analysis comparing partial versus radical nephrectomy in adults with localised renal cell carcinoma (RCC)
2.	Review question	What is the clinical and cost effectiveness of partial compared with radical nephrectomy in adults with localised renal cell carcinoma and for whom and under what circumstances is partial or radical nephrectomy most suitable?
3.	Objective	To evaluate the effectiveness, safety, and cost effectiveness of partial versus radical nephrectomy for treating adults with localised RCC and to determine for whom and under what circumstances partial or radical nephrectomy may be most suitable.
4.	Searches	The following databases will be searched: • Cochrane Central Register of Controlled Trials (CENTRAL) • Cochrane Database of Systematic Reviews (CDSR) • Embase • MEDLINE • Epistemonikos • INAHTA For the economics review the following databases will be searched: • Embase • MEDLINE • Medline in Process • Medline EPub Ahead of Print • Econlit • HTA (legacy records)

		• NHS EED (legacy records) • INAHTA Searches will be restricted by: • OECD countries • Date limitations: None • English language • Human studies • Abstracts, conference presentations and theses will be excluded The full search strategies for MEDLINE database will be published in the final review.
5.	Condition or domain being studied	Localised renal cell carcinoma
6.	Population	Adults (18 years or over) with (histologically confirmed or suspected on imaging) localised RCC and where nephrectomy is indicated or planned. Localised RCC diagnosis can be defined according to the clinical or pathological TNM classification, stage 1 and stage 2. Exclusion: • Adults with localised RCC who are deemed unsuitable for nephrectomy • Adults with locally advanced and advanced RCC (inoperable or metastatic) Initially, the RCC diagnosis may be based on the tumour appearance in the imaging test, such as the CT scan. Later, the diagnosis is confirmed histologically by biopsy or when the tumour or entire kidney is removed during surgery. Once RCC is diagnosed, the next step is to determine its stage, which helps to guide treatment and can help predict the long-term outlook.

7.	Intervention	Partial nephrectomy, including open, laparoscopic, and nephron-sparing surgery, using robotic-assisted surgery or not.
8.	Comparator	Radical nephrectomy, including open or laparoscopic surgery, using robotic-assisted surgery or not.
9.	Types of study to be included	Systematic reviews of RCTs and RCTs are preferred where available for a comparison. Where RCTs are not available for a comparison, systematic reviews of non-randomised comparative studies and primary non-randomised comparative studies published after the systematic reviews will be considered. Where good quality systematic reviews of non-randomised studies are identified, these may be used completely or as a source of references (limited to cohort studies only), depending on applicability. Where individual primary non-randomised comparative studies are included to update a good quality systematic review or where a full evidence review is required, these will be limited to prospective and retrospective cohort studies.
10.	Other exclusion criteria	• Abstracts, conference presentations and theses • Non-human studies • Non-English language studies
11.	Context	There is currently no national guideline in the UK on the diagnosis and treatment of kidney cancer and audit data indicates variation in the clinical practice within NHS. Stakeholders identified this gap and NICE was commissioned to develop a guideline on kidney cancer by NHSE. This review aims to address variation in practice for nephrectomy by identifying which people with localised renal cell carcinoma may benefit from partial nephrectomy e.g. through retaining renal function compared to radical nephrectomy.

12.	Outcomes	• Disease-free survival, including cancer-free survival (time to event data) Some studies may report disease-free survival as the local recurrence or distant metastases (dichotomous data or time to event data). These will be extracted as proxy outcomes where survival data is not reported in the studies. • Overall survival (time to event data) Some studies may report overall survival as death or mortality. These will be extracted as proxy outcomes where survival data is not reported in the studies. • Severe adverse events and complications reported as: o observed in the intraoperative period (measured according to Intraoperative Adverse Incident Classification – EAUiaiC; dichotomous data) o observed in postoperative period (measured according to Clavien-Dindo Classification of Surgical Classifications at 30-days and 90-days after surgery; dichotomous data) • Long-term severe adverse events o Renal function impairment measured by estimated glomerular filtration rate (eGFR; dichotomous or continuous data) o Cardiovascular events (dichotomous data) • Duration of hospital stay (continuous data) • Quality of life using: o EORTC Core Quality of Life Questionnaire (EORTC QLQ-C30; (dichotomous or continuous data)) o EuroQol-5 dimensions (EQ-5D; (dichotomous or continuous data)) • • **Minimal important differences** • Any statistically significant difference will be used for the following outcomes: o Disease-free survival o Severe adverse events and complications

		○ Long-term adverse events ○ Duration of hospital stay ○ Quality of life using EORTC QLQ-C30 • MIDs for the following quality of life measure was identified in the literature: • EQ-5D: 0.08 for UK-based scores and 0.07 for VAS scores
13.	Data extraction (selection and coding)	All references identified by the searches and from other sources will be uploaded into EPPI reviewer and de-duplicated. 10% of the abstracts will be reviewed by two reviewers, with any disagreements resolved by discussion or, if necessary, a third independent reviewer. The full text of potentially eligible studies will be retrieved and will be assessed in line with the criteria outlined above. A standardised form will be used to extract data from studies (see Developing NICE guidelines: the manual section 6.2). Study investigators may be contacted for missing data where time and resources allow. This review may make use of the priority screening functionality within the EPPI-reviewer software. If priority screening is used, the following rules will be adopted to determine when to stop screening: • at least 50% of the identified abstracts (or 1,000 records, if that is a greater number) will be screened • After this point, screening is only terminated if a threshold of 750 is met for a number of abstracts being screened without a single new include being identified. • if sifting is terminated before the full database has been looked at additional checks will be carried out to ensure that relevant studies have not been missed.
14.	Risk of bias (quality) assessment	Risk of bias will be carried out using the preferred checklists as described in Appendix H of Developing NICE guidelines: the manual. The risk of bias for RCTs will be assessed using the Cochrane Risk of Bias v.2.0 checklist and for systematic reviews, the Risk of Bias in Systematic Reviews (ROBIS) tool will be used. The risk of bias for non-RCT studies will be assessed using the Cochrane Risk Of Bias In Non-randomized Studies - of Interventions (ROBINS-I) tool.
15.	Strategy for data synthesis	Where possible, meta-analyses will be conducted to combine the results of quantitative studies for each outcome. RCT and non-RCT data will be pooled separately.

		Where data can be disambiguated it will be separated into the subgroups identified in section 17 (below). Pairwise meta-analyses will be performed in Cochrane Review Manager V5.3. Continuous outcomes will be analysed as pooled mean differences (using the inverse variance method) unless multiple scales are used to measure the same factor. In these cases, standardised mean differences will be used instead. Where different studies present continuous data measuring the same outcome but using different numerical scales (e.g. a 0-10 and a 0-100 visual analogue scale), these outcomes will all converted to the same scale before meta-analysis is conducted on the mean differences. Pooled relative risks will be calculated for dichotomous outcomes (using the Mantel–Haenszel method) reporting numbers of people having an event. Absolute risks will be presented where possible. Hazard ratios will be pooled using the generic inverse-variance method. Adjusted, unadjusted and partially adjusted hazard ratios will be pooled. Sensitivity analysis will be carried out to look at the effect of removing partially and unadjusted studies. For survival outcomes, time-to-event data is preferred. Where this data is not available, relative risks will be calculated for proxy outcomes as described in section 12. Fixed- and random-effects models (der Simonian and Laird) will be fitted for all outcomes, with the presented analysis dependent on the degree of heterogeneity in the assembled evidence. Fixed-effects models will be deemed to be inappropriate if one or both of the following conditions are met: Significant between-study heterogeneity in methodology, population, intervention, or comparator was identified by the reviewer in advance of data analysis. The presence of significant statistical heterogeneity in the meta-analysis, defined as $I^2 \geq 50\%$. GRADE will be used to assess the quality of the outcomes. Data from randomised controlled trials and non-randomised comparative trials will be initially rated as high quality where they come from: • RCTs and systematic reviews of RCTs (where individual studies have been quality assessed using Cochrane risk of bias) • non-randomised comparative trials and systematic reviews of non-randomised studies (where individual studies have been quality assessed using the ROBINS-I assessment tool)

<table>
<tr><td></td><td></td><td>The quality of the evidence for each outcome will then be downgraded or not from this starting point based on the other GRADE domains.

To assess imprecision, where there are no defined MIDs we will set the MID as the line of no effect for all outcomes (1.0 for dichotomous outcomes and 0 for continuous outcomes). A second decision threshold will be applied where the sample size is sufficiently small that it is not plausible any realistic effect size could have been detected.

Where 10 or more studies are included as part of a single meta-analysis, a funnel plot will be produced to graphically (visually) assess the potential for publication bias.</td></tr>
<tr><td>16.</td><td>Analysis of sub-groups</td><td>Where the data allows, subgroup analyses may be conducted to explore heterogeneity considering the following:
surgery technique used (e.g. open vs laparoscopic or robotic),
age,
by TNM classification,
by primary RCC type e.g. clear cell, papillary, chromophobe
renal function at baseline, and
performance status of the person at baseline (e.g. ECOG and Karnofsky).</td></tr>
<tr><td>17.</td><td>Type and method of review</td><td>X Intervention
Diagnostic
Prognostic
Qualitative
Epidemiologic
Service Delivery
Other (please specify)</td></tr>
<tr><td>18.</td><td>Language</td><td>English</td></tr>
<tr><td>19.</td><td>Country</td><td>England</td></tr>
<tr><td>20.</td><td>Anticipated or actual start date</td><td>April 2024</td></tr>
<tr><td>21.</td><td>Anticipated completion date</td><td>March 2026</td></tr>
<tr><td rowspan="5">22.</td><td rowspan="5">Stage of review at time of this submission</td><td>Review stage</td><td>Started</td><td>Completed</td></tr>
<tr><td>Preliminary searches</td><td></td><td>X</td></tr>
<tr><td>Piloting of the study selection process</td><td></td><td>X</td></tr>
<tr><td>Formal screening of search results against eligibility criteria</td><td></td><td>X</td></tr>
<tr><td>Data extraction</td><td></td><td>X</td></tr>
</table>

		Risk of bias (quality) assessment		X
		Data analysis		X
23.	Named contact	**Named contact** Centre for Guidelines, NICE **Named contact e-mail** kidneycancerguideline@nice.org.uk **Organisational affiliation of the review** National Institute for Health and Care Excellence (NICE) and Guideline Development Team.		
24.	Review team members	From the Guideline Development Team: • Steve Sharp, Technical adviser • Sarah Boyce, Senior technical analyst • Olivia Crane, Senior technical analyst • Fernando Zanghelini, Technical analyst • Agnesa Mehmeti, Technical analyst • Lucy Beggs, Health economics adviser • Hannah Tebbs, Senior Health economist • Yuanyuan Zhang, Health economist • Amy Finnegan, Senior Information specialist		
25.	Funding sources/sponsor	This systematic review is being completed by the Guideline Development Team which receives funding from NICE.		
26.	Conflicts of interest	All guideline committee members and anyone who has direct input into NICE guidelines (including the evidence review team and expert witnesses) must declare any potential conflicts of interest in line with NICE's code of practice for declaring and dealing with conflicts of interest. Any relevant interests, or changes to interests, will also be declared publicly at the start of each guideline committee meeting. Before each meeting, any potential conflicts of interest will be considered by the guideline committee Chair and a senior member of the development team. Any decisions to exclude a person from all or part of a meeting will be documented. Any changes to a member's declaration of interests will be recorded in the minutes of the meeting. Declarations of interests will be published with the final guideline.		
27.	Collaborators	Development of this systematic review will be overseen by an advisory committee who will use the review to inform the development of evidence-based recommendations in line with section 3 of Developing NICE guidelines: the manual. Members of the guideline committee are available on the NICE website: Kidney Cancer (GID-NG10398).		
28.	Other registration details	None		
29.	Reference/URL for published protocol	None		
30.	Dissemination plans	NICE may use a range of different methods to raise awareness of the guideline. These include standard approaches such as: • notifying registered stakeholders of publication		

		• publicising the guideline through NICE's newsletter and alerts • issuing a press release or briefing as appropriate, posting news articles on the NICE website, using social media channels, and publicising the guideline within NICE.	
31.	Keywords	Localised renal cell carcinoma, partial nephrectomy, radical nephrectomy	
32.	Details of existing review of same topic by same authors	Not applicable	
33.	Current review status		Ongoing
			Completed but not published
		X	Completed and published
			Completed, published and being updated
			Discontinued
34.	Additional information	None	
35.	Details of final publication	www.nice.org.uk	

Economic review protocol

ID	Field	Content
1.	Review title	A: Cost-effectiveness of partial versus radical nephrectomy in adults with localised renal cell carcinoma B: Cost-effectiveness of non-surgical interventions or active surveillance in adults with localised renal cell carcinoma C: Cost-effectiveness of nephrectomy or stereotactic ablative radiotherapy for treating locally advanced renal cell carcinoma in adults H1: Cost-effectiveness of non-pharmacological interventions, used before systemic anti-cancer therapy for adults with advanced renal cell carcinoma H2: Cost-effectiveness of non-pharmacological interventions, used after systemic anti-cancer therapy for adults with advanced renal cell carcinoma
2.	Objective	To identify economic studies for all relevant guideline review questions on the management of renal cell carcinoma
3.	Inclusion criteria	• Populations, interventions and comparators as specified in the effectiveness review protocol. • Relevant comparative economic study design: cost–utility analysis • Decision analytic model-based or within-trial economic analyses • OECD countries (except USA) • Healthcare and personal social services cost perspective • Studies published from 2010 – this cut off has been applied to restrict the review to more recent studies which will have more applicable resource use and costs High-quality studies in line with the NICE reference case (recent UK NHS/PSS cost-utility analyses using the QALY as the measure of outcome) are the most applicable to NICE decision making. Not all studies meeting

		the inclusion criteria will therefore necessarily be used in decision-making - see Review strategy below for details.
4.	Exclusion criteria	• Conference posters or abstract only studies – these do not provide sufficient information for quality assessment. • Studies published before 2010 – this cut off has been applied to restrict the review to more recent studies which will have more applicable resource use and costs • Studies from non-OECD countries or the USA – these are considered unlikely to be applicable to the UK NHS setting due to substantial differences in healthcare delivery and unit costs. • Non-comparative economic analyses including cost-of-illness studies. • Letters, editorials or commentaries, study protocols or reviews of economic evaluations (recent reviews will be ordered and the bibliographies will be checked for relevant individual economic studies, which will then be ordered and checked for eligibility). • Non-English language papers. • Studies considering exclusively intervention costs, e.g. medicine acquisition costs, without considering wider healthcare costs associated with the management of renal cell carcinoma. • Studies comparing costs of branded vs generic forms of the same medicine. • Studies only focussing on productivity losses or gains.
5.	Search strategy	An economic study search will be undertaken covering all review questions relating to the management of renal cell carcinoma using guideline population-specific terms and a health economic study filter. For search details see appendix B below. The following databases will be searched: • MEDLINE All, Ovid • Embase, Ovid • International HTA database, International Network of Agencies for Health Technology Assessment (INAHTA) • Econlit • NHS EED and HTA (legacy records)
6.	Review strategy	• Studies meeting the inclusion and exclusion criteria will be assessed for applicability and methodological limitations using the NICE economic evaluation checklist in appendix H of Developing NICE guidelines: the manual. • The NICE economic evaluation checklist assesses: ○ Applicability to the NICE guideline decision making context with consideration of the NICE reference case relevant to the guideline. Recent UK studies that use the NICE reference case methods are the most applicable when considering cost effectiveness. ○ Methodological limitations. • The aim is to present the best available economic evidence to inform committee decision-making in the context of the guideline, the current UK NHS setting and NICE methods. Therefore, the health economist may not present all studies that meet inclusion criteria. If recent high quality, UK cost-utility analyses are available for a question, it is often not deemed informative to present studies that are less applicable or lower quality such as older UK analyses or analyses from other countries. A similar

		principle is deemed to apply more generally when considering applicability and methodological limitations. Some specific examples are given below: ○ If multiple versions of a model are available for the UK and other countries it is usually reasonable to only present the UK version. ○ If multiple versions of the same UK model are available, it is usually reasonable to present only the most recent. ○ If there has been a NICE MTA or guideline model that informs current NHS practice it is usually reasonable not to present older studies, unless they address a different subpopulation or other specific issue. ○ If a UK model that includes all interventions in the decision space is available it may be reasonable not to present studies that only include individual or fewer interventions, if the analysis is sufficiently applicable and of good methodological quality. • Quality and relevance of effectiveness data used in the economic analysis: the more closely the clinical effectiveness data used in the economic analysis match with the outcomes of the studies included in the clinical review the more useful the analysis will be for decision-making in the guideline. • Hierarchy of economic evaluation evidence based on quality assessment ○ 'Directly applicable' and 'Minor limitations' (only recent UK CUAs can get this rating). Usually presented and used in decision-making. ○ Directly or partially applicable combined with minor or potentially serious limitations (other than 1). Discretion over whether these are presented and used in decision-making, depending on the availability of more relevant evidence. ○ 'Not applicable' or 'Very serious limitations'. Typically not presented and not used in decision-making. The health economist will make a decision based on the relative applicability and quality of the available evidence for each question, in discussion with the guideline committee if required. All decisions will be transparently reported in the evidence report. Studies that are presented to the committee and used in decision-making when formulating recommendations will be included in the summary tables and will have an evidence extraction. Other studies may not be presented to the committee in detail but will be listed, with the reason for not being presented to the committee and thus not used in decision-making being provided. Committee members can review and query the decision not to present studies with the health economist and will be provided with full details of these studies where requested.

Appendix B – Literature search strategies

Background and development

Search design and peer review

A NICE Senior Information Specialist (SIS) conducted the literature searches. The MEDLINE strategies below were quality assured (QA) by another NICE SIS. All translated search strategies were peer reviewed to ensure their accuracy. Both procedures were adapted from the Peer Review of Electronic Search Strategies Guideline Statement (for further details see: McGowan J et al. PRESS 2015 Guideline Statement. *Journal of Clinical Epidemiology*, 75, 40-46).

The principal search strategies were developed in MEDLINE (Ovid interface) and adapted, as appropriate, for use in the other sources listed in the protocol, taking into account their size, search functionality and subject coverage.

This search report is based on the requirements of the PRISMA Statement for Reporting Literature Searches in Systematic Reviews (for further details see: Rethlefsen M et al. PRISMA-S. *Systematic Reviews*, 10(1), 39).

Review management

The search results were managed in EPPI-Reviewer v5. Duplicates were removed in EPPI-R5 using a two-step process. First, automated deduplication is performed using a high-value algorithm. Second, manual deduplication is used to assess "low-probability" matches. All decisions made for the review can be accessed via the deduplication history.

Prior work

A test set of 8 systematic reviews were supplied by the technical analysts, this test set covered the current review (review A) and reviews B, C, H1 and H2 combined (review B: non-surgical interventions for localised RCC, review C: nephrectomy or stereotactic ablative radiotherapy for locally advanced RCC, reviews H1 and H2: non-pharmacological management of advanced RCC).

Search limits and other restrictions

Formats

Limits were applied in adherence to standard NICE practice and the review protocol to exclude:

- Animal studies
- Editorials, letters, news items and commentaries
- Conference abstracts and posters
- Registry entries for ongoing clinical trials or those that contain no results

- Theses and dissertations
- Papers not published in the English language.

The limit to remove animal studies in the searches was the standard NICE practice, which has been adapted from:

> Dickersin K, Scherer R & Lefebvre C. (1994) Systematic Reviews: Identifying relevant studies for systematic reviews. *BMJ*, 309(6964), 1286.

Date limits

No date limits were applied, in adherence to the review protocol.

Search filters and classifiers

Effectiveness searches

OECD:

The OECD countries filters were used without modification:

Ayiku, L., Hudson, T., Williams, C., Levay, P., & Jacob, C. (2021). The NICE OECD countries' geographic search filters: Part 2 - Validation of the MEDLINE and Embase (Ovid) filters. Journal of the Medical Library Association, 109(4), 583–589.

Observational filter:

The terms used for observational studies are standard NICE practice that have been developed in house.

Systematic reviews filters:

Lee, E. et al. (2012) An optimal search filter for retrieving systematic reviews and meta-analyses. BMC Medical Research Methodology, 12(1), 51.

- In MEDLINE, the standard NICE modifications were used: pubmed.tw added; systematic review.pt added from MeSH update 2019.
- In Embase, the standard NICE modifications were used: pubmed.tw added to line medline.tw.

RCT filters:

McMaster Therapy – Medline – "best balance of sensitivity and specificity" version:

The standard NICE modifications were used: the MeSH heading *randomized controlled trial/*, which is equivalent *to randomized controlled trial.pt* was exploded to capture newer, narrower *terms equivalence trial/ and pragmatic clinical trial*. The free-text term

randomized.mp was also changed to the (more inclusive) alternative *randomi?ed.mp.* to capture both UK and US spellings.

Haynes RB e al. (2005) Optimal search strategies for retrieving scientifically strong studies of treatment from Medline: analytical survey. BMJ, 330, 1179-1183.

McMaster Therapy – Embase "best balance of sensitivity and specificity" version:

Wong SSL et al. (2006) Developing optimal search strategies for detecting clinically sound treatment studies in EMBASE. Journal of the Medical Library Association, 94(1), 41-47.

Cost effectiveness searches

In line with the review protocol, the precise version of the validated NICE cost utility filter was used in the MEDLINE and Embase strategies without amendment.

> Hubbard W et al. (2022) Development and validation of paired MEDLINE and Embase search filters for cost-utility studies. *BMC Medical Research Methodology*, 22(1), 310.

Key decisions

A single systematic search was carried out to identify potentially relevant studies for the current review (review A) and reviews B, C, H1 and H2 combined (review B: non-surgical interventions for localised RCC, review C: nephrectomy or stereotactic ablative radiotherapy for locally advanced RCC, reviews H1 and H2: non-pharmacological management of advanced RCC).

Clinical searches

Database results

Database	Date searched	Database Platform	Database segment or version	No. of results downloaded
Cochrane Central Register of Controlled Trials (CENTRAL)	18/01/2024	Wiley	Issue 1 of 12, January 2024	767
Cochrane Database of Systematic Reviews (CDSR)	18/01/2024	Wiley	Issue 1 of 12, January 2024	8
Embase	18/01/2024	Ovid	1974 to 2024 January 18	13394
Epistemonikos	18/01/2024	Epistemonikos	n/a	1993
INAHTA	18/01/2024	INAHTA	n/a	97
MEDLINE ALL	18/01/2024	Ovid	1946 to January 17, 2024	9991

Rerun search database results

Databases	Date searched	Database platform	Database segment or version	No. of results downloaded
Cochrane Central Register of Controlled Trials (CENTRAL)	14/02/2025	Wiley	Issue 2 of 12, February 2025	845
Cochrane Database of Systematic Reviews (CDSR)	14/02/2025	Wiley	Issue 2 of 12, February 2025	8
Embase	14/02/2025	Ovid	1974 to 2025 February 13	14588
Epistemonikos	14/02/2025	Epistemonikos	n/a	2350
INAHTA	14/02/2025	INAHTA	n/a	177
MEDLINE ALL	14/02/2025	Ovid	1946 to February 13, 2025	10686

No date limits were applied to the rerun searches due to technical issues in OVID. Duplication of records was managed in EPPI Reviewer 5.

Search strategy history

Database name: Medline ALL

Searches
1 exp Kidney Neoplasms/ (85773) 2 (Kidney* adj2 (cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumo?r* or mass or metastat* or malignan* or sarcoma* or parenchyma* or t1 or t1a or t1b or tb or t2a or t2b or t3 or t3a or t3b or t3c or stage-1 or stage-2 or stage-3 or stage-4)).ti,ab. (17162) 3 (collecting-duct* adj2 (cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumo?r* or mass or metastat* or malignan* or sarcoma* or parenchyma* or stage-4)).ti,ab. (490) 4 (renal-cell* or RCC or ccRCC or Renal-mass* or renal-tumo?r* or grawitz-tumo?r* or hypernephroma* or nephrocarcinoma*).ti,ab. (70604) 5 (Kidney* adj2 (Transitional-cell* or cell or urothelial* or duct or advanc*) adj2 (cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumo?r* or mass or metastat* or malignan* or sarcoma* or parenchyma*)).ti,ab. (808) 6 or/1-5 (118618) 7 exp nephrectomy/ (37938) 8 (nephrectom* or lymphadenectom*).ti,ab,kw. (62205) 9 ((kidney* or renal* or RCC or ccRCC or lymph* or adrenal* or cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumo?r* or mass or metastat* or malignan* or sarcoma* or hypernephroma* or nephrocarcinoma*) adj3 (remov* or surg* or extract* or extirpat* or operat*)).ti,ab. (204663) 10 ((kidney* or renal* or RCC or ccRCC or lymph* or adrenal* or cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumo?r* or mass or metastat* or malignan* or sarcoma* or hypernephroma* or nephrocarcinoma*) and (remov* or surg* or extract* or extirpat* or operat*)).kf. (59909) 11 ((laproscop* or open or partial* or radical or transperiton* or retroperiton*) adj3 (surg* or remov* or partial* or procedur* or treat* or operat*)).ti,ab. (918105) 12 ((laproscop* or open or partial* or radical or transperiton* or retroperiton*) and (surg* or remov* or partial* or procedur* or treat* or operat*)).kf. (21870) 13 (nephron* adj2 (surg* or remov* or partial* or procedur* or treat* or operat* or spar* or preserv*)).ti,ab. (2661) 14 (nephron* and (surg* or remov* or partial* or procedur* or treat* or operat* or spar* or preserv*)).kf. (446) 15 radiotherapy/ or lymphatic irradiation/ or radiosurgery/ or radiotherapy, adjuvant/ or radiotherapy dosage/ or radiotherapy, high-energy/ or re-irradiation/ or Cytoreduction Surgical Procedures/ or Ablation Techniques/ or Radiofrequency Ablation/ or Robotic Surgical Procedures/ or Minimally Invasive Surgical Procedures/ or Metastasectomy/ or Lymph Node Excision/ or Watchful Waiting/ (239644) 16 (radiotherap* or radiation* or radiosurg* or cyberknife* or irradiat* or thermoablat* or ablat* or cyrotherap* or cytoreduct* or cyroablat* or stereostat* or SABR).ti,ab,kw. (933898) 17 ((RAS or (robotic* adj1 assist*)) adj1 (surg* or remov* or partial* or procedur* or treat* or operat*)).ti,ab. (2177) 18 ((RAS or (robotic* adj1 assist*)) and (surg* or remov* or partial* or procedur* or treat* or operat*)).kw. (11) 19 (minimal* adj2 invas* adj2 (surg* or procedur* or treat*)).ti,ab. (38472) 20 (minimal* and invas* and (surg* or procedur* or treat*)).kw. (5) 21 ((inferior-vena-cava or IVC) adj2 thrombectom*).ti,ab. (279) 22 ((inferior-vena-cava or IVC) and thrombectom*).kw. (26) 23 ((activ* or tumo?r* or delay*) adj2 (surveil* or monitor*)).ti,ab. (38392) 24 ((activ* or tumo?r* or delay*) and (surveil* or monitor*)).kw. (266) 25 (delay* adj2 treat*).ti,ab. (20889) 26 (delay* and treat*).kw. (162)

Searches
27 (watchful* adj1 wait*).ti,ab. (3238) 28 (watchful* and wait*).kw. (4) 29 or/7-28 (2201330) 30 6 and 29 (38582) 31 animals/ not humans/ (5153512) 32 30 not 31 (36911) 33 limit 32 to english language (30806) 34 limit 33 to (letter or historical article or comment or editorial or news or case reports) (9081) 35 33 not 34 (21725) 36 exp Randomized Controlled Trial/ (608436) 37 randomi?ed.mp. (1099661) 38 placebo.mp. (252799) 39 or/36-38 (1166623) 40 (MEDLINE or pubmed).tw. (344612) 41 systematic review.tw. (287748) 42 systematic review.pt. (249879) 43 meta-analysis.pt. (193317) 44 intervention$.ti. (208375) 45 or/40-44 (719849) 46 Epidemiologic studies/ (9465) 47 exp case control studies/ (1474038) 48 exp cohort studies/ (2562056) 49 Case control.tw. (159034) 50 (cohort adj (study or studies)).tw. (337093) 51 Cohort analy$.tw. (12565) 52 (Follow up adj (study or studies)).tw. (57443) 53 (observational adj (study or studies)).tw. (171478) 54 Longitudinal.tw. (336148) 55 Retrospective.tw. (784597) 56 Cross sectional.tw. (542555) 57 Cross-sectional studies/ (489693) 58 or/46-57 (3917614) 59 39 or 45 or 58 (5240090) 60 35 and 59 (10204) 61 afghanistan/ or africa/ or africa, northern/ or africa, central/ or africa, eastern/ or "africa south of the sahara"/ or africa, southern/ or africa, western/ or albania/ or algeria/ or andorra/ or angola/ or "antigua and barbuda"/ or argentina/ or armenia/ or azerbaijan/ or bahamas/ or bahrain/ or bangladesh/ or barbados/ or belize/ or benin/ or bhutan/ or bolivia/ or borneo/ or "bosnia and herzegovina"/ or botswana/ or brazil/ or brunei/ or bulgaria/ or burkina faso/ or burundi/ or cabo verde/ or cambodia/ or cameroon/ or central african republic/ or chad/ or exp china/ or comoros/ or congo/ or cote d'ivoire/ or croatia/ or cuba/ or "democratic republic of the congo"/ or cyprus/ or djibouti/ or dominica/ or dominican republic/ or ecuador/ or egypt/ or el salvador/ or equatorial guinea/ or eritrea/ or eswatini/ or ethiopia/ or fiji/ or gabon/ or gambia/ or "georgia (republic)"/ or ghana/ or grenada/ or guatemala/ or guinea/ or guinea-bissau/ or guyana/ or haiti/ or honduras/ or independent state of samoa/ or exp india/ or indian ocean islands/ or indochina/ or indonesia/ or iran/ or iraq/ or jamaica/ or jordan/ or kazakhstan/ or kenya/ or kosovo/ or kuwait/ or kyrgyzstan/ or laos/ or lebanon/ or liechtenstein/ or lesotho/ or liberia/ or libya/ or madagascar/ or malaysia/ or malawi/ or mali/ or malta/ or mauritania/ or mauritius/ or mekong valley/ or melanesia/ or micronesia/ or monaco/ or mongolia/ or montenegro/ or morocco/ or mozambique/ or myanmar/ or namibia/ or nepal/ or nicaragua/ or niger/ or nigeria/ or oman/ or pakistan/ or palau/ or exp panama/ or papua new guinea/ or paraguay/ or peru/ or philippines/ or qatar/ or "republic of belarus"/ or "republic of north macedonia"/ or romania/ or exp russia/ or rwanda/ or "saint kitts and nevis"/ or saint lucia/ or "saint vincent and the grenadines"/ or "sao tome and principe"/ or saudi arabia/ or serbia/ or sierra leone/ or senegal/ or

Searches
seychelles/ or singapore/ or somalia/ or south africa/ or south sudan/ or sri lanka/ or sudan/ or suriname/ or syria/ or taiwan/ or tajikistan/ or tanzania/ or thailand/ or timor-leste/ or togo/ or tonga/ or "trinidad and tobago"/ or tunisia/ or turkmenistan/ or uganda/ or ukraine/ or united arab emirates/ or uruguay/ or uzbekistan/ or vanuatu/ or venezuela/ or vietnam/ or west indies/ or yemen/ or zambia/ or zimbabwe/ (1322150) 62 "organisation for economic co-operation and development"/ (581) 63 australasia/ or exp australia/ or austria/ or baltic states/ or belgium/ or exp canada/ or chile/ or colombia/ or costa rica/ or czech republic/ or exp denmark/ or estonia/ or europe/ or finland/ or exp france/ or exp germany/ or greece/ or hungary/ or iceland/ or ireland/ or israel/ or exp italy/ or exp japan/ or korea/ or latvia/ or lithuania/ or luxembourg/ or mexico/ or netherlands/ or new zealand/ or north america/ or exp norway/ or poland/ or portugal/ or exp "republic of korea"/ or "scandinavian and nordic countries"/ or slovakia/ or slovenia/ or spain/ or sweden/ or switzerland/ or turkey/ or exp united kingdom/ or exp united states/ (3526314) 64 european union/ (17879) 65 developed countries/ (21470) 66 or/62-65 (3542495) 67 61 not 66 (1231834) 68 60 not 67 (9991)

Database name: Embase

Searches
1 exp kidney tumor/ (169289) 2 (Kidney* adj2 (cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumo?r* or mass or metastat* or malignan* or sarcoma* or parenchyma* or t1 or t1a or t1b or tb or t2a or t2b or t3 or t3a or t3b or t3c or stage-1 or stage-2 or stage-3 or stage-4)).ti,ab. (25843) 3 (collecting-duct* adj2 (cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumo?r* or mass or metastat* or malignan* or sarcoma* or parenchyma* or stage-4)).ti,ab. (738) 4 (renal-cell* or RCC or ccRCC or Renal-mass* or renal-tumo?r* or grawitz-tumo?r* or hypernephroma* or nephrocarcinoma*).ti,ab. (105763) 5 (Kidney* adj2 (Transitional-cell* or cell or urothelial* or duct or advanc*) adj2 (cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumo?r* or mass or metastat* or malignan* or sarcoma* or parenchyma*)).ti,ab. (1179) 6 or/1-5 (199212) 7 exp nephrectomy/ (79135) 8 (nephrectom* or lymphadenectom*).ti,ab,kw. (95869) 9 ((kidney* or renal* or RCC or ccRCC or lymph* or adrenal* or cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumo?r* or mass or metastat* or malignan* or sarcoma* or hypernephroma* or nephrocarcinoma*) adj3 (remov* or surg* or extract* or extirpat* or operat*)).ti,ab. (296316) 10 ((kidney* or renal* or RCC or ccRCC or lymph* or adrenal* or cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumo?r* or mass or metastat* or malignan* or sarcoma* or hypernephroma* or nephrocarcinoma*) and (remov* or surg* or extract* or extirpat* or operat*)).kf. (84073) 11 ((laproscop* or open or partial* or radical or transperiton* or retroperiton*) adj3 (surg* or remov* or partial* or procedur* or treat* or operat*)).ti,ab. (1172497) 12 ((laproscop* or open or partial* or radical or transperiton* or retroperiton*) and (surg* or remov* or partial* or procedur* or treat* or operat*)).kf. (39682)

Searches
13 (nephron* adj2 (surg* or remov* or partial* or procedur* or treat* or operat* or spar* or preserv*)).ti,ab. (4849) 14 (nephron* and (surg* or remov* or partial* or procedur* or treat* or operat* or spar* or preserv*)).kf. (923) 15 radiotherapy/ or cancer radiotherapy/ or adjuvant radiotherapy/ or exp radiosurgery/ or radiotherapy dosage/ or megavoltage radiotherapy/ or re-irradiation/ or cytoreductive surgery/ or ablation therapy/ or radiofrequency ablation/ or robot assisted surgery/ or minimally invasive surgery/ or metastasis resection/ or lymph node dissection/ or cryotherapy/ or stereotactic body radiation therapy/ or active surveillance/ or watchful waiting/ (700411) 16 (radiotherap* or radiation* or radiosurg* or cyberknife* or irradiat* or thermoablat* or ablat* or cyrotherap* or cytoreduct* or cyroablat* or stereostat* or SABR).ti,ab,kw. (1245790) 17 ((RAS or (robotic* adj1 assist*)) adj1 (surg* or remov* or partial* or procedur* or treat* or operat*)).ti,ab. (3847) 18 ((RAS or (robotic* adj1 assist*)) and (surg* or remov* or partial* or procedur* or treat* or operat*)).kw. (21) 19 (minimal* adj2 invas* adj2 (surg* or procedur* or treat*)).ti,ab. (58741) 20 (minimal* and invas* and (surg* or procedur* or treat*)).kw. (8) 21 ((inferior-vena-cava or IVC) adj2 thrombectom*).ti,ab. (642) 22 ((inferior-vena-cava or IVC) and thrombectom*).kw. (36) 23 ((activ* or tumo?r* or delay*) adj2 (surveil* or monitor*)).ti,ab. (56960) 24 ((activ* or tumo?r* or delay*) and (surveil* or monitor*)).kw. (432) 25 (delay* adj2 treat*).ti,ab. (32640) 26 (delay* and treat*).kw. (278) 27 (watchful* adj1 wait*).ti,ab. (4967) 28 (watchful* and wait*).kw. (8) 29 or/7-28 (3008790) 30 6 and 29 (72417) 31 nonhuman/ not human/ (5369703) 32 30 not 31 (70586) 33 limit 32 to english language (63135) 34 33 not (letter or editorial).pt. (61048) 35 34 not (conference abstract* or conference review or conference paper or conference proceeding).db,pt,su. (41463) 36 random:.tw. (2023923) 37 placebo:.mp. (532136) 38 double-blind:.tw. (248720) 39 or/36-38 (2304835) 40 (MEDLINE or pubmed).tw. (428718) 41 exp systematic review/ or systematic review.tw. (533296) 42 meta-analysis/ (304008) 43 intervention$.ti. (274290) 44 or/40-43 (1007209) 45 Clinical study/ (165319) 46 Case control study/ (212430) 47 Family study/ (25771) 48 Longitudinal study/ (205110) 49 Retrospective study/ (1556506) 50 comparative study/ (1042643) 51 Prospective study/ (902470) 52 Randomized controlled trials/ (268035) 53 51 not 52 (891477) 54 Cohort analysis/ (1106561) 55 cohort analy$.tw. (20347) 56 (Cohort adj (study or studies)).tw. (487394)

Searches
57 (Case control$ adj (study or studies)).tw. (176315) 58 (follow up adj (study or studies)).tw. (75066) 59 (observational adj (study or studies)).tw. (266587) 60 (epidemiologic$ adj (study or studies)).tw. (124259) 61 (cross sectional adj (study or studies)).tw. (359262) 62 case series.tw. (152596) 63 prospective.tw. (1133006) 64 retrospective.tw. (1304827) 65 or/45-50,53-64 (5603678) 66 39 or 44 or 65 (7885322) 67 35 and 66 (13670) 68 afghanistan/ or africa/ or "africa south of the sahara"/ or albania/ or algeria/ or andorra/ or angola/ or argentina/ or "antigua and barbuda"/ or armenia/ or exp azerbaijan/ or bahamas/ or bahrain/ or bangladesh/ or barbados/ or belarus/ or belize/ or benin/ or bhutan/ or bolivia/ or borneo/ or exp "bosnia and herzegovina"/ or botswana/ or exp brazil/ or brunei darussalam/ or bulgaria/ or burkina faso/ or burundi/ or cambodia/ or cameroon/ or cape verde/ or central africa/ or central african republic/ or chad/ or exp china/ or comoros/ or congo/ or cook islands/ or cote d'ivoire/ or croatia/ or cuba/ or cyprus/ or democratic republic congo/ or djibouti/ or dominica/ or dominican republic/ or ecuador/ or el salvador/ or egypt/ or equatorial guinea/ or eritrea/ or eswatini/ or ethiopia/ or exp "federated states of micronesia"/ or fiji/ or gabon/ or gambia/ or exp "georgia (republic)"/ or ghana/ or grenada/ or guatemala/ or guinea/ or guinea-bissau/ or guyana/ or haiti/ or honduras/ or exp india/ or exp indonesia/ or iran/ or exp iraq/ or jamaica/ or jordan/ or kazakhstan/ or kenya/ or kiribati/ or kosovo/ or kuwait/ or kyrgyzstan/ or laos/ or lebanon/ or liechtenstein/ or lesotho/ or liberia/ or libyan arab jamahiriya/ or madagascar/ or malawi/ or exp malaysia/ or maldives/ or mali/ or malta/ or mauritania/ or mauritius/ or melanesia/ or moldova/ or monaco/ or mongolia/ or "montenegro (republic)"/ or morocco/ or mozambique/ or myanmar/ or namibia/ or nauru/ or nepal/ or nicaragua/ or niger/ or nigeria/ or niue/ or north africa/ or oman/ or exp pakistan/ or palau/ or palestine/ or panama/ or papua new guinea/ or paraguay/ or peru/ or philippines/ or polynesia/ or qatar/ or "republic of north macedonia"/ or romania/ or exp russian federation/ or rwanda/ or sahel/ or "saint kitts and nevis"/ or "saint lucia"/ or "saint vincent and the grenadines"/ or saudi arabia/ or senegal/ or exp serbia/ or seychelles/ or sierra leone/ or singapore/ or "sao tome and principe"/ or solomon islands/ or exp somalia/ or south africa/ or south asia/ or south sudan/ or exp southeast asia/ or sri lanka/ or sudan/ or suriname/ or syrian arab republic/ or taiwan/ or tajikistan/ or tanzania/ or thailand/ or timor-leste/ or togo/ or tonga/ or "trinidad and tobago"/ or tunisia/ or turkmenistan/ or tuvalu/ or uganda/ or exp ukraine/ or exp united arab emirates/ or uruguay/ or exp uzbekistan/ or vanuatu/ or venezuela/ or viet nam/ or western sahara/ or yemen/ or zambia/ or zimbabwe/ (1736652) 69 exp "organisation for economic co-operation and development"/ (2827) 70 exp australia/ or "australia and new zealand"/ or austria/ or baltic states/ or exp belgium/ or exp canada/ or chile/ or colombia/ or costa rica/ or czech republic/ or denmark/ or estonia/ or europe/ or exp finland/ or exp france/ or exp germany/ or greece/ or hungary/ or iceland/ or ireland/ or israel/ or exp italy/ or japan/ or korea/ or latvia/ or lithuania/ or luxembourg/ or exp mexico/ or netherlands/ or new zealand/ or north america/ or exp norway/ or poland/ or exp portugal/ or scandinavia/ or sweden/ or slovakia/ or slovenia/ or south korea/ or exp spain/ or switzerland/ or "Turkey (republic)"/ or exp united kingdom/ or exp united states/ or western europe/ (3832351) 71 european union/ (31891) 72 developed country/ (35945) 73 or/69-72 (3866518) 74 68 not 73 (1580645) 75 67 not 74 (13394)

Database name: Cochrane CDSR & CENTRAL

Searches
#1 MeSH descriptor: [Kidney Neoplasms] explode all trees 1694 #2 (Kidney* NEAR/2 (cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumo?r* or mass or metastat* or malignan* or sarcoma* or parenchyma* or t1 or t1a or t1b or tb or t2a or t2b or t3 or t3a or t3b or t3c or stage-1 or stage-2 or stage-3 or stage-4)):ti,ab 1332 #3 (collecting-duct* NEAR/2 (cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumor* or tumour* or mass or metastat* or malignan* or sarcoma* or parenchyma* or stage-4)):ti,ab 14 #4 (renal-cell* or RCC or ccRCC or Renal-mass* or renal-tumor* or renal-tumour* or grawitz-tumor* or grawitz-tumour* or hypernephroma* or nephrocarcinoma*):ti,ab 3747 #5 (Kidney* NEAR/2 (Transitional-cell* or cell or urothelial* or duct or advanc*) NEAR/2 (cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumor* or tumour* or mass or metastat* or malignan* or sarcoma* or parenchyma*)):ti,ab 69 #6 {or #1-#5} 5140 #7 MeSH descriptor: [Nephrectomy] explode all trees 594 #8 (nephrectom* or lymphadenectom*):ti,ab 3676 #9 MeSH descriptor: [Radiotherapy] this term only 2824 #10 MeSH descriptor: [Lymphatic Irradiation] this term only 76 #11 MeSH descriptor: [Radiosurgery] this term only 485 #12 MeSH descriptor: [Radiotherapy, Adjuvant] this term only 1427 #13 MeSH descriptor: [Radiotherapy Dosage] this term only 2429 #14 MeSH descriptor: [Radiotherapy, High-Energy] this term only 320 #15 MeSH descriptor: [Re-Irradiation] this term only 37 #16 MeSH descriptor: [Cytoreduction Surgical Procedures] this term only 232 #17 MeSH descriptor: [Ablation Techniques] this term only 127 #18 MeSH descriptor: [Radiofrequency Ablation] this term only 342 #19 MeSH descriptor: [Robotic Surgical Procedures] this term only 716 #20 MeSH descriptor: [Minimally Invasive Surgical Procedures] this term only 1280 #21 MeSH descriptor: [Metastasectomy] this term only 43 #22 MeSH descriptor: [Lymph Node Excision] this term only 1540 #23 MeSH descriptor: [Watchful Waiting] this term only 469 #24 ((kidney* or renal* or RCC or ccRCC or lymph* or adrenal* or cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumor* or tumour* or mass or metastat* or malignan* or sarcoma* or hypernephroma* or nephrocarcinoma*) NEAR/3 (remov* or surg* or extract* or extirpat* or operat*)):ti,ab 18334 #25 ((laproscop* or open or partial* or radical or transperiton* or retroperiton*) NEAR/3 (surg* or remov* or partial* or procedur* or treat* or operat*)):ti,ab 63782 #26 (nephron* NEAR/2 (surg* or remov* or partial* or procedur* or treat* or operat* or spar* or preserv*)):ti,ab 123 #27 (radiotherap* or radiation* or radiosurg* or cyberknife* or irradiat* or thermoablat* or ablat* or cyrotherap* or cytoreduct* or cyroablat* or stereostat* or SABR):ti,ab 63947 #28 ((RAS or (robotic* NEAR/1 assist*)) NEAR/1 (surg* or remov* or partial* or procedur* or treat* or operat*)):ti,ab 256 #29 (minimal* NEAR/2 invas* NEAR/2 (surg* or procedur* or treat*)):ti,ab 3606 #30 ((inferior-vena-cava or IVC) NEAR/2 thrombectom*):ti,ab 2 #31 ((activ* or tumor* or tumour* or delay*) NEAR/2 (surveil* or monitor*)):ti,ab 4050 #32 (delay* NEAR/2 treat*):ti,ab 2913 #33 (watchful* NEAR/1 wait*):ti,ab 668 #34 {or #7-#33} 150254 #35 #6 AND #34 1693 #36 "conference":pt or (clinicaltrials or trialsearch):so 725938 #37 #35 NOT #36 776

Database name: Epistemonikos

Searches
(kidney* AND (cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumor* or tumour* or mass or metastat* or malignan* or sarcoma* or parenchyma* or t1 or t1a or t1b or tb or t2a or t2b or t3 or t3a or t3b or t3c or stage-1 or stage-2 or stage-3 or stage-4 or (stage 1) or (stage 2) or (stage 3) or (stage 4))) OR (collecting-duct* AND (cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumor* or tumour* or mass or metastat* or malignan* or sarcoma* or parenchyma* or stage-4 or (stage 1) or (stage 2) or (stage 3) or (stage 4))) OR ((collecting duct*) AND (cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumor* or tumour* or mass or metastat* or malignan* or sarcoma* or parenchyma* or stage-4 or (stage 1) or (stage 2) or (stage 3) or (stage 4))) OR (renal-cell* or (renal cell*) or rcc or ccrcc or renal-mass* or (renal mass*) or renal-tumor* or (renal tumor*) or renal-tumour* or (renal tumour*) or grawitz-tumor* or (grawitz tumor*) or grawitz-tumour* or (grawitz tumour*) or hypernephroma* or nephrocarcinoma*) OR (kidney* AND (transitional-cell* or (transitional cell*) or cell or urothelial* or duct or advanc*) AND (cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumor* or tumour* or mass or metastat* or malignan* or sarcoma* or parenchyma*)) AND (nephrectom* or lymphadenectom*) OR ((kidney* or renal* or rcc or ccrcc or lymph* or adrenal* or cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumor* or tumour* or mass or metastat* or malignan* or sarcoma* or hypernephroma* or nephrocarcinoma*) AND (remov* or surg* or extract* or extirpat* or operat*)) OR ((laproscop* or open or partial* or radical or transperiton* or retroperiton*) AND (surg* or remov* or partial* or procedur* or treat* or operat*)) OR (nephron* AND (surg* or remov* or partial* or procedur* or treat* or operat* or spar* or preserv*)) OR (radiotherap* or radiation* or radiosurg* or cyberknife* or irradiat* or thermoablat* or ablat* or cyrotherap* or cytoreduct* or cyroablat* or stereostat* or sabr) OR ((ras or (robotic* AND assist*)) AND (surg* or remov* or partial* or procedur* or treat* or operat*)) OR (minimal* AND invas* AND (surg* or procedur* or treat*)) OR ((inferior-vena-cava or ivc or (inferior vena cava)) AND thrombectom*) OR ((activ* or tumor* or tumour* or delay*) AND (surveil* or monitor*)) OR (delay* AND treat*) OR (watchful* AND wait*)

Database name: INAHTA

Searches
#1 "Kidney Neoplasms"[mhe] 111
#2 ((Kidney* AND (cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumo?r* or mass or metastat* or malignan* or sarcoma* or parenchyma* or t1 or t1a or t1b or tb or t2a or t2b or t3 or t3a or t3b or t3c or stage-1 or stage-2 or stage-3 or stage-4))) OR ((collecting-duct* AND (cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumor* or tumour* or mass or metastat* or malignan* or sarcoma* or parenchyma* or stage-4)) OR ((renal-cell* or RCC or ccRCC or Renal-mass* or renal-tumor* or renal-tumour* or grawitz-tumor* or grawitz-tumour* or hypernephroma* or nephrocarcinoma*)) OR ((Kidney* AND (Transitional-cell* or cell or urothelial* or duct or advanc*) AND (cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumor* or tumour* or mass or metastat* or malignan* or sarcoma* or parenchyma*))) 105
#3 (((Kidney* AND (cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumo?r* or mass or metastat* or malignan* or sarcoma* or parenchyma* or t1 or t1a or t1b or tb or t2a or t2b or t3 or t3a or t3b or t3c or stage-1 or stage-2 or stage-3 or stage-4))) OR ((collecting-duct* AND (cancer* or carcinoma* or carcinosarcoma* or

Searches
adenocarcino* or neoplas* or tumor* or tumour* or mass or metastat* or malignan* or sarcoma* or parenchyma* or stage-4)) OR ((renal-cell* or RCC or ccRCC or Renal-mass* or renal-tumor* or renal-tumour* or grawitz-tumor* or grawitz-tumour* or hypernephroma* or nephrocarcinoma*)) OR ((Kidney* AND (Transitional-cell* or cell or urothelial* or duct or advanc*) AND (cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumor* or tumour* or mass or metastat* or malignan* or sarcoma* or parenchyma*)))) OR ("Kidney Neoplasms"[mhe]) 155
#4 "Nephrectomy"[mhe] 12
#5 ((nephrectom* or lymphadenectom*)) 31
#6 "Radiotherapy"[mh] 220
#7 "Lymphatic Irradiation"[mh] 0
#8 "Radiosurgery"[mh] 71
#9 "Radiotherapy Adjuvant"[mh] 27
#10 "Radiotherapy Dosage"[mh] 27
#11 "Radiotherapy High-Energy"[mh] 9
#12 "Re-Irradiation"[mh] 2
#13 "Cytoreduction Surgical Procedures"[mh] 2
#14 "Ablation Techniques"[mh] 35
#15 "Radiofrequency Ablation"[mh] 29
#16 "Robotic Surgical Procedures"[mh] 22
#17 "Minimally Invasive Surgical Procedures"[mh] 109
#18 "Metastasectomy"[mh] 1
#19 "Lymph Node Excision"[mh] 9
#20 ((kidney* or renal* or RCC or ccRCC or lymph* or adrenal* or cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumor* or tumour* or mass or metastat* or malignan* or sarcoma* or hypernephroma* or nephrocarcinoma*) AND (remov* or surg* or extract* or extirpat* or operat*)) 878
#21 ((laproscop* or open or partial* or radical or transperiton* or retroperiton*) AND (surg* or remov* or partial* or procedur* or treat* or operat*)) 756
#22 (nephron* AND (surg* or remov* or partial* or procedur* or treat* or operat* or spar* or preserv*)) 2
#23 radiotherap* or radiation* or radiosurg* or cyberknife* or irradiat* or thermoablat* or ablat* or cyrotherap* or cytoreduct* or cyroablat* or stereostat* or SABR) 1000
#24 ((RAS or (robotic* AND assist*)) AND (surg* or remov* or partial* or procedur* or treat* or operat*)) 73
#25 (minimal* AND invas* AND (surg* or procedur* or treat*))246
#26 ((inferior-vena-cava or IVC) AND thrombectom*) 0
#27 ((activ* or tumor* or tumour* or delay*) AND (surveil* or monitor*)) 318
#28 (delay* AND treat*) 201
#29 (watchful* AND wait*) 45
#29 #28 OR #27 OR #26 OR #25 OR #24 OR #23 OR #22 OR #21 OR #20 OR #19 OR #18 OR #17 OR #16 OR #15 OR #14 OR #13 OR #12 OR #11 OR #10 OR #9 OR #8 OR #7 OR #6 OR #5 OR #4 2796
#30 #29 AND #3 155
Limit English language 97

Cost-effectiveness searches

Database results

Databases	Date searched	Database platform	Database segment or version	No. of results downloaded
EconLit	05/02/2024	OVID	1886 to January 25, 2024	1
EED	07/02/2024	CRD	n/a	23
Embase	05/02/2024	Ovid	1974 to 2024 February 02	65
HTA	07/02/2024	CRD	n/a	27
INAHTA	05/02/2024	INAHTA	n/a	155
MEDLINE ALL	05/02/2024	Ovid	1946 to February 02, 2024	62

Rerun search database results

Databases	Date searched	Database platform	Database segment or version	No. of results downloaded
EconLit	06/05/2025	OVID	1886 to May 01, 2025	1
Embase	06/05/2025	Ovid	1974 to 2025 May 05	73
INAHTA	06/05/2025	INAHTA	n/a	177
MEDLINE ALL	06/05/2025	Ovid	1946 to May 05, 2025	68

Search strategy history

Database name: Econlit

Searches
1 (Kidney* adj2 (cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumo?r* or mass or metastat* or malignan* or sarcoma* or parenchyma* or t1 or t1a or t1b or tb or t2a or t2b or t3 or t3a or t3b or t3c or stage-1 or stage-2 or stage-3 or stage-4)).ti,ab. (8) 2 (collecting-duct* adj2 (cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumo?r* or mass or metastat* or malignan* or sarcoma* or parenchyma* or stage-4)).ti,ab. (0) 3 (renal-cell* or RCC or ccRCC or Renal-mass* or renal-tumo?r* or grawitz-tumo?r* or hypernephroma* or nephrocarcinoma*).ti,ab. (22) 4 (Kidney* adj2 (Transitional-cell* or cell or urothelial* or duct or advanc*) adj2 (cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumo?r* or mass or metastat* or malignan* or sarcoma* or parenchyma*)).ti,ab. (0) 5 or/1-4 (30) 6 (nephrectom* or lymphadenectom*).ti,ab,kw. (0)

Searches
7 ((kidney* or renal* or RCC or ccRCC or lymph* or adrenal* or cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumo?r* or mass or metastat* or malignan* or sarcoma* or hypernephroma* or nephrocarcinoma*) adj3 (remov* or surg* or extract* or extirpat* or operat*)).ti,ab. (80) 8 ((laproscop* or open or partial* or radical or transperiton* or retroperiton*) adj3 (surg* or remov* or partial* or procedur* or treat* or operat*)).ti,ab. (25798) 9 (nephron* adj2 (surg* or remov* or partial* or procedur* or treat* or operat* or spar* or preserv*)).ti,ab. (0) 10 (radiotherap* or radiation* or radiosurg* or cyberknife* or irradiat* or thermoablat* or ablat* or cyrotherap* or cytoreduct* or cyroablat* or stereostat* or SABR).ti,ab,kw. (599) 11 ((RAS or (robotic* adj1 assist*)) adj1 (surg* or remov* or partial* or procedur* or treat* or operat*)).ti,ab. (10) 12 ((RAS or (robotic* adj1 assist*)) and (surg* or remov* or partial* or procedur* or treat* or operat*)).kw. (0) 13 (minimal* adj2 invas* adj2 (surg* or procedur* or treat*)).ti,ab. (7) 14 (minimal* and invas* and (surg* or procedur* or treat*)).kw. (0) 15 ((inferior-vena-cava or IVC) adj2 thrombectom*).ti,ab. (0) 16 ((inferior-vena-cava or IVC) and thrombectom*).kw. (0) 17 ((activ* or tumo?r* or delay*) adj2 (surveil* or monitor*)).ti,ab. (388) 18 ((activ* or tumo?r* or delay*) and (surveil* or monitor*)).kw. (4) 19 (delay* adj2 treat*).ti,ab. (48) 20 (delay* and treat*).kw. (0) 21 (watchful* adj1 wait*).ti,ab. (10) 22 (watchful* and wait*).kw. (0) 23 or/6-22 (26909) 24 5 and 23 (1)

Database name: CRD EED & HTA

Searches

Line	Search	Hits
1	MESH DESCRIPTOR Kidney Neoplasms EXPLODE ALL TREES	201
2	(Kidney* NEAR2 (cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumo?r* or mass or metastat* or malignan* or sarcoma* or parenchyma* or t1 or t1a or t1b or tb or t2a or t2b or t3 or t3a or t3b or t3c or stage-1 or stage-2 or stage-3 or stage-4))	194
3	(collecting-duct* NEAR2 (cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumor* or tumour* or mass or metastat* or malignan* or sarcoma* or parenchyma* or stage-4))	1
4	(renal-cell* or RCC or ccRCC or Renal-mass* or renal-tumor* or renal-tumour* or grawitz-tumor* or grawitz-tumour* or hypernephroma* or nephrocarcinoma*)	204
5	(Kidney* NEAR2 (Transitional-cell* or cell or urothelial* or duct or advanc*) NEAR2 (cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumor* or tumour* or mass or metastat* or malignan* or sarcoma* or parenchyma*))	3
6	#1 OR #2 OR #3 OR #4 OR #5	262
7	MESH DESCRIPTOR Nephrectomy EXPLODE ALL TREES	95
8	(nephrectom* or lymphadenectom*)	235
9	MESH DESCRIPTOR Radiotherapy	247
10	MESH DESCRIPTOR Lymphatic Irradiation	1
11	MESH DESCRIPTOR Radiosurgery	125
12	MESH DESCRIPTOR Radiotherapy, Adjuvant	176
13	MESH DESCRIPTOR Radiotherapy Dosage	112
14	MESH DESCRIPTOR Radiotherapy, High-Energy	15
15	MESH DESCRIPTOR Re-Irradiation	0
16	MESH DESCRIPTOR Cytoreduction Surgical Procedures	4
17	MESH DESCRIPTOR Ablation Techniques	29
18	MESH DESCRIPTOR Radiofrequency Ablation	0
19	MESH DESCRIPTOR Robotic Surgical Procedures	23
20	MESH DESCRIPTOR Minimally Invasive Surgical Procedures	260
21	MESH DESCRIPTOR Metastasectomy	5
22	MESH DESCRIPTOR Lymph Node Excision	171
23	((kidney* or renal* or RCC or ccRCC or lymph* or adrenal* or cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumor* or tumour* or mass or metastat* or malignan* or sarcoma* or hypernephroma* or nephrocarcinoma*) NEAR3 (remov* or surg* or extract* or extirpat* or operat*))	2281
24	((laproscop* or open or partial* or radical or transperiton* or retroperiton*) NEAR3 (surg* or remov* or partial* or procedur* or treat* or operat*))	1045
25	(nephron* NEAR2 (surg* or remov* or partial* or procedur* or treat* or operat* or spar* or preserv*))	9
26	(radiotherap* or radiation* or radiosurg* or cyberknife* or irradiat* or thermoablat* or ablat* or cyrotherap* or cytoreduct* or cyroablat* or stereostat* or SABR)	3151
27	((RAS or (robotic* NEAR1 assist*)) NEAR1 (surg* or remov* or partial* or procedur* or treat* or operat*))	28
28	(minimal* NEAR2 invas* NEAR2 (surg* or procedur* or treat*))	425
29	((inferior-vena-cava or IVC) NEAR2 thrombectom*)	0
30	((activ* or tumor* or tumour* or delay*) NEAR2 (surveil* or monitor*))	119
31	(delay* NEAR2 treat*)	119
32	MESH DESCRIPTOR Watchful Waiting	38
33	(watchful* NEAR1 wait*)	137
34	#7 or #8 or #9 or #10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21 or #22 or #23 or #24 or #25 or #26 or #27 or #28 or #29 or #30 or #31 or #32 or #33	6388
35	#6 AND #34	97
36	(#35) IN NHSEED	23
37	(#35) IN HTA	27

Database name: Embase

Searches
1 exp kidney tumor/ (169657) 2 (Kidney* adj2 (cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumo?r* or mass or metastat* or malignan* or sarcoma* or parenchyma* or t1 or t1a or t1b or tb or t2a or t2b or t3 or t3a or t3b or t3c or stage-1 or stage-2 or stage-3 or stage-4)).ti,ab. (25905) 3 (collecting-duct* adj2 (cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumo?r* or mass or metastat* or malignan* or sarcoma* or parenchyma* or stage-4)).ti,ab. (739) 4 (renal-cell* or RCC or ccRCC or Renal-mass* or renal-tumo?r* or grawitz-tumo?r* or hypernephroma* or nephrocarcinoma*).ti,ab. (105980) 5 (Kidney* adj2 (Transitional-cell* or cell or urothelial* or duct or advanc*) adj2 (cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumo?r* or mass or metastat* or malignan* or sarcoma* or parenchyma*)).ti,ab. (1182) 6 or/1-5 (199645) 7 exp nephrectomy/ (79289) 8 (nephrectom* or lymphadenectom*).ti,ab,kw. (96024) 9 ((kidney* or renal* or RCC or ccRCC or lymph* or adrenal* or cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumo?r* or mass or metastat* or malignan* or sarcoma* or hypernephroma* or nephrocarcinoma*) adj3 (remov* or surg* or extract* or extirpat* or operat*)).ti,ab. (296981) 10 ((kidney* or renal* or RCC or ccRCC or lymph* or adrenal* or cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumo?r* or mass or metastat* or malignan* or sarcoma* or hypernephroma* or nephrocarcinoma*) and (remov* or surg* or extract* or extirpat* or operat*)).kf. (84341) 11 ((laproscop* or open or partial* or radical or transperiton* or retroperiton*) adj3 (surg* or remov* or partial* or procedur* or treat* or operat*)).ti,ab. (1174471) 12 ((laproscop* or open or partial* or radical or transperiton* or retroperiton*) and (surg* or remov* or partial* or procedur* or treat* or operat*)).kf. (39794) 13 (nephron* adj2 (surg* or remov* or partial* or procedur* or treat* or operat* or spar* or preserv*)).ti,ab. (4849) 14 (nephron* and (surg* or remov* or partial* or procedur* or treat* or operat* or spar* or preserv*)).kf. (927) 15 radiotherapy/ or cancer radiotherapy/ or adjuvant radiotherapy/ or exp radiosurgery/ or radiotherapy dosage/ or megavoltage radiotherapy/ or re-irradiation/ or cytoreductive surgery/ or ablation therapy/ or radiofrequency ablation/ or robot assisted surgery/ or minimally invasive surgery/ or metastasis resection/ or lymph node dissection/ or cryotherapy/ or stereotactic body radiation therapy/ or active surveillance/ or watchful waiting/ (702412) 16 (radiotherap* or radiation* or radiosurg* or cyberknife* or irradiat* or thermoablat* or ablat* or cyrotherap* or cytoreduct* or cyroablat* or stereostat* or SABR).ti,ab,kw. (1248256) 17 ((RAS or (robotic* adj1 assist*)) adj1 (surg* or remov* or partial* or procedur* or treat* or operat*)).ti,ab. (3873) 18 ((RAS or (robotic* adj1 assist*)) and (surg* or remov* or partial* or procedur* or treat* or operat*)).kw. (21) 19 (minimal* adj2 invas* adj2 (surg* or procedur* or treat*)).ti,ab. (58898) 20 (minimal* and invas* and (surg* or procedur* or treat*)).kw. (8) 21 ((inferior-vena-cava or IVC) adj2 thrombectom*).ti,ab. (647) 22 ((inferior-vena-cava or IVC) and thrombectom*).kw. (36) 23 ((activ* or tumo?r* or delay*) adj2 (surveil* or monitor*)).ti,ab. (57069)

Searches
24 ((activ* or tumo?r* or delay*) and (surveil* or monitor*)).kw. (432) 25 (delay* adj2 treat*).ti,ab. (32723) 26 (delay* and treat*).kw. (281) 27 (watchful* adj1 wait*).ti,ab. (4971) 28 (watchful* and wait*).kw. (8) 29 or/7-28 (3014855) 30 6 and 29 (72543) 31 nonhuman/ not human/ (5377221) 32 30 not 31 (70709) 33 limit 32 to english language (63258) 34 33 not (letter or editorial).pt. (61164) 35 34 not (conference abstract* or conference review or conference paper or conference proceeding).db,pt,su. (41542) 36 afghanistan/ or africa/ or "africa south of the sahara"/ or albania/ or algeria/ or andorra/ or angola/ or argentina/ or "antigua and barbuda"/ or armenia/ or exp azerbaijan/ or bahamas/ or bahrain/ or bangladesh/ or barbados/ or belarus/ or belize/ or benin/ or bhutan/ or bolivia/ or borneo/ or exp "bosnia and herzegovina"/ or botswana/ or exp brazil/ or brunei darussalam/ or bulgaria/ or burkina faso/ or burundi/ or cambodia/ or cameroon/ or cape verde/ or central africa/ or central african republic/ or chad/ or exp china/ or comoros/ or congo/ or cook islands/ or cote d'ivoire/ or croatia/ or cuba/ or cyprus/ or democratic republic congo/ or djibouti/ or dominica/ or dominican republic/ or ecuador/ or el salvador/ or egypt/ or equatorial guinea/ or eritrea/ or eswatini/ or ethiopia/ or exp "federated states of micronesia"/ or fiji/ or gabon/ or gambia/ or exp "georgia (republic)"/ or ghana/ or grenada/ or guatemala/ or guinea/ or guinea-bissau/ or guyana/ or haiti/ or honduras/ or exp india/ or exp indonesia/ or iran/ or exp iraq/ or jamaica/ or jordan/ or kazakhstan/ or kenya/ or kiribati/ or kosovo/ or kuwait/ or kyrgyzstan/ or laos/ or lebanon/ or liechtenstein/ or lesotho/ or liberia/ or libyan arab jamahiriya/ or madagascar/ or malawi/ or exp malaysia/ or maldives/ or mali/ or malta/ or mauritania/ or mauritius/ or melanesia/ or moldova/ or monaco/ or mongolia/ or "montenegro (republic)"/ or morocco/ or mozambique/ or myanmar/ or namibia/ or nauru/ or nepal/ or nicaragua/ or niger/ or nigeria/ or niue/ or north africa/ or oman/ or exp pakistan/ or palau/ or palestine/ or panama/ or papua new guinea/ or paraguay/ or peru/ or philippines/ or polynesia/ or qatar/ or "republic of north macedonia"/ or romania/ or exp russian federation/ or rwanda/ or sahel/ or "saint kitts and nevis"/ or "saint lucia"/ or "saint vincent and the grenadines"/ or saudi arabia/ or senegal/ or exp serbia/ or seychelles/ or sierra leone/ or singapore/ or "sao tome and principe"/ or solomon islands/ or exp somalia/ or south africa/ or south asia/ or south sudan/ or exp southeast asia/ or sri lanka/ or sudan/ or suriname/ or syrian arab republic/ or taiwan/ or tajikistan/ or tanzania/ or thailand/ or timor-leste/ or togo/ or tonga/ or "trinidad and tobago"/ or tunisia/ or turkmenistan/ or tuvalu/ or uganda/ or exp ukraine/ or exp united arab emirates/ or uruguay/ or exp uzbekistan/ or vanuatu/ or venezuela/ or viet nam/ or western sahara/ or yemen/ or zambia/ or zimbabwe/ (1740991) 37 exp "organisation for economic co-operation and development"/ (2851) 38 exp australia/ or "australia and new zealand"/ or austria/ or baltic states/ or exp belgium/ or exp canada/ or chile/ or colombia/ or costa rica/ or czech republic/ or denmark/ or estonia/ or europe/ or exp finland/ or exp france/ or exp germany/ or greece/ or hungary/ or iceland/ or ireland/ or israel/ or exp italy/ or japan/ or korea/ or latvia/ or lithuania/ or luxembourg/ or exp mexico/ or netherlands/ or new zealand/ or north america/ or exp norway/ or poland/ or exp portugal/ or scandinavia/ or sweden/ or slovakia/ or slovenia/ or south korea/ or exp spain/ or switzerland/ or "Turkey (republic)"/ or exp united kingdom/ or exp united states/ or western europe/ (3835523) 39 european union/ (31807) 40 developed country/ (35992) 41 or/37-40 (3869712) 42 36 not 41 (1584824) 43 35 not 42 (41050) 44 cost utility analysis/ (12696)

Searches
45 (cost* and ((qualit* adj2 adjust* adj2 life*) or qaly*)).tw. (30947) 46 ((incremental* adj2 cost*) or ICER).tw. (31650) 47 (cost adj2 utilit*).tw. (11338) 48 (cost* and ((net adj benefit*) or (net adj monetary adj benefit*) or (net adj health adj benefit*))).tw. (3393) 49 ((cost adj2 (effect* or utilit*)) and (quality adj of adj life)).tw. (37671) 50 (cost and (effect* or utilit*)).ti. (58589) 51 or/44-50 (92726) 52 43 and 51 (65)

Database name: Medline ALL

Searches
1 exp Kidney Neoplasms/ (85968) 2 (Kidney* adj2 (cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumo?r* or mass or metastat* or malignan* or sarcoma* or parenchyma* or t1 or t1a or t1b or tb or t2a or t2b or t3 or t3a or t3b or t3c or stage-1 or stage-2 or stage-3 or stage-4)).ti,ab. (17223) 3 (collecting-duct* adj2 (cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumo?r* or mass or metastat* or malignan* or sarcoma* or parenchyma* or stage-4)).ti,ab. (491) 4 (renal-cell* or RCC or ccRCC or Renal-mass* or renal-tumo?r* or grawitz-tumo?r* or hypernephroma* or nephrocarcinoma*).ti,ab. (70816) 5 (Kidney* adj2 (Transitional-cell* or cell or urothelial* or duct or advanc*) adj2 (cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumo?r* or mass or metastat* or malignan* or sarcoma* or parenchyma*)).ti,ab. (817) 6 or/1-5 (118910) 7 exp nephrectomy/ (37965) 8 (nephrectom* or lymphadenectom*).ti,ab,kw. (62344) 9 ((kidney* or renal* or RCC or ccRCC or lymph* or adrenal* or cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumo?r* or mass or metastat* or malignan* or sarcoma* or hypernephroma* or nephrocarcinoma*) adj3 (remov* or surg* or extract* or extirpat* or operat*)).ti,ab. (205263) 10 ((kidney* or renal* or RCC or ccRCC or lymph* or adrenal* or cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumo?r* or mass or metastat* or malignan* or sarcoma* or hypernephroma* or nephrocarcinoma*) and (remov* or surg* or extract* or extirpat* or operat*)).kf. (60200) 11 ((laproscop* or open or partial* or radical or transperiton* or retroperiton*) adj3 (surg* or remov* or partial* or procedur* or treat* or operat*)).ti,ab. (920508) 12 ((laproscop* or open or partial* or radical or transperiton* or retroperiton*) and (surg* or remov* or partial* or procedur* or treat* or operat*)).kf. (22001) 13 (nephron* adj2 (surg* or remov* or partial* or procedur* or treat* or operat* or spar* or preserv*)).ti,ab. (2662) 14 (nephron* and (surg* or remov* or partial* or procedur* or treat* or operat* or spar* or preserv*)).kf. (447) 15 radiotherapy/ or lymphatic irradiation/ or radiosurgery/ or radiotherapy, adjuvant/ or radiotherapy dosage/ or radiotherapy, high-energy/ or re-irradiation/ or Cytoreduction Surgical Procedures/ or Ablation Techniques/ or Radiofrequency Ablation/ or Robotic Surgical Procedures/ or Minimally Invasive Surgical Procedures/ or Metastasectomy/ or Lymph Node Excision/ or Watchful Waiting/ (240052) 16 (radiotherap* or radiation* or radiosurg* or cyberknife* or irradiat* or thermoablat* or ablat* or cyrotherap* or cytoreduct* or cyroablat* or stereostat* or SABR).ti,ab,kw. (936452) 17 ((RAS or (robotic* adj1 assist*)) adj1 (surg* or remov* or partial* or procedur* or treat* or operat*)).ti,ab. (2212)

Searches
18 ((RAS or (robotic* adj1 assist*)) and (surg* or remov* or partial* or procedur* or treat* or operat*)).kw. (11) 19 (minimal* adj2 invas* adj2 (surg* or procedur* or treat*)).ti,ab. (38673) 20 (minimal* and invas* and (surg* or procedur* or treat*)).kw. (5) 21 ((inferior-vena-cava or IVC) adj2 thrombectom*).ti,ab. (279) 22 ((inferior-vena-cava or IVC) and thrombectom*).kw. (26) 23 ((activ* or tumo?r* or delay*) adj2 (surveil* or monitor*)).ti,ab. (38554) 24 ((activ* or tumo?r* or delay*) and (surveil* or monitor*)).kw. (268) 25 (delay* adj2 treat*).ti,ab. (20957) 26 (delay* and treat*).kw. (163) 27 (watchful* adj1 wait*).ti,ab. (3243) 28 (watchful* and wait*).kw. (4) 29 or/7-28 (2207356) 30 6 and 29 (38664) 31 animals/ not humans/ (5159676) 32 30 not 31 (36990) 33 limit 32 to english language (30881) 34 limit 33 to (letter or historical article or comment or editorial or news or case reports) (9092) 35 33 not 34 (21789) 36 afghanistan/ or africa/ or africa, northern/ or africa, central/ or africa, eastern/ or "africa south of the sahara"/ or africa, southern/ or africa, western/ or albania/ or algeria/ or andorra/ or angola/ or "antigua and barbuda"/ or argentina/ or armenia/ or azerbaijan/ or bahamas/ or bahrain/ or bangladesh/ or barbados/ or belize/ or benin/ or bhutan/ or bolivia/ or borneo/ or "bosnia and herzegovina"/ or botswana/ or brazil/ or brunei/ or bulgaria/ or burkina faso/ or burundi/ or cabo verde/ or cambodia/ or cameroon/ or central african republic/ or chad/ or exp china/ or comoros/ or congo/ or cote d'ivoire/ or croatia/ or cuba/ or "democratic republic of the congo"/ or cyprus/ or djibouti/ or dominica/ or dominican republic/ or ecuador/ or egypt/ or el salvador/ or equatorial guinea/ or eritrea/ or eswatini/ or ethiopia/ or fiji/ or gabon/ or gambia/ or "georgia (republic)"/ or ghana/ or grenada/ or guatemala/ or guinea/ or guinea-bissau/ or guyana/ or haiti/ or honduras/ or independent state of samoa/ or exp india/ or indian ocean islands/ or indochina/ or indonesia/ or iran/ or iraq/ or jamaica/ or jordan/ or kazakhstan/ or kenya/ or kosovo/ or kuwait/ or kyrgyzstan/ or laos/ or lebanon/ or liechtenstein/ or lesotho/ or liberia/ or libya/ or madagascar/ or malaysia/ or malawi/ or mali/ or malta/ or mauritania/ or mauritius/ or mekong valley/ or melanesia/ or micronesia/ or monaco/ or mongolia/ or montenegro/ or morocco/ or mozambique/ or myanmar/ or namibia/ or nepal/ or nicaragua/ or niger/ or nigeria/ or oman/ or pakistan/ or palau/ or exp panama/ or papua new guinea/ or paraguay/ or peru/ or philippines/ or qatar/ or "republic of belarus"/ or "republic of north macedonia"/ or romania/ or exp russia/ or rwanda/ or "saint kitts and nevis"/ or saint lucia/ or "saint vincent and the grenadines"/ or "sao tome and principe"/ or saudi arabia/ or serbia/ or sierra leone/ or senegal/ or seychelles/ or singapore/ or somalia/ or south africa/ or south sudan/ or sri lanka/ or sudan/ or suriname/ or syria/ or taiwan/ or tajikistan/ or tanzania/ or thailand/ or timor-leste/ or togo/ or tonga/ or "trinidad and tobago"/ or tunisia/ or turkmenistan/ or uganda/ or ukraine/ or united arab emirates/ or uruguay/ or uzbekistan/ or vanuatu/ or venezuela/ or vietnam/ or west indies/ or yemen/ or zambia/ or zimbabwe/ (1325188) 37 "organisation for economic co-operation and development"/ (587) 38 australasia/ or exp australia/ or austria/ or baltic states/ or belgium/ or exp canada/ or chile/ or colombia/ or costa rica/ or czech republic/ or exp denmark/ or estonia/ or europe/ or finland/ or exp france/ or exp germany/ or greece/ or hungary/ or iceland/ or ireland/ or israel/ or exp italy/ or exp japan/ or korea/ or latvia/ or lithuania/ or luxembourg/ or mexico/ or netherlands/ or new zealand/ or north america/ or exp norway/ or poland/ or portugal/ or exp "republic of korea"/ or "scandinavian and nordic countries"/ or slovakia/ or slovenia/ or spain/ or sweden/ or switzerland/ or turkey/ or exp united kingdom/ or exp united states/ (3530229) 39 european union/ (17894)

Searches
40 developed countries/ (21491) 41 or/37-40 (3546443) 42 36 not 41 (1234802) 43 35 not 42 (21490) 44 Cost-Benefit Analysis/ (93959) 45 (cost* and ((qualit* adj2 adjust* adj2 life*) or qaly*)).tw. (18159) 46 ((incremental* adj2 cost*) or ICER).tw. (18654) 47 (cost adj2 utilit*).tw. (7142) 48 (cost* and ((net adj benefit*) or (net adj monetary adj benefit*) or (net adj health adj benefit*))).tw. (2429) 49 ((cost adj2 (effect* or utilit*)) and (quality adj of adj life)).tw. (24749) 50 (cost and (effect* or utilit*)).ti. (39941) 51 or/44-50 (116479) 52 43 and 51 (62)

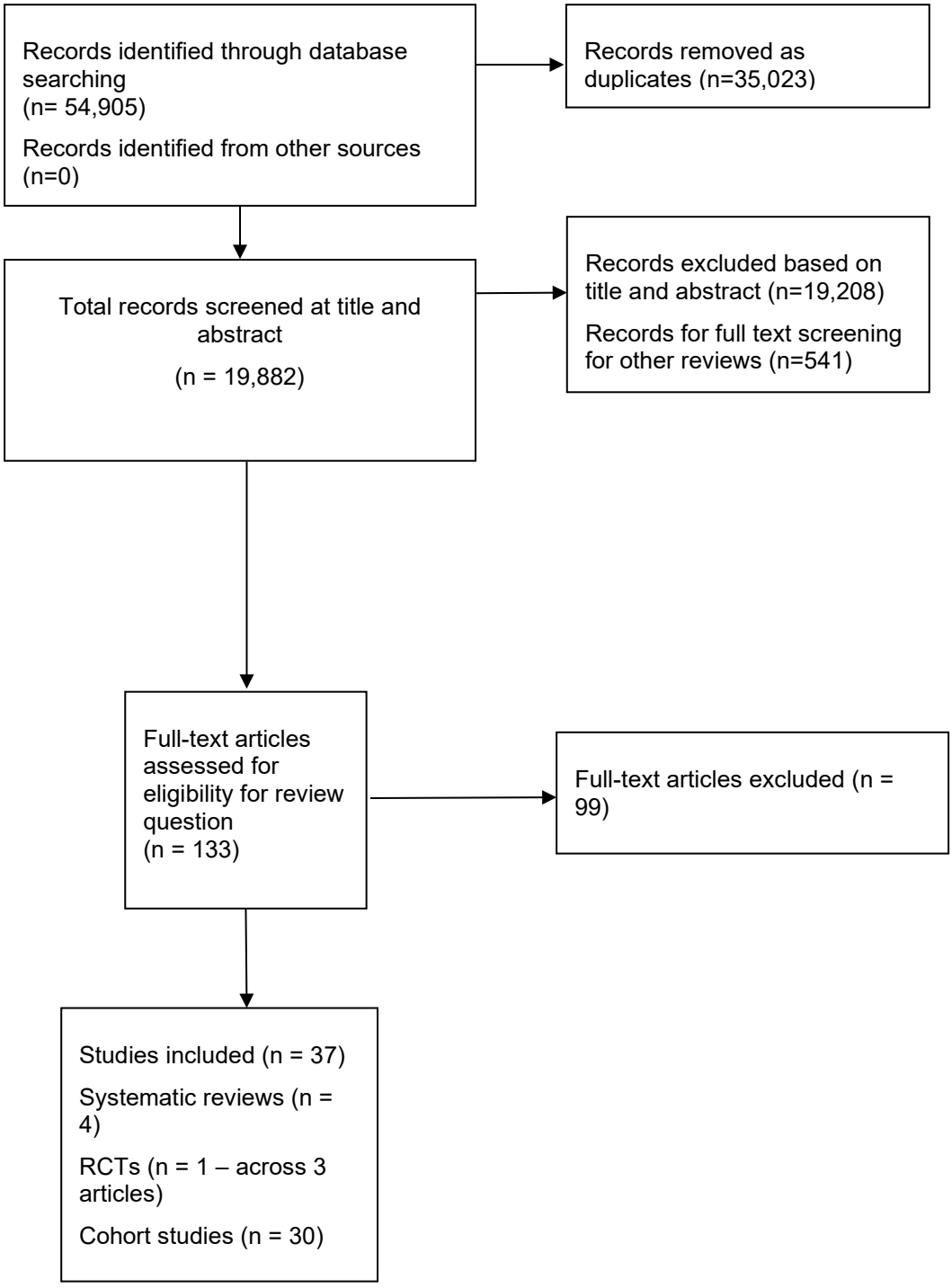
Database name: INAHTA

Searches
#1 "Kidney Neoplasms"[mhe] 111
#2 ((Kidney* AND (cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumo?r* or mass or metastat* or malignan* or sarcoma* or parenchyma* or t1 or t1a or t1b or tb or t2a or t2b or t3 or t3a or t3b or t3c or stage-1 or stage-2 or stage-3 or stage-4))) OR ((collecting-duct* AND (cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumor* or tumour* or mass or metastat* or malignan* or sarcoma* or parenchyma* or stage-4)) OR ((renal-cell* or RCC or ccRCC or Renal-mass* or renal-tumor* or renal-tumour* or grawitz-tumor* or grawitz-tumour* or hypernephroma* or nephrocarcinoma*)) OR ((Kidney* AND (Transitional-cell* or cell or urothelial* or duct or advanc*) AND (cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumor* or tumour* or mass or metastat* or malignan* or sarcoma* or parenchyma*))) 105
#3 #1 or #2 155
#4 "Nephrectomy"[mhe] 12
#5 ((nephrectom* or lymphadenectom*)) 31
#6 "Radiotherapy"[mh] 220
#7 "Lymphatic Irradiation"[mh] 0
#8 "Radiosurgery"[mh] 71
#9 "Radiotherapy Adjuvant"[mh] 27
#10 "Radiotherapy Dosage"[mh] 27
#11 "Radiotherapy High-Energy"[mh] 9
#12 "Re-Irradiation"[mh] 2
#13 "Cytoreduction Surgical Procedures"[mh] 2
#14 "Ablation Techniques"[mh] 35
#15 "Radiofrequency Ablation"[mh] 29
#16 "Robotic Surgical Procedures"[mh] 22
#17 "Minimally Invasive Surgical Procedures"[mh] 109
#18 "Metastasectomy"[mh] 1
#19 "Lymph Node Excision"[mh] 9
#20 ((kidney* or renal* or RCC or ccRCC or lymph* or adrenal* or cancer* or carcinoma* or carcinosarcoma* or adenocarcino* or neoplas* or tumor* or tumour* or mass or metastat* or malignan* or sarcoma* or hypernephroma* or nephrocarcinoma*) AND (remov* or surg* or extract* or extirpat* or operat*)) 878

Searches
#21 ((laproscop* or open or partial* or radical or transperiton* or retroperiton*) AND (surg* or remov* or partial* or procedur* or treat* or operat*)) 756
#22 (nephron* AND (surg* or remov* or partial* or procedur* or treat* or operat* or spar* or preserv*)) 2
#23 radiotherap* or radiation* or radiosurg* or cyberknife* or irradiat* or thermoablat* or ablat* or cyrotherap* or cytoreduct* or cyroablat* or stereostat* or SABR) 1000
#24 ((RAS or (robotic* AND assist*)) AND (surg* or remov* or partial* or procedur* or treat* or operat*)) 73
#25 (minimal* AND invas* AND (surg* or procedur* or treat*))246
#26 ((inferior-vena-cava or IVC) AND thrombectom*) 0
#27 ((activ* or tumor* or tumour* or delay*) AND (surveil* or monitor*)) 318
#28 (delay* AND treat*) 201
#29 (watchful* AND wait*) 45
#30 "Watchful Waiting"[mh] 17
#31 #30 OR #29 OR #28 OR #27 OR #26 OR #25 OR #24 OR #23 OR #22 OR #21 OR #20 OR #19 OR #18 OR #17 OR #16 OR #15 OR #14 OR #13 OR #12 OR #11 OR #10 OR #9 OR #8 OR #7 OR #6 OR #5 OR #4 2803
#32 #31 AND #3 155

Appendix C – Effectiveness evidence study selection

Figure 1: PRISMA diagram



Appendix D – Effectiveness evidence

Systematic review evidence

Deng, 2019

Bibliographic Reference	Deng, Wen; Chen, Luyao; Wang, Yibing; Liu, Xiaoqiang; Wang, Gongxian; Fu, Bin; Partial nephrectomy versus radical nephrectomy for large (>= 7 cm) renal tumors: A systematic review and meta-analysis.; Urologic oncology; 2019; vol. 37 (no. 4); 263-272

Study Characteristics

Study design	Systematic review
Study details	Dates searched Up to October in 2018 Databases searched PubMed, EMBASE, the Cochrane Library, and Scopus Sources of funding This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.
Inclusion criteria	(1) Studies that compared PN and RN for large (≥7 cm) renal tumours (2) data on at least one of the required outcomes were extractable
Exclusion criteria	(1) Noncomparative study (2) no available data could be extracted from relevant studies (3) editorials or letters (4) conference abstracts (5) case reports (6) animal experimental studies
Intervention(s)	Partial nephrectomy Radical nephrectomy
Outcome(s)	Postoperative severe adverse events Other outcomes not used as more applicable systematic reviews identified

Number of studies included in the systematic review	12 studies reported in 13 publications; all studies were retrospective cohorts
Studies from the systematic review that are relevant for use in the current review	Odds ratios on postoperative severe adverse events were taken from Deng et al. 2019 for the following studies and added to RevMan Web: • Breau 2010 • Chebbi 2017 • de S Aubert 2018 • Janssen 2018 • Kopp 2014
Studies from the systematic review that are not relevant for use in the current review	Data on postoperative severe adverse events was not reported for the following studies by Deng et al. 2019: • Hansen 2012 • Jeldres 2009 • Lee 2017 • Reix 2018 • Rinott 2018 • Roos 2012 • Shum 2017
Additional comments	Whenever reduplicative or updated reports describing the same population were published, the most recent or complete one was included. Study characteristics were not reported, and neither was an overall summary of included studies.

Study arms

Partial nephropathy (N = 248)

This is the number of participants included in this arm by studies reporting on postoperative severe adverse events.

Radical nephropathy (N = 653)

This is the number of participants included in this arm by studies reporting on postoperative severe adverse events.

Critical appraisal - GDT Crit App - ROBIS checklist

Section	Question	Answer
Overall study ratings	Overall risk of bias	Moderate *(There was no reference of a review protocol and it was unclear whether criteria were pre-specified or adapted post-hoc. The full search strategy was not reported and it was unclear whether the search strategy was fit for purpose. Pre-defined analyses were not reported.)*
Overall study ratings	Applicability as a source of data	Fully applicable

Gu, 2016

Bibliographic Reference	Gu, Liangyou; Ma, Xin; Li, Hongzhao; Chen, Luyao; Xie, Yongpeng; Li, Xintao; Gao, Yu; Zhang, Yu; Zhang, Xu; Comparison of oncologic outcomes between partial and radical nephrectomy for localized renal cell carcinoma: A systematic review and meta-analysis.; Surgical oncology; 2016; vol. 25 (no. 4); 385-393

Study Characteristics

Study design	Systematic review
Study details	Dates searched From inception to March 2016 Databases searched Pubmed, Embase, Cochrane Library and Web of Science Sources of funding This work was supported in part by the National High Technology Research and Development Program (“863” Program) of China (2014AA020607).
Inclusion criteria	The study cohort included patients diagnosed with localised RCC (clinical stage T1a-T2N0M0) according to magnetic resonance imaging or computed tomography. Studies embracing pathologic T3 patients were also included if only the clinical stage was T1-2N0M0. Studies that compared oncologic outcomes between partial nephropathy and radical nephropathy were included.
Exclusion criteria	(1) non-human research (2) studies that did not analyse patients with renal cell carcinoma

	(3) studies of limited to paediatric patients (age <18 years), hereditary renal cancer syndromes, and Wilm's tumours (4) studies that included patients had lymphatic or distant metastases or venous tumour thrombus (5) studies that included patients with multifocal or bilateral tumours, benign tumours, solitary kidneys (6) non-primary studies (e.g., letters, editorials, expert opinions, reviews, meta-analysis, systematic reviews) (7) grey literature (e.g., thesis, abstract only); and (8) studies that can't obtained hazard ratios (HRs) from multivariate analyses and 95% confidence intervals (CIs)
Intervention(s)	Partial nephrectomy Radical nephrectomy
Outcome(s)	Overall survival Recurrence-free survival Other reported outcomes were not relevant to the review question (cancer-specific survival)
Number of studies included in the systematic review	14 cohort studies • 2 were prospectively designed • 12 were retrospectively designed • 8 were population-based or multi-institution data used to examine the comparative outcomes of partial nephrectomy and radical nephrectomy
Studies from the systematic review that are relevant for use in the current review	Hazard ratios on overall survival were taken from Gu et al. 2016 for the following studies and added to RevMan Web. N = 19,580: • Lai 2016 • Mashni 2015 • Milonas 2013 • O'Malley 2015 • Roos 2014 • Weight 2011 Hazard ratios on recurrence-free survival were taken from Gu et al. 2016 for the following studies and added to RevMan Web. N = 3752: • Ha 2013

	• Nayak 2016 • Oh 2014 • Shim 2015
Studies from the systematic review that are not relevant for use in the current review	Data on overall survival and recurrence-free survival was not reported for the following studies by Gu et al. 2016: • Hansen 2012 • Antonelli 2012 • Weight 2010 • Bedke 2008
Additional comments	When more than one study analysing the same patient cohort was retrieved, the more well-designed, recent and informative publication was selected.

Study arms

Partial nephrectomy (N = 6803)

This is the number of participants included in this arm by studies reporting on overall survival or recurrence-free survival.

Radical nephrectomy (N = 16529)

This is the number of participants included in this arm by studies reporting on overall survival or and recurrence-free survival.

Characteristics

Arm-level characteristics

Characteristic	Partial nephrectomy (N = 6803)	Radical nephrectomy (N = 16529)
Age Custom value	mean or median age ranged from 53 to 63 years	mean or median age ranged from 53 to 67 years

Critical appraisal - GDT Crit App - ROBIS checklist

Section	Question	Answer
Overall study ratings	Overall risk of bias	Moderate *(There was no reference of a review protocol and it was unclear whether criteria were pre-specified or adapted post-hoc. Pre-defined analyses were not reported. The full search*

Section	Question	Answer
		strategy was not reported and it was unclear whether the search strategy was fit for purpose.)
Overall study ratings	Applicability as a source of data	Fully applicable

Huang, 2021

Bibliographic Reference	Huang, Ruizhen; Zhang, Chiyu; Wang, Xing; Hu, Honglin; Partial Nephrectomy Versus Radical Nephrectomy for Clinical T2 or Higher Stage Renal Tumors: A Systematic Review and Meta-Analysis.; Frontiers in oncology; 2021; vol. 11; 680842

Study Characteristics

Study design	Systematic review
Study details	Dates searched From inception until September 2020 Databases searched PubMed database, Web of Science, and Embase Sources of funding This work was supported by grants from the National Natural Science Foundation of China (No. 81860128) and the Natural Science Foundation of Jiangxi Province (No. 20171BAB205016).
Inclusion criteria	Original articles that involved studying the efficacy of partial nephrectomy vs. radical nephrectomy in the treatment of T2 renal tumours, or some subgroups; publications written in the English language; studies in which the patients undergoing nephrectomy were all adults (>18 years old); both retrospective and prospective studies; studies meeting at least one of the required outcome indicators for this study.
Exclusion criteria	Non-partial nephrectomy vs. radical nephrectomy research; comments, conference abstracts, reviews, or replies, in which relevant data could not be extracted; case reports; and studies in which the research subjects were animals, cells, or minors.
Intervention(s)	Partial nephrectomy Radical nephrectomy
Outcome(s)	Duration of hospital stay Other outcomes not extracted as more applicable or recent systematic reviews used (Ochoa-Arvizo 2023 for renal functional outcomes; Deng

	2019 for complications and Gu 2016 for overall survival and disease free survival).
Number of studies included in the systematic review	• 27 studies were included in the qualitative synthesis (not relevant for this review) • 15 retrospective cohort studies were included in the quantitative synthesis
Studies from the systematic review that are relevant for use in the current review	Mean differences on duration of hospital stay were taken from Huang et al. 2021 for the following studies: • Brewer 2012 • De Saint Aubert 2018 • Kopp 2015 • Margulis 2007 • Shum 2017
Studies from the systematic review that are not relevant for use in the current review	Data on duration of hospital stay was not reported for the following studies by Huang et al. 2021: • An 2017 • Breau 2010 • Hansen 2012 • Janssen 2018 • Jeldres 2009 • Reix 2018 • Rinott 2018 • Roos 2012 • Vilaseca 2020 • Van Poppel 2011
Additional comments	

Study arms

Partial nephrectomy (N = 735)

This is the number of participants included in this arm by studies reporting on duration of hospital stay.

Radical nephrectomy (N = 1405)

This is the number of participants included in this arm by studies reporting on duration of hospital stay.

Critical appraisal - GDT Crit App - ROBIS checklist

Section	Question	Answer
Overall study ratings	Overall risk of bias	High *(There was no reference of a review protocol and it was unclear whether criteria were pre-specified or adapted post-hoc. The full search strategy was not reported and it was unclear whether the search strategy was fit for purpose. Pre-defined analyses were not reported. One study was listed in the included studies but no data was reported on this study (reference 30: Van Poppel et al. 2011)*
Overall study ratings	Applicability as a source of data	Fully applicable

Ochoa-Arvizo, 2023

Bibliographic Reference	Ochoa-Arvizo, Mario; Garcia-Campa, Mariano; Santos-Santillana, Karla M; Klatte, Tobias; Garcia-Chairez, Luis R; Gonzalez-Colmenero, Alejandro D; Pallares-Mendez, Rigoberto; Cervantes-Miranda, Daniel E; Plata-Huerta, Hiram H; Rodriguez-Gutierrez, Rene-; Gutierrez-Gonzalez, Adrian; Renal functional and cardiovascular outcomes of partial nephrectomy versus radical nephrectomy for renal tumors: a systematic review and meta-analysis.; Urologic oncology; 2023; vol. 41 (no. 3); 113-124

Study Characteristics

Study design	Systematic review
Study details	Dates searched From inception to September 17, 2021 Databases searched Scopus, Web of Science, MEDLINE, and EMBASE Sources of funding Not reported
Inclusion criteria	Eligible studies were included if they compared renal function and cardiovascular adverse events in adults with renal cell carcinoma that underwent either partial or radical nephrectomy with at least three months of follow-up and reported an adjusted effect estimate (hazard ratio or odds ratio). Only articles written in English were included.
Exclusion criteria	Patients with metastatic renal disease, bilateral kidney tumours, or a solitary kidney were excluded.

Intervention(s)	Partial nephrectomy Radical nephrectomy
Outcome(s)	Renal function impairment New-onset of CKD after the intervention, defined as the progression of any CKD stage to the next stage, new onset of an estimated glomerular filtration rate (eGFR) of <60 mL/min/1.73 m2 and new onset of an eGFR of <45, <30, and <15 mL/min/1.73 m2. Due to the heterogeneity of defining CKD across studies, studies were pooled for stages III-V or IV-V as determined by the eGFR or by renal replacement therapy and kidney transplant. Cardiovascular events Defined as the diagnosis of coronary heart disease, cardiomyopathy, thromboembolic event, peripheral arteriopathy, myocardial infarction, arrhythmia, new-onset or worsening hypertension, or cerebrovascular disease during the follow-up period in patients with no prior history of cardiovascular events. New-onset hypertension was classified as a new diagnosis of hypertension requiring at least one antihypertensive medication. Worsening hypertension was defined as the use of additional antihypertensive medications after surgery. Cardiovascular events were evaluated as composite outcomes in most studies.

Number of studies included in the systematic review	• 64 studies were included in the qualitative analysis
	• 39 studies met the inclusion criteria for quantitative analyses
	  ○ 31 studies reported renal function impairment
	  ○ 11 studies reported cardiovascular events (3 of these studies also reported renal function impairment)

Studies from the systematic review that are relevant for use in the current review	Hazard ratios on renal function impairment and cardiovascular events were taken from Ochoa-Arvizo et al. 2023 for the following studies and added into RevMan Web: • Nayan 2020 • Yap 2015 Hazard ratios on renal function impairment were taken from Ochoa-Arvizo et al. 2023 for the following studies and added into RevMan Web: • Bradshaw 2020 • Choi 2014 • Chung 2018 • Cotta 2021 • Gershman 2018 • Jang 2016 • Jeon 2009 • Lai 2016

	• Leppert 2018 • Lin 2015 • Mashni 2015 • Mir 2020 • Mühlbauer 2020 • Süer 2011 • Sun 2012 • Yoo 2017 Odds ratios on renal function impairment were taken from Ochoa-Arvizo et al. 2023 for the following studies: • Ahn 2018 • Jeon 2013 • Kim 2014 • Kong 2013 • Malcom 2009 • Mariusdottir 2013 • Miyamoto 2012 • O'Malley 2015 • Roos 2012 • Scosyrev 2017 • Weight 2010 • Wenzel 2021 Hazard ratios on cardiovascular events were taken from Ochoa-Arvizo et al. 2023 for the following studies: • Capitano 2020 • Chung 2016 • Huang 2009 • Hutchinson 2017 • Kambara 2018 • Kyung 2014 • Shah 2019
Studies from the systematic review that are not relevant for use in the current review	Data on renal function impairment and cardiovascular events was not reported for the following studies by Ochoa-Arvizo et al. 2023: • Kopp 2015

Additional comments	Data was also extracted from Ochoa-Arvizo 2023 for renal function impairment (new onset eGFR <60) from 2 subgroup analyses: • participants with T1a renal tumours • participants with T1b renal tumours The total number of participants includes numbers from Kopp 2015 (n=202) and Weight 2010 (n=510) which could not be taken off the total number of participants from each arm because this specific data was not reported by Ochoa-Arvizo et al. 2023. Overall mean age of 59.3 years with a mean follow-up of 4.26 years for studies reporting on renal function impairment. Overall mean age of 62.3 years with a mean follow-up of 3.2 years for studies reporting on cardiovascular events.

Study arms

Partial nephrectomy (N = 59874)

Number of people with data on renal function impairment outcomes in this arm = 20713; Number of people with data on cardiovascular outcomes in this arm = 39161

Radical nephrectomy (N = 93670)

Number of people with data on renal function impairment outcomes in this arm = 31153; Number of people with data on cardiovascular outcomes in this arm = 62517

Critical appraisal - GDT Crit App - ROBIS checklist

Section	Question	Answer
Overall study ratings	Overall risk of bias	High *(There were differences between the PROSPERO registration and the publication of results; for example: inclusion of studies in the publication of results had further restrictions such as studies with at least 3 months of follow-up and studies reporting an adjusted effect estimate (hazard ratio or odds ratio).)*
Overall study ratings	Applicability as a source of data	Fully applicable

RCT evidence

Scosyrev, 2017

Bibliographic Reference	Scosyrev, Emil; Messing, Edward M; Sylvester, Richard; Van Poppel, Hendrik; Exploratory Subgroup Analyses of Renal Function and Overall Survival in European Organization for Research and Treatment of Cancer randomized trial of Nephron-sparing Surgery Versus Radical Nephrectomy.; European urology focus; 2017; vol. 3 (no. 6); 599-605

Study details

Other publications associated with this study included in review	Van Poppel, Hendrik, Da Pozzo, Luigi, Albrecht, Walter et al. (2011) A prospective, randomised EORTC intergroup phase 3 study comparing the oncologic outcome of elective nephron-sparing surgery and radical nephrectomy for low-stage renal cell carcinoma. European urology 59(4): 543-52. Van Poppel, Hendrik, Da Pozzo, Luigi, Albrecht, Walter et al. (2007) A prospective randomized EORTC intergroup phase 3 study comparing the complications of elective nephron-sparing surgery and radical nephrectomy for low-stage renal cell carcinoma. European urology 51(6): 1606-15.
Trial registration number and/or trial name	EORTC: 30904 (http://www.cancer.gov/clinicaltrials/EORTC-30904). Clinicaltrials.gov: NCT00002473.
Study type	Randomised controlled trial (RCT)
Study location	Multicentre (Belgium, Italy, Austria, Russia, Poland, France, Turkey, Spain, Canada, The Netherlands, Hungary, Germany, UK, Switzerland, Rep of Georgia, US)
Study setting	Hospital setting
Study dates	March 1992 to January 2003
Sources of funding	This publication was supported by grants number 5U10 CA11488-24 through 5U10 CA011488-40 from the National Cancer Institute (Bethesda, MD, US) and by Fonds Cancer (FOCA) from Belgium.
Inclusion criteria	Solitary renal tumour T1–T2 N0 M0 Renal tumour ≤5 cm suspicious for renal cell carcinoma Normal contralateral kidney WHO performance status of 0 to 2
Exclusion criteria	Solitary kidney

	von Hippel-Lindau disease Multifocal disease T3–T4 tumours Clinical presence of distant or lymphatic metastases WHO performance status >2 Another carcinoma (except for adequately treated nonmelanoma skin cancer)
Intervention(s)	For partial nephrectomy, tumour removal was done by excavation (no enucleation), wedge resection, or partial nephrectomy after rigorous inspection of the entire renal capsula together with limited lymphadenectomy. Hilar clamping was not routinely done. When there was any doubt about the margin status, a frozen section analysis of the resection margins was performed. In the case of a positive resection margin, satellite or secondary lesions, radical nephrectomy was done and the patient was, however, followed for recurrence and survival. When enlarged lymph nodes were found, a frozen section was done. In case of a positive lymphadenectomy, further treatment was left to the surgeon's discretion but the patient was still followed for recurrence and survival.
Comparator	Radical nephrectomy consisted of removal of the entire kidney with the adrenal and perinephric fat within the intact Gerota fascia. Limited lymphadenectomy could be done separately or en bloc and includes the lymphatic tissue in the renal hilus (usually included in the radical nephrectomy specimen anyway) and the nodes around the vena cava at the level of the renal veins on the right side and on the aorta at the level of the artery on the left side.
Outcome measures	Local recurrence Distant metastases All-cause mortality Renal function impairment • eGFR <60 ml/min/1.73 m2 • eGFR <45 ml/min/1.73 m2 • eGFR <30 ml/min/1.73 m2
Number of participants	N = 541 PN: 268 RN: 273

Duration of follow-up	The median follow-up periods were 6.7 years for eGFR and 9.3 years for survival and recurrence.
Loss to follow-up	PN: eGFR no follow-up (n=13) RN: eGFR no follow-up (n=14)
Methods of analysis	All-cause mortality and recurrence analyses included all randomised patients based on the intention-to-treat principle. Multivariable analyses were performed to identify independent predictors of progression to eGFR <60 ml/min/1.73 m2, eGFR <45 ml/min/1.73 m2, and eGFR <30 ml/min/ 1.73 m2, as well as independent predictors of time to death due to any cause. A separate multivariable model was fit for each of these four end points, with randomised treatment and the five baseline variables as covariates. Multivariable models were based on patients with available information on all five baseline variables. All reported p values were two sided. Subgroup analyses of the effect of randomised treatment on each end point were performed by fitting a regression model with treatment as the only covariate within each level of the respective baseline variable. Logistic regression models were used for analysis of the incidence of renal dysfunction, while Cox regression was used for analysis of the overall duration of survival. Tests of baseline variable-by-treatment interactions were performed by including the randomised treatment and the baseline variable of interest as covariates in the model, along with their product term. A small p value for the product term would represent evidence for a difference in the magnitude of the treatment effect across levels of the baseline variable in question. Patients with missing values for a given baseline variable were excluded from subgroup analysis involving the variable but were included in other subgroup analyses.

Study arms

Partial nephrectomy (N = 268)

Type of surgery not specified

Radical nephrectomy (N = 273)

Type of surgery not specified

Characteristics

Arm-level characteristics

Characteristic	Partial nephrectomy (N = 268)	Radical nephrectomy (N = 273)
% Female No of events	n = 87 ; % = 32.5	n = 91 ; % = 33.3
Age less than 62 years No of events	n = 125 ; % = 46.6	n = 131 ; % = 48
Age 62 years or more No of events	n = 143 ; % = 53.4	n = 142 ; % = 52
TNM classification - T1 No of events	n = 127 ; % = 47.4	n = 139 ; % = 50.9
TNM classification - T2 No of events	n = 137 ; % = 51.1	n = 130 ; % = 47.6
TNM classification - T3 No of events	n = 0 ; % = 0	n = 1 ; % = 0.4
TNM classification - missing No of events	n = 4 ; % = 1.5	n = 3 ; % = 1.1
Primary RCC type - Clear cell No of events	n = 177 ; % = 66	n = 163 ; % = 59.7
Primary RCC type - other malignant tumours (RCC) No of events	n = 50 ; % = 18.7	n = 69 ; % = 25.3
Primary RCC type - other cell type No of events	n = 37 ; % = 13.8	n = 34 ; % = 12.5
Primary RCC type - missing No of events	n = 4 ; % = 1.5	n = 7 ; % = 2.6
Performance status at baseline - WHO = 0 No of events	n = 229 ; % = 85.4	n = 227 ; % = 83.2

Characteristic	Partial nephrectomy (N = 268)	Radical nephrectomy (N = 273)
Performance status at baseline - WHO = 1 No of events	n = 35 ; % = 13.1	n = 37 ; % = 13.6
Performance status at baseline - WHO = 2 No of events	n = 1 ; % = 0.4	n = 6 ; % = 2.2
Performance status at baseline - missing No of events	n = 3 ; % = 1.1	n = 3 ; % = 1.1

Outcomes

Study timepoints

- 10 year

Survival

Outcome	Partial nephrectomy, 10 year, N = 268	Radical nephrectomy, 10 year, N = 273
local recurrence No of events	n = 6 ; % = 2.23	n = 1 ; % = 0.36
Distant metastases No of events	n = 6 ; % = 2.23	n = 7 ; % = 2.56

local recurrence - Polarity - Lower values are better
Distant metastases - Polarity - Lower values are better

Survival

Outcome	Partial nephrectomy vs Radical nephrectomy, 10 year, N2 = 273, N1 = 268
All-cause mortality Cox regression analysis Hazard ratio/95% CI	1.5 (1.03 to 2.16)

Outcome	Partial nephrectomy vs Radical nephrectomy, 10 year, N2 = 273, N1 = 268
All-cause mortality - Age (<62 years) Hazard ratio/95% CI	1.65 (0.7 to 3.86)
All-cause mortality - Age (≥62 years) Hazard ratio/95% CI	1.46 (0.97 to 2.2)
All-cause mortality - Performance status: 0 Hazard ratio/95% CI	1.62 (1.03 to 2.55)
All-cause mortality - Performance status: ≥1 Hazard ratio/95% CI	1.34 (0.7 to 2.57)

All-cause mortality - Polarity - Lower values are better

Long-term adverse events

Outcome	Partial nephrectomy vs Radical nephrectomy, 10 year, N2 = 273, N1 = 268
eGFR <60 ml/min/1.73 m2 Logistic regression model Odds ratio/95% CI	0.31 (0.2 to 0.47)
eGFR <60 - Age (<62 years) Odds ratio/95% CI	0.35 (0.2 to 0.59)
eGFR <60 - Age (≥62 years) Odds ratio/95% CI	0.11 (0.04 to 0.33)
eGFR <60 - Performance status: 0 Odds ratio/95% CI	0.32 (0.2 to 0.51)
eGFR <60 - Performance status: ≥1 Odds ratio/95% CI	0.24 (0.07 to 0.85)
eGFR <45 ml/min/1.73 m2 Logistic regression model Odds ratio/95% CI	0.39 (0.27 to 0.56)

Outcome	Partial nephrectomy vs Radical nephrectomy, 10 year, N2 = 273, N1 = 268
eGFR <45 - Age (<62 years) Odds ratio/95% CI	0.45 (0.24 to 0.84)
eGFR <45 - Age (≥62 years) Odds ratio/95% CI	0.28 (0.17 to 0.46)
eGFR <45 - Performance status: 0 Odds ratio/95% CI	0.4 (0.27 to 0.6)
eGFR <45 - Performance status: ≥1 Odds ratio/95% CI	0.32 (0.12 to 0.85)
eGFR <30 ml/min/1.73 m2 Logistic regression model Odds ratio/95% CI	0.6 (0.31 to 1.15)
eGFR <30 - Age (<62 years) Odds ratio/95% CI	1.05 (0.15 to 7.58)
eGFR <30 - Age (≥62 years) Odds ratio/95% CI	0.53 (0.26 to 1.07)
eGFR <30 - Performance status: 0 Odds ratio/95% CI	0.51 (0.24 to 1.1)
eGFR <30 - Performance status: ≥1 Odds ratio/95% CI	1.08 (0.3 to 3.92)

eGFR <60 ml/min/1.73 m2 - Polarity - Lower values are better
eGFR <45 ml/min/1.73 m2 - Polarity - Lower values are better
eGFR <30 ml/min/1.73 m2 - Polarity - Lower values are better

Critical appraisal - GDT Crit App - Cochrane Risk of Bias tool (RoB 2.0) Normal RCT

Local recurrence

Section	Question	Answer
Overall bias and Directness	Risk of bias judgement	Moderate *(There was no information about outcome assessors being aware of the type of surgery received by study participants. However, outcome measurements are not expected to be affected. Pre-analysis plan was not reported.)*
Overall bias and Directness	Overall Directness	Directly applicable

Distant metastases

Section	Question	Answer
Overall bias and Directness	Risk of bias judgement	Moderate *(There was no information about outcome assessors being aware of the type of surgery received by study participants. However, outcome measurements are not expected to be affected. Pre-analysis plan was not reported.)*
Overall bias and Directness	Overall Directness	Directly applicable

All-cause mortality

Section	Question	Answer
Overall bias and Directness	Risk of bias judgement	Moderate *(There was no information about outcome assessors being aware of the type of surgery received by study participants. However, outcome measurements are not expected to be affected. Pre-analysis plan was not reported.)*
Overall bias and Directness	Overall Directness	Directly applicable

eGFR<60ml/min/1.73m2

Section	Question	Answer
Overall bias and Directness	Risk of bias judgement	Moderate *(There was no information about outcome assessors being aware of the type of surgery received by study participants.*

Section	Question	Answer
		However, outcome measurements are not expected to be affected. Pre-analysis plan was not reported.)
Overall bias and Directness	Overall Directness	Directly applicable

eGFR<45ml/min/1.73m2

Section	Question	Answer
Overall bias and Directness	Risk of bias judgement	Moderate *(There was no information about outcome assessors being aware of the type of surgery received by study participants. However, outcome measurements are not expected to be affected. Pre-analysis plan was not reported.)*
Overall bias and Directness	Overall Directness	Directly applicable

eGFR<30ml/min/1.73m2

Section	Question	Answer
Overall bias and Directness	Risk of bias judgement	Moderate *(There was no information about outcome assessors being aware of the type of surgery received by study participants. However, outcome measurements are not expected to be affected. Pre-analysis plan was not reported.)*
Overall bias and Directness	Overall Directness	Directly applicable

Non-randomised studies evidence

Amparore, 2021

Bibliographic Reference	Amparore, D.; Pecoraro, A.; Piramide, F.; Checcucci, E.; de Cillis, S.; Volpi, G.; Piana, A.; Verri, P.; Granato, S.; Sica, M.; Manfredi, M.; Fiori, C.; Porpiglia, F.; Comparison between minimally-invasive partial and radical nephrectomy for the treatment of clinical T2 renal masses: Results of a 10-year study in a tertiary care center; Minerva Urology and Nephrology; 2021; vol. 73 (no. 4); 509-517

Study details

Study type	Retrospective cohort study

Study location	Italy
Study setting	Hospital setting
Study dates	2009 to 2019
Sources of funding	No sources of funding reported.
Inclusion criteria	cT2 renal tumours Treated with minimally invasive PN or RN
Exclusion criteria	Kidney failure by CKD classification Single kidney
Intervention(s)	Partial nephrectomy (PN) (laparoscopic or robot-assisted). All surgery (intervention and control) performed by a single experienced surgeon.
Comparator	Radical nephrectomy (RN) (laparoscopic or robot-assisted).
Outcome measures	Recurrence Complications Length of hospital stay
Number of participants	Total: n = 116 Minimally invasive PN: 52 Minimally invasive RN: 64
Duration of follow-up	Median: 46 months (authors report that there was no difference between groups). No IQR reported.
Loss to follow-up	None reported.
Methods of analysis	The statistical significance of differences in means, medians and proportions was evaluated with Student's t-test, Kruskal-Wallis, and chi square tests. No adjustment for confounders in extracted outcomes. Kaplan Meier
Additional comments	No survival data matching review protocol presented.

Study arms

Partial nephrectomy (N = 52)

Minimally invasive (laparoscopic or robot-assisted)

Radical nephrectomy (N = 64)

Minimally invasive (laparoscopic or robot-assisted)

Characteristics

Arm-level characteristics

Characteristic	Partial nephrectomy (N = 52)	Radical nephrectomy (N = 64)
% Female No of events	n = 12 ; % = 23.1	n = 30 ; % = 46.9
Age Mean (SE)	57.3 (1.84)	60.5 (1.77)
Surgery technique used - Laparoscopic No of events	n = 29 ; % = 55.8	n = 62 ; % = 96.9
Surgery technique used - robot-assisted No of events	n = 23 ; % = 44.2	n = 2 ; % = 3.1
Primary RCC type - Clear cell No of events	n = 16 ; % = 30.8	n = 45 ; % = 70.3
Primary RCC type - Papillary No of events	n = 13 ; % = 25	n = 2 ; % = 3.1
Primary RCC type - Chromophobe No of events	n = 7 ; % = 13.5	n = 8 ; % = 12.5
Primary RCC type - Others No of events	n = 16 ; % = 30.8	n = 9 ; % = 14.1
Baseline renal function - preoperative eGFR mL/min Median (IQR)	80 (64 to 92.9)	79.2 (69.5 to 84.2)
Tumour size (mm) perioperative Mean (SE)	85.8 (3.32)	92.1 (3.03)

Outcomes

Length of hospital stay

Outcome	Partial nephrectomy, , N = 52	Radical nephrectomy, , N = 64
Length of hospital stay (days) Mean (SE)	7.4 (0.53)	7.1 (0.2)

Length of hospital stay - Polarity - Lower values are better

Complications

Outcome	Partial nephrectomy, , N = 52	Radical nephrectomy, , N = 64
Clavien-Dindo 0 No complications No of events	n = 39 ; % = 75	n = 59 ; % = 92.2
Clavien-Dindo I No of events	n = 8 ; % = 15.4	n = 3 ; % = 4.7
Clavien-Dindo II No of events	n = 4 ; % = 7.7	n = 2 ; % = 3.1
Clavien-Dindo 3 No of events	n = 1 ; % = 1.9	n = 0 ; % = 0

Clavien-Dindo 0 - Polarity - Higher values are better
Clavien-Dindo I - Polarity - Lower values are better
Clavien-Dindo II - Polarity - Lower values are better
Clavien-Dindo 3 - Polarity - Lower values are better

Survival

Outcome	Partial nephrectomy, , N = 52	Radical nephrectomy, , N = 64
local recurrence People who had recurrence No of events	n = 3 ; % = 5.8	n = 0 ; % = 0

local recurrence - Polarity - Lower values are better

Critical appraisal - GDT Crit App - ROBINS-I: a tool for non-randomised studies of interventions

Length of hospital stay-Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(No adjustment for confounders, outcome could be affected by staff knowledge of intervention)*
Overall bias	Directness	Partially Applicable *(T2 only, minimally invasive surgery only)*

Clavien-Dindo 0- Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Moderate *(No adjustment for confounders,)*
Overall bias	Directness	Partially Applicable *(T2 only, minimally invasive surgery only)*

Clavien-Dindo I- Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Moderate *(No adjustment for confounders)*
Overall bias	Directness	Partially Applicable *(T2 only, minimally invasive surgery only)*

Clavien-Dindo II -Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Moderate *(No adjustment for confounders)*
Overall bias	Directness	Partially Applicable *(T2 only, minimally invasive surgery only)*

Clavien-Dindo III -Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Moderate *(No adjustment for confounders)*

Section	Question	Answer
Overall bias	Directness	Partially Applicable *(T2 only, minimally invasive surgery only)*

Local recurrence- Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(No adjustment for confounders)*
Overall bias	Directness	Partially Applicable *(T2 only, minimally invasive surgery only)*

An, 2017

Bibliographic Reference	An, Julie Y; Ball, Mark W; Gorin, Michael A; Hong, Jiwon J; Johnson, Michael H; Pavlovich, Christian P; Allaf, Mohamad E; Pierorazio, Phillip M; Partial vs Radical Nephrectomy for T1-T2 Renal Masses in the Elderly: Comparison of Complications, Renal Function, and Oncologic Outcomes.; Urology; 2017; vol. 100; 151-157

Study details

Study type	Retrospective cohort study
Study location	US
Study setting	Hospital setting
Study dates	2003 to 2015
Sources of funding	This study was supported by the National Institute on Aging [RFA-AG-15-009], the American Federation for Aging Research, and The John A. Hartford Foundation
Inclusion criteria	Clinically localized (cT1-2N0M0) renal masses Patients aged 65 or older
Exclusion criteria	Single kidney Bilateral tumours
Intervention(s)	Partial nephrectomy (PN)
Comparator	Radical nephrectomy (RN)
Outcome measures	Overall survival Complications
Number of participants	N = 787

	PN = 437 RN = 350
Duration of follow-up	Median follow-up for the entire cohort was 36 months (interquartile range [IQR] 14–70 months)
Loss to follow-up	There is no information on loss to follow-up
Methods of analysis	The preoperative patients and operative and postoperative data were evaluated using comparative statistics (rank-sum for continuous data, Fisher's exact for categorical data). Overall survival (OS) was compared using the Kaplan-Meier method, and the impact of intervention type was determined by Cox proportional hazard regression, controlling for patient age, tumour diameter, American Society of Anesthesiologists score, and pathologic stage.
Additional comments	None

Study arms

Partial nephrectomy (N = 437)

Radical nephrectomy (N = 350)

Characteristics

Arm-level characteristics

Characteristic	Partial nephrectomy (N = 437)	Radical nephrectomy (N = 350)
% Female No of events	n = 154 ; % = 35.2	n = 145 ; % = 41.4
Age Median (IQR)	70.3 (67.2 to 74.7)	71.9 (68.2 to 77.5)
Surgery technique used - minimally invasive No of events	n = 324 ; % = 74.1	n = 318 ; % = 90.9
Surgery technique used - open No of events	n = 113 ; % = 25.9	n = 32 ; % = 9.1

Characteristic	Partial nephrectomy (N = 437)	Radical nephrectomy (N = 350)
Tumour size Median (IQR)	2.8 (2 to 4)	5 (3.5 to 7)
Primary RCC type - Clear cell No of events	n = 177 ; % = 53.2	n = 195 ; % = 64.8
Primary RCC type - Papillary No of events	n = 99 ; % = 29.7	n = 58 ; % = 19.3
Primary RCC type - Chromophobe No of events	n = 28 ; % = 8.4	n = 24 ; % = 8
Primary RCC type - other No of events	n = 31 ; % = 9.5	n = 29 ; % = 9.5
Baseline renal function Median (IQR)	65.7 (52.2 to 80.7)	64.7 (52.8 to 74.2)
Performance status at baseline - ASA score Mean (p value)	2.6 (*empty data*)	2.8 (0.001)

Outcomes

Complications

Outcome	Partial nephrectomy, , N = 437	Radical nephrectomy, , N = 350
Clavien grade I–II No of events	n = 116 ; % = 26.5	n = 103 ; % = 29.4
Clavien grade III–IV No of events	n = 49 ; % = 11.2	n = 33 ; % = 9.4

Clavien grade I–II - Polarity - Lower values are better

Overall survival

Outcome	Partial nephrectomy vs Radical nephrectomy, , N2 = 350, N1 = 437
Overall survival Hazard ratio/95% CI	1 (0.6 to 1.7)

Overall survival - Polarity - Higher values are better

Critical appraisal - GDT Crit App - ROBINS-I: a tool for non-randomised studies of interventions

Complications - Clavien grade I–II

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(Analysis was not controlled for all important confounding variables)*
Overall bias	Directness	Partially Applicable

Complications - Clavien grade III–IV

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(Analysis was not controlled for all important confounding variables)*
Overall bias	Directness	Partially Applicable

Overall survival

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(Analysis was not controlled for all important confounding variables expected as defined in the protocol)*
Overall bias	Directness	Partially Applicable

Bradshaw, 2020

Bibliographic Reference	Bradshaw, Aaron W; Autorino, Riccardo; Simone, Giuseppe; Yang, Bo; Uzzo, Robert G; Porpiglia, Francesco; Capitanio, Umberto; Porter, James; Bertolo, Riccardo; Minervini, Andrea; Lau, Clayton; Jacobsohn, Kenneth; Ashrafi, Akbar; Eun, Daniel; Mottrie, Alexandre; White, Wesley M; Schips, Luigi; Challacombe, Benjamin J; De Cobelli, Ottavio; Mir, Carmen M; Veccia, Alessandro; Larcher, Alessandro; Kutikov, Alexander; Aron, Monish; Dasgupta, Prokar; Montorsi, Francesco; Gill, Inderbir S; Sundaram, Chandru P; Kaouk, Jihad; Derweesh, Ithaar H; Robotic partial nephrectomy vs minimally invasive radical nephrectomy for clinical T2a renal mass: a propensity score-matched comparison from the ROSULA

(Robotic Surgery for Large Renal Mass) Collaborative Group.; BJU international; 2020; vol. 126 (no. 1); 114-123

Study details

Other publications associated with this study included in review	Cerrato 2023
Study type	Retrospective cohort study
Study location	Analysis utilizing the ROSULA (RObotic SUrgery for LArge) renal mass consortium - Location of participants not specified
Study setting	Hospital setting
Study dates	2007 to 2017
Sources of funding	Stephen Weissman Kidney Cancer Research Fund
Inclusion criteria	Renal mass suspicious for malignancy Localised renal masses measuring >7 and ≤10 cm (cT2a)
Exclusion criteria	Clinical node positive disease (cN1+) Suspected metastasis Clinical / radiological T2b+ disease
Intervention(s)	Robot-assisted partial nephrectomy. All procedures were performed by urological oncological surgeons, and selection of operation (RAPN vs MIS-RN) and operative approach (laparoscopic or robot-assisted) was dictated by surgeon preference.
Comparator	Minimally-invasive radical nephrectomy.
Outcome measures	Recurrence Complications Length of hospital stay Mortality Hospital readmission
Number of participants	N = 648

	Robot-assisted partial nephrectomy (RAPN): 216 Minimally invasive radical nephrectomy (MIS-RN): 432
Duration of follow-up	Median (IQR) RAPN: 36 months (18-54) MIS-RN: 33 (18-49)
Loss to follow-up	None reported
Methods of analysis	Propensity score matching (PSM) was performed using age, sex, BMI, ASA Class, tumour size, and R.E.N.A.L. score. Matching variables were selected with the intention to balance variables most likely influencing operative bias. Matching was performed using a 2:1 ratio between MIS-RN:RAPN groups with a nearest neighbour matching algorithm. Multivariable Cox regression analysis (MVA) was performed to elucidate risk factors for disease recurrence, all-cause mortality (ACM).
Additional comments	Kaplan Meier curves were reported but data was not extracted. Data on renal functional impairment included in the included systematic review Ochoa-Arvizo 2023, and so not extracted here. Univariable and multivariable Cox regression analyses presented for all-cause mortality and recurrence. Multivariable results extracted. Results for recurrence and all-cause mortality are out of patients who had confirmed renal carcinoma only (6.6% of participants had benign tumours, confirmed during the course of the study).

Study arms

Partial nephrectomy (N = 216)

Robot-assisted only

Radical nephrectomy (N = 432)

Minimally invasive only

Characteristics

Arm-level characteristics

Characteristic	Partial nephrectomy (N = 216)	Radical nephrectomy (N = 432)
% Female No of events	n = 61 ; % = 28.2	n = 133 ; % = 30.8
Age Mean (SD)	61.1 (11.2)	62.1 (11.5)
Tumour size (cm) Median (IQR)	8 (7.2 to 8.8)	8 (7.5 to 8.5)
Primary RCC type - Benign No of events	n = 3 ; % = 1.4	n = 0 ; % = 0
Primary RCC type - clear cell RCC No of events	n = 9 ; % = 4.2	n = 6 ; % = 1.4
Primary RCC type - Papillary RCC No of events	n = 2 ; % = 0.93	n = 1 ; % = 0.23
Primary RCC type - Chromophobe RCC No of events	n = 3 ; % = 1.4	n = 2 ; % = 0.46
Primary RCC type - Other RCC histology No of events	n = 0 ; % = 0	n = 1 ; % = 0.23
RENAL score Median (IQR)	9 (7 to 11)	9 (6 to 12)
ASA class 1-2 No of events	n = 151 ; % = 69.6	n = 325 ; % = 75.3
ASA class 3-4 No of events	n = 65 ; % = 30.1	n = 107 ; % = 24.7

Outcomes

Survival

Outcome	Radical nephrectomy vs Partial nephrectomy, , N2 = 417, N1 = 188
All-cause mortality Confirmed RCC patients only Hazard ratio/95% CI	0.78 (0.3 to 2)
Recurrence Confirmed RCC patients only Hazard ratio/95% CI	1.28 (0.56 to 2.92)

All-cause mortality - Polarity - Lower values are better
Recurrence - Polarity - Lower values are better

Duration of hospital stay

Outcome	Partial nephrectomy, , N = 216	Radical nephrectomy, , N = 432
Duration of hospital stay (days) Mean (SD)	4.3 (2.6)	4.4 (2.8)

Duration of hospital stay - Polarity - Lower values are better

Hospital readmission

Outcome	Partial nephrectomy, , N = 216	Radical nephrectomy, , N = 432
30-day readmission No of events	n = 2 ; % = 0.9	n = 11 ; % = 2.5

30-day readmission - Polarity - Lower values are better

Complications

Outcome	Partial nephrectomy, , N = 216	Radical nephrectomy, , N = 432
Clavien-Dindo ≥III No of events	n = 11 ; % = 5.3	n = 10 ; % = 2.3

Clavien-Dindo ≥III - Polarity - Lower values are better

Critical appraisal - GDT Crit App - ROBINS-I: a tool for non-randomised studies of interventions

Duration of hospital stay - Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Moderate *(Appropriate adjustment for confounders, possible bias due to subjective outcome)*
Overall bias	Directness	Partially Applicable *(T2 only)*

All-cause mortality- Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Moderate *(Appropriate adjustment for confounders)*
Overall bias	Directness	Partially Applicable *(T2 only)*

Recurrence-Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Moderate *(Appropriate adjustment for confounders)*
Overall bias	Directness	Partially Applicable *(T2 only)*

Hospital readmission-30-day -Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Moderate *(Appropriate adjustment for confounders, possible bias due to subjective outcome)*
Overall bias	Directness	Partially Applicable *(T2 only)*

Clavien-Dindo ≥III - Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Moderate *(Appropriate adjustment for confounders)*

Section	Question	Answer
Overall bias	Directness	Partially Applicable *(T2 only)*

Breau, 2020

Bibliographic Reference	Breau, Rodney H; Kapoor, Anil; Nash, Danielle M; Rowe, Neal; Cristea, Octav; Chan, Garson; Dixon, Stephanie N; McArthur, Eric; Tajzler, Camilla; Kumar, Ravi; Vinden, Christopher; Izawa, Jonathan; Garg, Amit X; Luke, Patrick P; Partial vs. radical nephrectomy and the risk of all-cause mortality, cardiovascular, and nephrological outcomes.; Canadian Urological Association journal = Journal de l'Association des urologues du Canada; 2020; vol. 14 (no. 10); 337-345

Study details

Other publications associated with this study included in review	Uses several databases which are also used in Nayan 2020. Nayan 2020 study dates are wider (1995 to 2014).
Study type	Retrospective cohort study
Study location	Canada
Study setting	Three large hospitals in Ontario. Several national databases used to link data to provide information on demographics and medical history.
Study dates	2002 to 2010
Sources of funding	No funding reported. Authors report no competing interests.
Inclusion criteria	Tumour diameter <7cm
Exclusion criteria	Metastatic cancer Tumour diameter >7cm Dialysis in the previous year Previous kidney transplant Tumour thrombus
Intervention(s)	Partial nephrectomy (PN) (type unspecified - likely all surgery types)
Comparator	Radical nephrectomy (RN) (type unspecified - likely all surgery types)

Outcome measures	Overall survival eGFR Cardiovascular outcomes
Number of participants	N = 1065 (in propensity score weighted cohort) PN: 575 RN: 490 (1457 included in full cohort prior to weighting. Outcomes presented for weighted cohort).
Duration of follow-up	Median 6.9 years (IQR 5.2 to 8.5 years) PN: 6.8 years (5.3 to .4) RN: 7.2 years (5.1 to 9.5)
Loss to follow-up	Numbers lost to follow up not reported, but study authors report that: "Emigration from Ontario is very low (0.1%/year) and was the only reason for lost study follow up".
Methods of analysis	A multivariable logistic regression model including 11 baseline characteristics was used to calculate propensity scores for the probability of receiving a radical vs. a partial nephrectomy. These 11 variables were age, sex, tumour size, hospital centre, surgery type, surgery year, preoperative eGFR, ADG score, previous carotid ultrasound, previous prescription for nitrates, and previous prescription for statins. Hazard ratios (HR) were estimated using Cox proportional hazards regression models, accounting for weighting. To test for proportionality, we created a time-dependent covariate by modelling an interaction of procedure type and log-transformed follow-up time. If this time-dependent covariate was significant, then the proportionality assumption was considered violated. For outcomes where the proportionality assumption did not hold, the Cox models were time-stratified using Heaviside functions such that the proportionality assumption was met within each time period
Additional comments	Participant baseline characteristics presented as percentages. Number of participants calculated by NICE team. Mortality outcomes have been split into up to 5 years and over 5 years because the proportionality assumption was considered violated.

	Roughly 17% of participants had preoperative eGFR <60mL/min per 1.73m2.

Study arms

Partial nephrectomy (N = 575)

All surgical types

Radical nephrectomy (N = 490)

All surgical types

Characteristics

Arm-level characteristics

Characteristic	Partial nephrectomy (N = 575)	Radical nephrectomy (N = 490)
% Female No of events	n = 218 ; % = 37.9	n = 194 ; % = 39.5
Age Mean (SD)	59 (12.45)	59 (9.82)
Surgery technique used - Laparoscopic No of events	n = 218 ; % = 37.9	n = 195 ; % = 39.7
Surgery technique used - open No of events	n = 282 ; % = 49	n = 225 ; % = 46
Surgery technique used - missing data No of events	n = 75 ; % = 13	n = 70 ; % = 14.3
Tumour size ≤1cm No of events	n = 58 ; % = 10.1	n = 47 ; % = 9.5
Tumour size 2cm No of events	n = 213 ; % = 37	n = 154 ; % = 31.4

Characteristic	Partial nephrectomy (N = 575)	Radical nephrectomy (N = 490)
Tumour size 3cm No of events	n = 175 ; % = 30.4	n = 161 ; % = 32.8
Tumour size 4cm No of events	n = 84 ; % = 14.6	n = 84 ; % = 17.2
Tumour size 5cm No of events	n = 22 ; % = 3.8	n = 23 ; % = 4.6
Tumour size 6cm No of events	n = 14 ; % = 2.4	n = 13 ; % = 2.6
Tumour size 7cm No of events	% = 1.6	% = 2
Baseline renal function - serum creatinine Mean (SD)	86 (27)	91 (32)
Baseline renal function - eGFR mL/min per 1.73m2 Mean (SD)	81 (20)	78 (16)

Outcomes

Survival

Outcome	Partial nephrectomy vs Radical nephrectomy, , N2 = 575, N1 = 490
All-cause mortality - 0-5 years follow up Hazard ratio/95% CI	0.42 (0.27 to 0.66)
All-cause mortality - 0-5 years follow up (preop eGFR ≥45 mL/min/1.73 m2) Hazard ratio/95% CI	0.36 (0.21 to 0.62)
All-cause mortality - >5 years follow up Hazard ratio/95% CI	1.01 (0.68 to 1.49)

All-cause mortality - 0-5 years follow up - Polarity - Lower values are better
All-cause mortality - >5 years follow up - Polarity - Lower values are better

Cardiovascular events

Outcome	Partial nephrectomy vs Radical nephrectomy, , N2 = 575, N1 = 490
Hospitalisation with a major cardiovascular event Hazard ratio/95% CI	1.22 (0.75 to 1.96)

Hospitalisation with a major cardiovascular event - Polarity - Lower values are better

Duration of hospital stay

Outcome	Partial nephrectomy, , N = 575	Radical nephrectomy, , N = 490
Duration of hospital stay (days) Mean (SD)	4.66 (2.38)	4.73 (3.01)
Duration of hospital stay (days) Median (IQR)	4 (3 to 5)	4 (3 to 5)

Duration of hospital stay - Polarity - Lower values are better

Long term adverse events

Outcome	Partial nephrectomy, , N = 575	Radical nephrectomy, , N = 490
eGFR at 1 year (mL/min per 1·73 m2) Mean (SD)	71 (22.35)	52 (13.4)
eGFR at 1 year (mL/min per 1·73 m2) Median (IQR)	71 (57 to 88)	51 (41 to 63)
eGFR stage: normal /1-2 No of events	n = 196 ; % = 34.1	n = 76.1 ; % = 15.5
eGFR stage: 3a No of events	n = 36 ; % = 6.3	n = 70.2 ; % = 14.3
eGFR stage: 3b No of events	n = 24 ; % = 4.2	n = 64.8 ; % = 13.2
eGFR stage: 4-5	n = 14 ; % = 2.4	n = 24.3 ; % = 5

Outcome	Partial nephrectomy, , N = 575	Radical nephrectomy, , N = 490
No of events		
eGFR stage: missing No of events	n = 305 ; % = 53	n = 255.1 ; % = 52

eGFR at 1 year - Polarity - Higher values are better

Critical appraisal - GDT Crit App - ROBINS-I: a tool for non-randomised studies of interventions

All-cause mortality- 0-5 years follow up- Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(Possible residual confounding and selection of reported result)*
Overall bias	Directness	Directly applicable

All-cause mortality >5yearsfollowup - Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Moderate *(Possible residual confounding)*
Overall bias	Directness	Directly applicable

All-cause mortality - 0-5years follow up (eGFR≥45mL/min/1.73m2) - Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Moderate *(Possible residual confounding)*
Overall bias	Directness	Directly applicable

Hospitalisation with a major cardiovascular event - Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Moderate *(Possible residual confounding)*
Overall bias	Directness	Directly applicable

Duration of hospital stay- Mean SD - Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Moderate *(Possible residual confounding and bias in measurement of outcomes)*
Overall bias	Directness	Directly applicable

Duration of hospital stay- Median IQR - Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Moderate *(Possible residual confounding and bias in measurement of outcomes)*
Overall bias	Directness	Directly applicable

eGFR at 1year – Mean SD - Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Moderate *(Possible residual confounding)*
Overall bias	Directness	Directly applicable

eGFR at 1year – Median IQR - Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Moderate *(Possible residual confounding)*
Overall bias	Directness	Directly applicable

eGFR stage: normal/1-2 - Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Moderate *(Possible residual confounding, high proportion of missing data)*
Overall bias	Directness	Directly applicable

eGFR stage: 3a Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Moderate *(Possible residual confounding, high proportion of missing data)*
Overall bias	Directness	Directly applicable

eGFR stage: 3b Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Moderate *(Possible residual confounding, high proportion of missing data)*
Overall bias	Directness	Directly applicable

eGFR stage: 4-5 -Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Moderate *(Possible residual confounding, high proportion of missing data)*
Overall bias	Directness	Directly applicable

Cerrato, 2023

Bibliographic Reference	Cerrato, Clara; Patel, Devin; Autorino, Riccardo; Simone, Giuseppe; Yang, Bo; Uzzo, Robert; Porpiglia, Francesco; Capitanio, Umberto; Porter,

James; Beksac, Alp Tuna; Minervini, Andrea; Antonelli, Alessandro; Cerruto, Maria Angela; Lau, Clayton; Ashrafi, Akbar; Eun, Daniel; Mottrie, Alexandre; Mir, Carmen; Meagher, Margaret F; Puri, Dhruv; Nguyen, Mimi; Dhanji, Sohail; Liu, Franklin; Pandolfo, Savio D; Kutikov, Alexander; Montorsi, Francesco; Gill, Inderbir S; Sundaram, Chandru; Kaouk, Jihad; Derweesh, Ithaar H; Partial or radical nephrectomy for complex renal mass: a comparative analysis of oncological outcomes and complications from the ROSULA (Robotic Surgery for Large Renal Mass) Collaborative Group.; World journal of urology; 2023; vol. 41 (no. 3); 747-755

Study details

Other publications associated with this study included in review	Bradshaw 2020
Study type	Retrospective cohort study
Study location	Analysis utilizing the ROSULA (RObotic SUrgery for LArge) renal mass consortium - Location of participants not specified
Study setting	Hospital setting
Study dates	2011 to 2021
Sources of funding	Stephen Weissmen Kidney Cancer Research Fund
Inclusion criteria	Complex renal mass
Exclusion criteria	Renal score <10 Clinical node positive disease (cN1+) Suspected metastasis
Intervention(s)	Robot-assisted partial nephrectomy (RAPN)
Comparator	Minimally invasive radical nephrectomy (MIS-RN)
Outcome measures	Overall survival
Number of participants	N=926 MIS-RN=437 RAPN=489
Duration of follow-up	Median: 24 months

Loss to follow-up	Not reported
Methods of analysis	Multivariate models were adjusted for age, sex, BMI, transfusions, nuclear grade, and tumour size. Kaplan–Meier Analysis (KMA) was performed to analyse outcomes stratified by pathological stage.
Additional comments	T1, T2 and T3 participants grouped for most outcomes. Only overall survival, which was presented for participants with pathologically confirmed T1 and T2 stage RCC, is extracted. Characteristics table is for full group (Stages 1, 2, 3 and 4, n=926), not just T1 and T2 groups (n=771).

Study arms

Partial nephrectomy (N = 489)

Robot-assisted

Radical nephrectomy (N = 437)

Minimally invasive

Characteristics

Arm-level characteristics

Characteristic	Partial nephrectomy (N = 489)	Radical nephrectomy (N = 437)
% Female No of events	n = 171 ; % = 35	n = 135 ; % = 30.9
Age Mean (SD)	59 (12.5)	61.6 (12)
TNM classification - T1 No of events	n = 311 ; % = 63.6	n = 48 ; % = 11
TNM classification - T2 No of events	n = 156 ; % = 31.9	n = 256 ; % = 58.5
TNM classification - T3 No of events	n = 19 ; % = 3.9	n = 86 ; % = 19.7
TNM classification - T4	n = 3 ; % = 0.6	n = 47 ; % = 10.8

Characteristic	Partial nephrectomy (N = 489)	Radical nephrectomy (N = 437)
No of events		
Non-clear cell RCC No of events	n = 115 ; % = 23.5	n = 75 ; % = 17.2
Clear cell RCC No of events	n = 374 ; % = 76.5	n = 362 ; % = 82.8
Tumor size cm Median (IQR)	5.1 (3.8 to 7.5)	8.4 (7.5 to 10.5)

Outcomes

Survival

Outcome	Partial nephrectomy, , N = 489	Radical nephrectomy, , N = 437
Overall survival - 5 years T1 only No of events	n = 246 ; % = 88	n = 46 ; % = 85
Overall survival - 5 years T1 only Sample size	n = 279 ; % = 57.1	n = 54 ; % = 12.4
Overall survival - 5 years T2 only No of events	n = 54 ; % = 80	n = 144 ; % = 82
Overall survival - 5 years T2 only Sample size	n = 68 ; % = 13.9	n = 176 ; % = 40.1

Overall survival - 5 years - Polarity - Higher values are better

Critical appraisal - GDT Crit App - ROBINS-I: a tool for non-randomised studies of interventions

Overall survival-5years- T1 only Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(Confounding present)*
Overall bias	Directness	Partially Applicable *(Complex renal masses only)*

Overall survival - 5 years - T2 only Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(Confounding present)*
Overall bias	Directness	Partially Applicable *(Complex renal masses only)*

Chong, 2018

Bibliographic Reference	Chong, Julio T; Paulucci, David; Lubin, Marc; Beksac, Alp Tuna; Gin, Greg; Sfakianos, John P; Badani, Ketan K; Comparison of overall survival and unplanned hospital readmissions between partial and radical nephrectomy for cT1a and cT1b renal masses.; Therapeutic advances in urology; 2018; vol. 10 (no. 12); 383-391

Study details

Study type	Retrospective cohort study
Study location	American College of Surgeons' National Cancer Database - US
Study setting	Not reported
Study dates	2004 to 2013
Sources of funding	This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors
Inclusion criteria	T1a renal tumours T1b RCC
Exclusion criteria	Patients with renal tumours excised bilaterally or a horseshoe kidney Receiving additional treatments

	Patients with clinical T2-4, N1, or M1 renal cell carcinoma Patients with a concurrent or prior cancer diagnosis
Intervention(s)	Partial nephrectomy
Comparator	Radical nephrectomy
Outcome measures	Overall survival
Number of participants	cT1a N = 33,943 PN = 22,695 RN = 11,248 cT1b N = 17,075 PN = 4,419 RN = 12,656
Duration of follow-up	Median follow-up for the patients with a T1a was 46.0 months (interquartile range [IQR]: 26.9–69.5 months; range: 0.0–142.6 months). Median follow-up for patients with T1b was 44.5 months (IQR: 25.7–68.1 months; range: 0.0–141.5months)
Loss to follow-up	A complete case analysis was conducted and patients with missing data on baseline characteristics, survival, or readmission were excluded (n = 7,700)
Methods of analysis	Baseline characteristics were compared between PN and RN patients using the chi-square tests of independence and independent samples t-tests. Inverse probability of treatment weighting (IPTW) was employed to account for selection bias and confounding by the following demographic and clinical covariates: age, sex, race, Charlson score, primary insurer, income/education based on zip code, residence type (metropolitan, urban, or rural), distance to the hospital, treatment facility type (academic, community, or integrated network), tumour size (cm), and tumour laterality. OS was compared using IPTW-adjusted Cox proportional hazards regression models. The IPTW-adjusted Kaplan–Meier (IPTW-KM) method was used to estimate 5-year

	and 10-year OS. Logistic regression analysis was performed to confirm balance on covariates after IPTW adjustment.

Study arms

Partial nephrectomy (cT1a) (N = 22695)

Radical nephrectomy (cT1a) (N = 11248)

Partial nephrectomy (cT1b) (N = 4419)

Radical nephrectomy (cT1b) (N = 12656)

Characteristics

Arm-level characteristics

Characteristic	Partial nephrectomy (cT1a) (N = 22695)	Radical nephrectomy (cT1a) (N = 11248)	Partial nephrectomy (cT1b) (N = 4419)	Radical nephrectomy (cT1b) (N = 12656)
% Female No of events	n = 9422 ; % = 41.5	n = 4947 ; % = 44	n = 1511 ; % = 34.2	n = 1511 ; % = 34.2
Age Mean (SD)	59.1 (10.4)	61.7 (11.1)	60.7 (10.6)	62.1 (11.3)
White No of events	n = 19432 ; % = 85.6	n = 9496 ; % = 84.4	n = 3740 ; % = 84.6	n = 10926 ; % = 86.3
Black No of events	n = 2492 ; % = 11	n = 1411 ; % = 12.5	n = 536 ; % = 12.1	n = 1341 ; % = 10.6
Other No of events	n = 771 ; % = 3.4	n = 341 ; % = 3	n = 143 ; % = 3.2	n = 389 ; % = 3.1
Tumour size Mean (SD)	2.45 (0.81)	2.92 (0.78)	5.14 (0.76)	5.43 (0.81)

Characteristic	Partial nephrectomy (cT1a) (N = 22695)	Radical nephrectomy (cT1a) (N = 11248)	Partial nephrectomy (cT1b) (N = 4419)	Radical nephrectomy (cT1b) (N = 12656)
Renal mass No of events	n = 22695 ; % = 66.9	n = 11248 ; % = 33.1	n = 4419 ; % = 25.9	n = 12656 ; % = 74.1

Outcomes

Overall survival

Outcome	Radical nephrectomy (cT1a) vs Partial nephrectomy (cT1a), , N2 = 11248, N1 = 22695	Radical nephrectomy (cT1b) vs Partial nephrectomy (cT1b), , N2 = 12656, N1 = 4419
Overall survival Hazard ratio/95% CI	0.62 (0.57 to 0.67)	0.89 (0.79 to 1.02)

Overall survival - Polarity - Higher values are better

Critical appraisal - GDT Crit App - ROBINS-I: a tool for non-randomised studies of interventions

Overall survival

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(The outcome shows some concerns related to bias due to confounding and bias due to missing data)*
Overall bias	Directness	Partially Applicable

Forbes, 2016

Bibliographic Reference	Forbes, Connor M; Rendon, Ricardo A; Finelli, Antonio; Kapoor, Anil; Moore, Ronald B; Breau, Rodney H; Lacombe, Louis; Kawakami, Jun; Drachenberg, Darrel E; Pautler, Stephen E; Jewett, Michael M A; Saarela, Olli; Liu, Zhihui; Tanguay, Simon; Black, Peter C; Disease progression and kidney function after partial vs. radical nephrectomy for T1 renal cancer.; Urologic oncology; 2016; vol. 34 (no. 11); 486e17-486e23

Study details

Study type	Retrospective cohort study
Study location	Canada
Study setting	Hospital setting. The Canadian Kidney Cancer Information System was used to identify participants. 15 participating academic centres in 6 Canadian provinces.
Study dates	2000 to 2015
Sources of funding	No funding reported.
Inclusion criteria	Pathological stage T1 kidney cancer
Exclusion criteria	Previous history of RCC Received preoperative systemic chemotherapy Patients who had ablative therapy
Intervention(s)	Partial nephrectomy (PN). Open, laparoscopic and robot-assisted.
Comparator	Radical nephrectomy (RN). Open, laparoscopic and robot-assisted.
Outcome measures	Mortality Cancer free survival
Number of participants	N=2358 PN: 1615 RN: 743
Duration of follow-up	PN mean 1.99 years RN mean 2.87 years
Loss to follow-up	Not reported.
Methods of analysis	Progression-free survival was estimated by Kaplan-Meier analysis, and plotted by tumour stage. Overall survival was compared between PN and RN, also sub stratified by tumour stage. A Cox proportional hazards model was used to compare time with progression and overall survival for patients who received PN vs. RN as their initial treatment, adjusting for age at surgery, sex, pathologic T stage, diagnosis year, histopathology, grade, and province.
Additional comments	Long term severe adverse events (eGFR) not extracted as within search period of an included systematic review (Ochoa-Arvizo 2023).

	Time to progression is not a relevant outcome for this review. However, progression in this paper is defined as "local recurrence in either kidney or regional or distant metastases". This matches the protocol definition of disease free survival, and so is extracted and will be interpreted as disease free survival.

Study arms

Partial nephrectomy (N = 1615)

All surgery types

Radical nephrectomy (N = 743)

All surgery types

Characteristics

Arm-level characteristics

Characteristic	Partial nephrectomy (N = 1615)	Radical nephrectomy (N = 743)
% Female No of events	n = 587 ; % = 36	n = 276 ; % = 37
Age Custom value	Median 59, range 20-89	median 61, range 52-60
Surgery technique used - open No of events	n = 873 ; % = 54	n = 148 ; % = 20
Surgery technique used - Laparoscopic No of events	n = 620 ; % = 39	n = 566 ; % = 79
Surgery technique used - robotic No of events	n = 106 ; % = 7	n = 7 ; % = 1
Surgery technique used - unknown No of events	n = 16	n = 22

Characteristic	Partial nephrectomy (N = 1615)	Radical nephrectomy (N = 743)
TNM classification - T1a No of events	n = 1258 ; % = 78	n = 315 ; % = 42
TNM classification - T1b No of events	n = 357 ; % = 22	n = 428 ; % = 58
Tumour size (cm) Custom value	median 3, range 0.1-7	median 4.5, range 0.8-7
Primary RCC type - Chromophobe No of events	n = 114 ; % = 7	n = 50 ; % = 7
Primary RCC type - Clear cell No of events	n = 1049 ; % = 65	n = 543 ; % = 73
Primary RCC type - Papillary No of events	n = 313 ; % = 19	n = 106 ; % = 14
Primary RCC type - unclassified No of events	n = 24 ; % = 1	n = 14 ; % = 2
Primary RCC type - other No of events	n = 115 ; % = 7	n = 30 ; % = 4
Preoperative eGFR - 0-30 ml/min/1.73 m2 No of events	n = 12 ; % = 1	n = 30 ; % = 5
Preoperative eGFR - 30-60 ml/min/1.73 m2 No of events	n = 173 ; % = 13	n = 94 ; % = 17
Preoperative eGFR - 60-90 ml/min/1.73 m2 No of events	n = 598 ; % = 14	n = 232 ; % = 42
Preoperative eGFR - >90 ml/min/1.73 m2 No of events	n = 519 ; % = 40	n = 191 ; % = 35

Characteristic	Partial nephrectomy (N = 1615)	Radical nephrectomy (N = 743)
Preoperative eGFR - unknown ml/min/1.73 m2 No of events	n = 313	n = 196

Outcomes

Survival

Outcome	Radical nephrectomy vs Partial nephrectomy, , N2 = 743, N1 = 1615
Disease free survival Reported as 'time to progression' - see additional comments Hazard ratio/95% CI	1.17 (0.8 to 1.72)

Disease free survival - Polarity - Lower values are better

Mortality

Outcome	Partial nephrectomy, , N = 1615	Radical nephrectomy, , N = 743
Mortality No of events	n = 31 ; % = 2	n = 53 ; % = 7

Mortality - Polarity - Lower values are better

Critical appraisal - GDT Crit App - ROBINS-I: a tool for non-randomised studies of interventions

Disease free survival Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(Insufficient adjustments for confounders)*
Overall bias	Directness	Partially Applicable *(T1 only)*

Mortality Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(No adjustment for confounders)*
Overall bias	Directness	Partially Applicable *(T1 only)*

Gershman, 2018

Bibliographic Reference	Gershman, Boris; Thompson, R Houston; Boorjian, Stephen A; Lohse, Christine M; Costello, Brian A; Cheville, John C; Leibovich, Bradley C; Radical Versus Partial Nephrectomy for cT1 Renal Cell Carcinoma.; European urology; 2018; vol. 74 (no. 6); 825-832

Study details

Study type	Retrospective cohort study
Study location	US
Study setting	Hospital setting
Study dates	1990 and 2011
Sources of funding	Funding/Support and role of the sponsor: None
Inclusion criteria	cT1 renal tumours Unilateral sporadic solid renal masses M0 solid renal mass Without neoadjuvant therapy
Intervention(s)	Radical nephrectomy
Comparator	Partial nephrectomy
Outcome measures	Recurrence
Number of participants	N = 1953 RN = 808 PN = 1145
Duration of follow-up	Median follow-up among survivors of 11.1 (IQR 8.1-14.8) years
Loss to follow-up	None

Methods of analysis	Clinical, radiographic, and pathologic features were summarised with medians and interquartile ranges (IQRs) or frequency counts and percentages and were compared between groups using Wilcoxon rank sum, chi-square, and Fisher exact tests. Survival rates free of local ipsilateral recurrence and distant metastases were estimated using the Kaplan-Meier method. Propensity scores (PSs) for treatment with RN were obtained using a logistic regression model with RN as the outcome, and the preoperative clinical and radiographic features.
Additional comments	None

Study arms

Partial nephrectomy (N = 1145)

Radical nephrectomy (N = 808)

Characteristics

Arm-level characteristics

Characteristic	Partial nephrectomy (N = 1145)	Radical nephrectomy (N = 808)
% Female No of events	n = 381 ; % = 33	n = 278 ; % = 34
Age Median (IQR)	65 (56 to 73)	65 (56 to 72)
Open No of events	n = 940 ; % = 82	n = 678 ; % = 84
Laparoscopic No of events	n = 205 ; % = 18	n = 130 ; % = 16
cT1a No of events	n = 733 ; % = 64	n = 511 ; % = 63
cT1b No of events	n = 412 ; % = 36	n = 297 ; % = 37
Tumour size	3.5 (2.5 to 5)	3.5 (2.5 to 5)

Characteristic	Partial nephrectomy (N = 1145)	Radical nephrectomy (N = 808)
Median (IQR)		
≥90 No of events	n = 79 ; % = 7	n = 78 ; % = 10
60 to <90 No of events	n = 640 ; % = 56	n = 421 ; % = 52
≥45 to <60 No of events	n = 252 ; % = 22	n = 192 ; % = 24
≥30 to <45 No of events	n = 128 ; % = 11	n = 72 ; % = 9
15 to <30 No of events	n = 40 ; % = 3	n = 26 ; % = 3
> 15 No of events	n = 6 ; % = 1	n = 19 ; % = 2
ECOG = 0 No of events	n = 985 ; % = 86	n = 700 ; % = 87
ECOG = 1 No of events	n = 129 ; % = 11	n = 85 ; % = 11
ECOG = 2 No of events	n = 13 ; % = 1	n = 15 ; % = 2
ECOG = 3 No of events	n = 17 ; % = 1	n = 7 ; % = 1
ECOG = 4 No of events	n = 1 ; % = 1	n = 1 ; % = 1

Outcomes

Recurrence

Outcome	Radical nephrectomy vs Partial nephrectomy, , N2 = 808, N1 = 1145
Local ipsilateral recurrence Hazard ratio/95% CI	0.41 (0.24 to 0.7)
Distant metastases Hazard ratio/95% CI	1.98 (1.33 to 2.95)

Local ipsilateral recurrence - Polarity - Lower values are better
Distant metastases - Polarity - Lower values are better

Critical appraisal - GDT Crit App - ROBINS-I: a tool for non-randomised studies of interventions

Recurrence - Local ipsilateral recurrence

Section	Question	Answer
Overall bias	Risk of bias judgement	Moderate *(The outcome shows some concerns related to bias due to missing data)*
Overall bias	Directness	Directly applicable

Recurrence - Distant metastases

Section	Question	Answer
Overall bias	Risk of bias judgement	Moderate *(The outcome shows some concerns related to bias due to missing data)*
Overall bias	Directness	Directly applicable

Hadjipavlou, 2016

Bibliographic Reference	Hadjipavlou, Marios; Khan, Fahd; Fowler, Sarah; Joyce, Adrian; Keeley, Francis X; Sriprasad, Seshadri; Partial vs radical nephrectomy for T1 renal tumours: an analysis from the British Association of Urological Surgeons Nephrectomy Audit.; BJU international; 2016; vol. 117 (no. 1); 62-71

Study details

Study type	Prospective cohort study
Study location	UK
Study setting	Hospital setting. British Association of Urological Surgeons (BAUS) invited to recruit all patients undergoing nephrectomy for between 1 Jan and 31 Dec 2012. Data submitted to a central database. >200 respondents.
Study dates	1 Jan 2012 to 31 Dec 2012
Sources of funding	None reported. One author reports personal fees from Boston Scientific, Olympus Medical, Galil Medical, outside the submitted work.
Inclusion criteria	Tumour diameter <7cm Confirmed malignant histology
Exclusion criteria	None reported
Intervention(s)	Partial nephrectomy (PN). Open, laparoscopic and robot-assisted.
Comparator	Radical nephrectomy (RN). Open, laparoscopic and robot-assisted.
Outcome measures	Complications
Number of participants	N=1768 PN: 686 RN: 1082
Duration of follow-up	Only short and medium term outcomes reported. Study dates confined to one year.
Loss to follow-up	Not reported.
Methods of analysis	Logistic regression analysis was used to compare severe surgical complications across procedures and techniques. Some adjustments were carried out - this varies per analysis.
Additional comments	Study appears to collect data prospectively, by inviting surgeons to submit data. Potential selection bias within data submitted by each data source. Length of hospital stay also reported, but could not be extracted due to no measure of spread.

Study arms

Partial nephrectomy (N = 686)

Open, laparoscopic and robot-assisted

Radical nephrectomy (N = 1082)

Open, laparoscopic and robot-assisted

Characteristics

Arm-level characteristics

Characteristic	Partial nephrectomy (N = 686)	Radical nephrectomy (N = 1082)
% Female No of events	n = 244 ; % = 35.5	n = 438 ; % = 40.5
Age Custom value	mean 58.8	mean 63.9
Tumour size (cm) Custom value	mean 3.23	mean 4.77
Baseline renal function Custom value	mean 69.6	mean 67.03

Outcomes

Postoperative severe adverse events

Outcome	Radical nephrectomy vs Partial nephrectomy, , N2 = 1082, N1 = 686
Clavien-Dindo ≥3 Severe complications, adjusted for surgical technique and age Odds ratio/95% CI	0.25 (0.12 to 0.56)

Clavien-Dindo ≥3 - Polarity - Lower values are better

Critical appraisal - GDT Crit App - ROBINS-I: a tool for non-randomised studies of interventions

Clavien-Dindo≥3 Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(Insufficient adjustments for confounding, possible selection bias into the study, some risk of bias in selection of reported result)*
Overall bias	Directness	Partially Applicable *(T1 only)*

Hamilton, 2019

Bibliographic Reference	Hamilton, Zachary A; Capitanio, Umberto; Lane, Brian R; Larcher, Alessandro; Yim, Kendrick; Dey, Sumi; Cotta, Brittney H; Meagher, Margaret F; Kirmiz, Samer; Bezinque, Adam; Eldefrawy, Ahmed; Bradshaw, Aaron; Ryan, Stephen; Carenzi, Cristina; Wan, Fang; Proudfoot, James; Montorsi, Francesco; Derweesh, Ithaar H; Should partial nephrectomy be considered "elective" in patients with stage 2 chronic kidney disease? A comparative analysis of functional and survival outcomes after radical and partial nephrectomy.; World journal of urology; 2019; vol. 37 (no. 11); 2429-2437

Study details

Other publications associated with this study included in review	Kopp 2014
Study type	Retrospective cohort study
Study location	USA and Italy
Study setting	Hospital setting. Multiple centres participated (California, Michigan, Italy). Data obtained from institutional databases.
Study dates	2001 to 2015
Sources of funding	Stephen Weissman Kidney Cancer Research Fund Biostatistical analyses were supported by NIH Grants
Inclusion criteria	cT1 renal tumours cT2 renal tumours

	Participants with CKD stage 2 (eGFR 60-90 mL/min/1.73m2)
Exclusion criteria	Advanced or metastatic disease (T3/4) Urothelial malignancy
Intervention(s)	Partial nephrectomy (PN). Surgery type not specified, but likely to be all types. Determination of type of operation and operative approach were carried out by individual attending surgeons based on patient comorbidities, mass characteristics, and technical feasibility.
Comparator	Radical nephrectomy (RN). Details as for PN.
Outcome measures	Overall survival Complications eGFR Length of hospital stay
Number of participants	N = 1213 PN: 677 RN: 536
Duration of follow-up	Median follow up: 51.5 months (IQR 38 - 62.5). Follow up at arm level not reported.
Loss to follow-up	Not reported.
Methods of analysis	Multivariable logistic regression was utilized to elucidate independent risk factors for the development of eGFR < 60, eGFR < 45, and OS. Factors entered into the multivariable models included age (continuous), BMI (continuous), medical comorbidities (HTN, DM, CAD), clinical tumour size (continuous), year of treatment (continuous), type of surgery (radical vs. partial nephrectomy), malignancy (yes vs. no) and de novo eGFR<45 (yes vs. no). No adjustments for baseline renal function, surgery technique, RCC type or performance status at baseline. Kaplan–Meier analysis was performed for OS.
Additional comments	Primary aim of study is to report outcomes stratified by baseline CKD 2a vs CKD 2b. Some outcomes also presented by PN vs RN - these outcomes are extracted. PN arm was older and had a higher incidence of diabetes at baseline.

	All-cause mortality and eGFR <60 and <45 were presented as RN vs PN, and inverted by the NICE team.

Study arms

Partial nephrectomy (N = 677)

Type of surgery not specified

Radical nephrectomy (N = 536)

Type of surgery not specified

Characteristics

Arm-level characteristics

Characteristic	Partial nephrectomy (N = 677)	Radical nephrectomy (N = 536)
% Female No of events	n = 344 ; % = 34.6	n = 191 ; % = 35.5
Age Mean (SD)	62.5 (11.2)	60.7 (11.3)
Tumour size (cm) clinical Mean (SD)	3.8 (1.8)	4 (2.7)
Preoperative CKD stage 2a (eGFR 75–89) No of events	n = 332 ; % = 49	n = 275 ; % = 51.3
Preoperative CKD stage 2b (eGFR 60–74.9) No of events	n = 345 ; % = 51	n = 261 ; % = 48.7
Preoperative eGFR ml/min/1.73 m2 Mean (SD)	74.7 (8.8)	75.7 (8.5)

Outcomes

Survival

Outcome	Partial nephrectomy vs Radical nephrectomy , , N2 = 677, N1 = 536
All-cause mortality from logistic regression model; inverted OR Odds ratio/95% CI	0.27 (0.11 to 0.67)

All-cause mortality - Polarity - Lower values are better

Long term severe adverse events

Outcome	Partial nephrectomy vs Radical nephrectomy , , N2 = 677, N1 = 536
eGFR <60 (ml/min/1.73 m2) from logistic regression model Odds ratio/95% CI	0.23 (0.14 to 0.36)
eGFR <45 (ml/min/1.73 m2) from logistic regression model Odds ratio/95% CI	0.27 (0.13 to 0.58)

eGFR <60 - Polarity - Lower values are better
eGFR <45 - Polarity - Lower values are better

Long term severe adverse events

Outcome	Partial nephrectomy, , N = 677	Radical nephrectomy , , N = 536
GFR<60 at last follow-up (ml/min/1.73 m2) No of events	n = 230 ; % = 34	n = 347 ; % = 64.7
GFR<45 at last follow-up (ml/min/1.73 m2) No of events	n = 59 ; % = 8.7	n = 125 ; % = 23.3
GFR<30 at last follow-up (ml/min/1.73 m2) No of events	n = 18 ; % = 2.7	n = 23 ; % = 4.3

Outcome	Partial nephrectomy, , N = 677	Radical nephrectomy , , N = 536
Change in eGFR from baseline (ml/min/1.73 m2) Mean (SD)	-6.8 (19.5)	-19.8 (16.8)

GFR<60 at last follow-up - Polarity - Lower values are better
GFR<45 at last follow-up - Polarity - Lower values are better
GFR<30 at last follow-up - Polarity - Lower values are better
Change in eGFR from baseline - Polarity - Higher values are better

Complications

Outcome	Partial nephrectomy, , N = 677	Radical nephrectomy , , N = 536
Clavien-Dindo III-V No of events	n = 55 ; % = 8.1	n = 17 ; % = 3.2

Duration of hospital stay

Outcome	Partial nephrectomy, , N = 677	Radical nephrectomy , , N = 536
Duration of hospital stay (days) Mean (SD)	6.9 (4.4)	7.2 (3.9)

Duration of hospital stay - Polarity - Lower values are better

Critical appraisal - GDT Crit App - ROBINS-I: a tool for non-randomised studies of interventions

All-cause mortality - Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(Insufficient adjustment for confounders)*
Overall bias	Directness	Partially Applicable *(CKD stage2 only)*

eGFR<60 - Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(Insufficient adjustment for confounders)*

Section	Question	Answer
Overall bias	Directness	Partially Applicable *(CKD stage2 only)*

eGFR<45- Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(Insufficient adjustment for confounders)*
Overall bias	Directness	Partially Applicable *(CKD stage2 only)*

GFR<60 at last follow-up -Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(No adjustment for confounders)*
Overall bias	Directness	Partially Applicable *(CKD stage2 only)*

GFR <45 at last follow-up -Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(No adjustment for confounders)*
Overall bias	Directness	Partially Applicable *(CKD stage2 only)*

GFR <30 at last follow-up -Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(No adjustment for confounders)*
Overall bias	Directness	Partially Applicable *(CKD stage2 only)*

Change in eGFR from baseline -Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(No adjustment for confounders)*

Section	Question	Answer
Overall bias	Directness	Partially Applicable *(CKD stage2 only)*

Clavien-Dindo III-V -Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(No adjustment for confounders)*
Overall bias	Directness	Partially Applicable *(CKD stage2 only)*

Duration of hospital stay -Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(No adjustment for confounders, outcome may be subjectively measured)*
Overall bias	Directness	Partially Applicable *(CKD stage2 only)*

Hori, 2021

Bibliographic Reference	Hori, Shunta; Tanaka, Nobumichi; Iida, Kota; Nakai, Yasushi; Miyake, Makito; Anai, Satoshi; Torimoto, Kazumasa; Fujimoto, Kiyohide; Impact of Radical Nephrectomy and Partial Nephrectomy on Actual Estimated Overall Survival Compared to Life Expectancy in Patients with Renal Cell Carcinoma.; Research and reports in urology; 2021; vol. 13; 155-165

Study details

Study type	Retrospective cohort study
Study location	Japan
Study setting	Hospital setting, retrospective medical chart review of a single institute.
Study dates	1980 to 2008
Sources of funding	No funding sources reported, paper cites that authors report no conflicts of interest.
Inclusion criteria	cT1 renal tumours cT2 renal tumours
Exclusion criteria	None reported

Intervention(s)	Partial nephrectomy
Comparator	Radical nephrectomy
Outcome measures	Overall survival
Number of participants	N = 937 Partial nephrectomy (PN): 157 Radical nephrectomy (RN): 780
Duration of follow-up	Median 95 months (IQR 38-150) for whole cohort PN: 121 (53-169) RN: 89 (35-143)
Loss to follow-up	367/937 (39.1%) died during follow-up. No other loss to follow-up reported or discussed.
Methods of analysis	A survival curve was obtained using the Kaplan–Meier method and compared using the Log-rank test. A multivariate Cox proportional hazards regression analysis was carried out. No adjustments undertaken for potential confounders.
Additional comments	

Study arms

Partial nephrectomy (N = 157)

Any type

Radical nephrectomy (N = 780)

Any type

Characteristics

Study-level characteristics

Characteristic	Study (N = 937)
% Female No of events	n = 291 ; % = 31.1
Age Median (IQR)	63 (54 to 70)

Characteristic	Study (N = 937)
Tumour size mm Median (IQR)	39.5 (25 to 51)
Primary RCC type - Clear cell No of events	n = 712 ; % = 76
Primary RCC type - not clear cell No of events	n = 225 ; % = 24

Outcomes

Survival

Outcome	Partial nephrectomy vs Radical nephrectomy, , N2 = 157, N1 = 780
Overall survival From multivariate analysis Hazard ratio/95% CI	0.64 (0.44 to 0.91)

Overall survival - Polarity - Lower values are better

Critical appraisal - GDT Crit App - ROBINS-I: a tool for non-randomised studies of interventions

Overall survival- Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(No adjustments for confounders)*
Overall bias	Directness	Directly applicable

Janssen, 2018

Bibliographic Reference	Janssen, M W W; Linxweiler, J; Terwey, S; Rugge, S; Ohlmann, C-H; Becker, F; Thomas, Ch; Neisius, A; Thuroff, J W; Siemer, S; Stockle, M; Roos, F C; Survival outcomes in patients with large (>=7cm) clear cell renal cell carcinomas treated with nephron-sparing surgery versus radical nephrectomy: Results of a multicenter cohort with long-term follow-up.; PloS one; 2018; vol. 13 (no. 5); e0196427

Study details

Study type	Retrospective cohort study
Study location	Germany
Study setting	Hospital setting. Databases of two academic urological referral centres.
Study dates	1980 to 2010 Intending to capture start of nephron sparing surgery (partial nephrectomy) and end at the introduction of robot-assisted surgery.
Sources of funding	No funding received.
Inclusion criteria	Renal masses of ≥7cm Clear cell renal carcinoma (ccRCC)
Exclusion criteria	Clinical stage T3 or higher Metastatic cancer Non-malignant histology Laparoscopic / robotic surgery Imperative indication for nephron sparing surgery (e.g. anatomic or functional solitary kidney)
Intervention(s)	Partial nephrectomy (PN) (described throughout paper as nephron sparing surgery, NSS). Patients were selected for NSS according to tumour size and location. The decision to perform NSS was based on discussion and approval by interdisciplinary internal review boards. NSS and RN were performed using standard open surgical techniques.
Comparator	Radical nephrectomy (RN). Details as per PN.
Outcome measures	Recurrence Complications Mortality
Number of participants	N = 123 PN: 18 RN: 105
Duration of follow-up	PN: 163 months (range 3–296)

	RN: 93 months (range 3–367)
Loss to follow-up	None reported.
Methods of analysis	To exclude an age difference between the groups, a matched-pair analysis allowing sampling with replacement was executed. Overall survival (OS) was estimated using the Kaplan-Meier-method; the log-rank (Mantel-Cox) test was used to compare survival among different groups. No propensity score matching or further univariate and multivariate Cox proportional hazard regression models could be applied due to the very small number of events in the study groups.
Additional comments	Complications events reported. Not extracted as included in an included systematic review (Deng 2019).

Study arms

Partial nephrectomy (N = 18)

Open surgery only

Radical nephrectomy (N = 105)

Open surgery only

Characteristics

Arm-level characteristics

Characteristic	Partial nephrectomy (N = 18)	Radical nephrectomy (N = 105)
% Female No of events	n = 9 ; % = 50	n = 34 ; % = 33
Age Custom value	Median 57, range 43-78	Median 62, range 32 to 80
Tumour size Custom value	Median 8, range 7 to 16	Median 8, range 7 to 18
ASA score ≥3 American Society of Anesthesiologists score No of events	n = 3 ; % = 16.6	n = 23 ; % = 21.9

Outcomes

Survival

Outcome	Partial nephrectomy, , N = 18	Radical nephrectomy, , N = 105
Mortality Median 102 month follow-up No of events	n = 5 ; % = 27.7	n = 61 ; % = 58.1
Recurrence No of events	n = 2 ; % = 11.1	n = 42 ; % = 40
Recurrence - pT1b and pT2 only Excludes pT3 No of events	n = 1 ; % = 6	n = 30 ; % = 38.9
Recurrence - pT1b and pT2 only Excludes pT3 Sample size	n = 15	n = 77
Recurrence - pT2 only Excludes pT3 and pT1b No of events	n = 1 ; % = 9	n = 30 ; % = 41.6
Recurrence - pT2 only Excludes pT3 and pT1b Sample size	n = 11	n = 32

Mortality - Polarity - Lower values are better
Recurrence - Polarity - Lower values are better

Critical appraisal - GDT Crit App - ROBINS-I: a tool for non-randomised studies of interventions

Mortality Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(No adjustment for confounders)*
Overall bias	Directness	Indirectly Applicable *(T2 only, clear cell RCC only)*

Recurrence - Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(No adjustment for confounders)*
Overall bias	Directness	Indirectly Applicable *(T2 only, clear cell RCC only)*

Recurrence- pT1b and pT2 only Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(No adjustment for confounders)*
Overall bias	Directness	Indirectly Applicable *(T2 only, clear cell RCC only)*

Recurrence- pT2 only Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(No adjustment for confounders)*
Overall bias	Directness	Indirectly Applicable *(T2 only, clear cell RCC only)*

Kambara, 2018

Bibliographic Reference	Kambara, Taiki; Tanimoto, Ryuta; Araki, Motoo; Saika, Takashi; Hashimoto, Hideaki; Oeda, Tadashi; Tsushima, Tomoyasu; Hayata, Shunji; Nasu, Yasutomo; Kobayashi, Yasuyuki; Renal Function after Nephrectomy Influences the Risk of Cardiovascular Events.; Acta medica Okayama; 2018; vol. 72 (no. 3); 241-247

Study details

Study type	Retrospective cohort study
Study location	Japan
Study setting	Hospital setting. Data analysed for patients at a single institution "and related hospitals".
Study dates	1990 to 2009
Sources of funding	No information on funding. Conflict of interest statement is that no potential conflict of interest relevant to this article was reported.

Inclusion criteria	Localised RCC Postoperative adjuvant chemotherapy not performed
Intervention(s)	Partial nephrectomy (PN). Open or laparoscopic. The surgical approach in each case was determined by considering the complexity of the renal mass and the preference of the surgeon.
Comparator	Radical nephrectomy (RN). Open or laparoscopic.
Outcome measures	Overall survival Cardiovascular outcomes
Number of participants	N=570 PN: 171 RN: 399
Duration of follow-up	PN: Median 54 months (IQR 34-80) RN: Median 59 months (IQR 38-86)
Loss to follow-up	Not reported.
Methods of analysis	The relationship between the type of surgery and each primary endpoint was evaluated in a time-to-event framework. Multivariate Cox proportional hazards regression was used to assess the effect on the hazards at each endpoint, controlled for demographic and clinical characteristics.
Additional comments	Cardiovascular events reported. Not extracted as included in an included systematic review (Ochoa-Arvizo 2023). Post-hoc exclusion of T2 RCC: Seventy-two patients with clinical T2 RCC were excluded from the study because all but one of the patients who underwent a PN had clinical T1a or T1b RCCs.

Study arms

Partial nephrectomy (N = 171)

Open or laparoscopic

Radical nephrectomy (N = 399)

Open or laparoscopic

Characteristics

Arm-level characteristics

Characteristic	Partial nephrectomy (N = 171)	Radical nephrectomy (N = 399)
% Female No of events	n = 38 ; % = 22.2	n = 140 ; % = 35.1
Age Median (IQR)	61 (52 to 72)	66 (56 to 74)
Surgery technique used - Laparoscopic No of events	n = 38 ; % = 22.2	n = 151 ; % = 37.8
TNM classification - cT1a No of events	n = 157 ; % = 91.8	n = 199 ; % = 49.9
TNM classification - cT1b No of events	n = 14 ; % = 8.2	n = 200 ; % = 59.1
Tumour size cm Median (IQR)	2.2 (1.7 to 3)	4 (3 to 5)
Baseline renal function - preop eGFR ≥60 ml/min/1.73 m2 No of events	n = 144 ; % = 84.2	n = 326 ; % = 81.7

Outcomes

Survival

Outcome	Partial nephrectomy vs Radical nephrectomy, , N2 = 171, N1 = 399
Overall survival Multivariate analysis Hazard ratio/95% CI	0.78 (0.25 to 2)

Overall survival - Polarity - Lower values are better

Critical appraisal - GDT Crit App - ROBINS-I: a tool for non-randomised studies of interventions

Overall survival- Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(Unclear adjustment for confounders, post hoc exclusion of T2)*
Overall bias	Directness	Partially Applicable *(T1 only)*

Klett, 2021

Bibliographic Reference	Klett, Dane E; Tsivian, Matvey; Packiam, Vignesh T; Lohse, Christine M; Ahmed, Mohamed E; Potretzke, Theodora A; Gopalakrishna, Ajay; Boorjian, Stephen A; Thompson, R Houston; Leibovich, Bradley C; Potretzke, Aaron M; Partial versus radical nephrectomy in clinical T2 renal masses.; International journal of urology : official journal of the Japanese Urological Association; 2021; vol. 28 (no. 11); 1149-1154

Study details

Study type	Retrospective cohort study
Study location	Follow-up data were collected from the hospital registry - US
Study setting	Hospital setting
Study dates	2000 to 2016
Sources of funding	NI - Authors declare no conflict of interest.
Inclusion criteria	People with 2 kidneys cT2 renal tumours eGFR ≥15 Unilateral sporadic solid renal masses
Intervention(s)	Partial nephrectomy (PN)
Comparator	Radical nephrectomy (RN)
Outcome measures	Overall survival Complications Cancer free survival

Number of participants	N = 451 PN = 72 RN = 379
Duration of follow-up	Median follow-up among the 259 surviving patients was 7.1 years (IQR 3.6– 11.4 years)
Loss to follow-up	89 RN patients and 3 PN patients had a propensity score that was outside the common range of RN and PN groups
Methods of analysis	Continuous features were summarised with medians and IQR; categorical features were summarised with frequencies and percentages. Comparisons of clinical, radiographic and pathological features between PN and RN were evaluated using Wilcoxon rank sum, X2 and Fisher's exact tests. Survival outcomes between PN and RN were estimated using the Kaplan–Meier method and the comparisons of survival outcomes between the two groups were evaluated using Cox proportional hazards regression models and summarised with HRs. Propensity scores for RN versus PN were generated using a logistic regression model with RN as the outcome, and the aforementioned clinical and radiographic features as covariates

Study arms

Partial nephrectomy (N = 72)

Radical nephrectomy (N = 379)

Characteristics

Arm-level characteristics

Characteristic	Partial nephrectomy (N = 72)	Radical nephrectomy (N = 379)
% Female No of events	n = 33 ; % = 46	n = 154 ; % = 41
Age Median (IQR)	59 (52 to 66)	60 (51 to 69)
Minimally invasive approach	n = 13 ; % = 18	n = 68 ; % = 18

Characteristic	Partial nephrectomy (N = 72)	Radical nephrectomy (N = 379)
No of events		
Multifocality No of events	n = 2 ; % = 3	n = 8 ; % = 2
cT2a No of events	n = 51 ; % = 71	n = 272 ; % = 72
cT2b No of events	n = 21 ; % = 29	n = 107 ; % = 28
Tumour size (cm) Median (IQR)	9.3 (7.6 to 11)	9 (8 to 10.7)
Benign No of events	n = 22 ; % = 31	n = 35 ; % = 9
RCC No of events	n = 50 ; % = 69	n = 344 ; % = 91
≥90 No of events	n = 11 ; % = 15	n = 55 ; % = 15
60 to <90 No of events	n = 37 ; % = 51	n = 209 ; % = 55
≥45 to <60 No of events	n = 17 ; % = 24	n = 82 ; % = 22
≥30 to <45 No of events	n = 5 ; % = 7	n = 26 ; % = 7
15 to <30 No of events	n = 2 ; % = 3	n = 6 ; % = 2
ECOG = 0 No of events	n = 67 ; % = 93	n = 344 ; % = 91
ECOG = 1 No of events	n = 4 ; % = 6	n = 28 ; % = 7
ECOG = 2	n = 1 ; % = 1	n = 3 ; % = 1

Characteristic	Partial nephrectomy (N = 72)	Radical nephrectomy (N = 379)
No of events		
ECOG = 3 No of events	n = 0 ; % = 0	n = 4 ; % = 1

Outcomes

Complications

Outcome	Partial nephrectomy, , N = 72	Radical nephrectomy, , N = 379
Clavien-Dindo grades I-V Overall complications No of events	n = 14 ; % = 19	n = 49 ; % = 13
Clavien-Dindo grades III-IV High-grade complications No of events	n = 3 ; % = 4	n = 9 ; % = 2

Clavien-Dindo grades I-V - Polarity - Lower values are better

Survival

Outcome	Radical nephrectomy vs Partial nephrectomy, , N2 = 379, N1 = 72
Overall survival Hazard ratio/95% CI	0.82 (0.51 to 1.33)
Metastases-free survival 10 years Hazard ratio/95% CI	1.56 (0.83 to 2.93)

Metastases-free survival - Polarity - Lower values are better

Critical appraisal - GDT Crit App - ROBINS-I: a tool for non-randomised studies of interventions

Complications - Clavien-Dindo grades I-IV

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(The outcome shows some concerns related to bias due to confounding and bias due to missing data)*
Overall bias	Directness	Partially Applicable

Complications Clavien-Dindo grades I-IV

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(The outcome shows some concerns related to bias due to confounding and bias due to missing data)*
Overall bias	Directness	Partially Applicable

Overall survival

Section	Question	Answer
Overall bias	Risk of bias judgement	Moderate *(The outcome shows some concerns related to bias due to confounding and bias due to missing data)*
Overall bias	Directness	Partially Applicable

Metastases-free survival

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(The outcome shows some concerns related to bias due to confounding and bias due to missing data)*
Overall bias	Directness	Partially Applicable

Kopp, 2015

Bibliographic Reference	Kopp, Ryan P; Liss, Michael A; Mehrazin, Reza; Wang, Song; Lee, Hak J; Jabaji, Ramzi; Mirheydar, Hossein S; Gillis, Kyle; Patel, Nishant; Palazzi,

Kerrin L; Wan, Jim Y; Patterson, Anthony L; Derweesh, Ithaar H; Analysis of Renal Functional Outcomes After Radical or Partial Nephrectomy for Renal Masses >=7 cm Using the RENAL Score.; Urology; 2015; vol. 86 (no. 2); 312-9

Study details

Other publications associated with this study included in review	Hamilton 2019
Study type	Retrospective cohort study
Study location	USA
Study setting	NA
Study dates	2002 to 2012S
Sources of funding	Stephen Weissman Kidney Cancer Research Fund
Inclusion criteria	Clinical T2 renal mass
Exclusion criteria	None reported
Intervention(s)	Partial nephrectomy (PN). 20 patients had imperative indications (CKD, low eGFR, solitary kidney, bilateral tumours), 29 patients had relative indications which weighted surgeon recommendation towards PN. 31 patients elected PN. Laparoscopic surgery candidacy was determined by operating surgeons.
Comparator	Radical nephrectomy (RN). Laparoscopic surgery candidacy was determined by operating surgeons.
Outcome measures	Complications eGFR
Number of participants	N=202 PN: 80 RN: 122
Duration of follow-up	Median 41.5 months. Not reported at arm level.
Loss to follow-up	Not reported.

Methods of analysis	Various analyses conducted for renal functional outcomes (not extracted here, see additional comments). For complications, only count data presented and no adjustments conducted.
Additional comments	Renal functional impairment outcomes not extracted, as they are included in an included systematic review (Ochoa-Arvizo 2023). Authors report that there were no conversions from PN to RN.

Study arms

Partial nephrectomy (N = 80)

Open or laparoscopic

Radical nephrectomy (N = 122)

Open or laparoscopic

Characteristics

Arm-level characteristics

Characteristic	Partial nephrectomy (N = 80)	Radical nephrectomy (N = 122)
% Female No of events	n = 26 ; % = 32.5	n = 45 ; % = 36.9
Age Mean (SD)	58 (12.4)	58 (9)
Surgery technique used - open No of events	n = 78 ; % = 97.5	n = 76 ; % = 62.3
Surgery technique used - Laparoscopic No of events	n = 2 ; % = 2.5	n = 46 ; % = 37.7
TNM classification - cT2a No of events	n = 62 ; % = 77.5	n = 78 ; % = 63.9
TNM classification - cT2b No of events	n = 18 ; % = 22.5	n = 44 ; % = 36.1
Tumour size (cm)	8.8 (1.6)	10.2 (2.7)

Characteristic	Partial nephrectomy (N = 80)	Radical nephrectomy (N = 122)
Mean (SD)		
Baseline renal function - preoperative eGFR <60 mL/min/1.73m2 No of events	n = 20 ; % = 25	n = 20 ; % = 16.3

Outcomes

Complications

Outcome	Partial nephrectomy, , N = 80	Radical nephrectomy, , N = 122
Clavien-Dindo ≥3 No of events	n = 14 ; % = 17.5	n = 3 ; % = 2.5

Clavien-Dindo ≥3 - Polarity - Lower values are better

Critical appraisal - GDT Crit App - ROBINS-I: a tool for non-randomised studies of interventions

Clavien-Dindo≥3 Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(No adjustment for confounders)*
Overall bias	Directness	Partially Applicable *(T2 only)*

Lambertini, 2024

Bibliographic Reference	Lambertini, L.; Mari, A.; Sandulli, A.; Amparore, D.; Antonelli, A.; Barale, M.; Bove, P.; Brunocilla, E.; Capitanio, U.; da Pozzo, L.F.; Maida, F.D.; Grosso, A.A.; Fiori, C.; Gontero, P.; Marzi, V.L.; Campi, R.; Longo, N.; Marchioni, M.; Montanari, E.; Montorsi, F.; Porpiglia, F.; Porreca, A.; Schiavina, R.; Simeone, C.; Siracusano, S.; Terrone, C.; Ficarra, V.; Minervini, A.; Minimally invasive transperitoneal partial versus radical nephrectomy in obese patients: perioperative and long-term functional outcomes from a large perspective contemporary series (RECORd2 project); Minerva Urology and Nephrology; 2024; vol. 76 (no. 2); 185

Study details

Trial registration number and/or trial name	The Italian REgistry of COnservative and Radical Surgery for cortical renal tumour Disease (RECORD 2 Project)
Study type	Prospective cohort study
Study location	Italy
Study setting	Prospective observational multicentre project promoted by the Italian Society of Urology (SIU) at 26 urological Italian centres and data collected from the e-form central database
Study dates	January 2013 to December 2016
Sources of funding	Not reported.
Inclusion criteria	Body Mass Index (BMI) ≥30 kg/m2 Patient treated with transperitoneal approach Clinical T1 renal tumour Preoperative eGFR >60 mL/min
Intervention(s)	Laparoscopic partial nephrectomy and robot-assisted partial nephrectomy
Comparator	Laparoscopic radical nephrectomy
Outcome measures	eGFR Length of hospital stay Adverse events
Number of participants	N = 388 Laparoscopic partial nephrectomy = 120 Robot-assisted partial nephrectomy = 145 Laparoscopic radical nephrectomy = 123
Duration of follow-up	Median follow-up was 36 (IQR 24-48) months
Loss to follow-up	Not reported.
Methods of analysis	The outcome variables were tested as change from baseline to each visit. Basing on their distribution, two categorical variables were compared using

	the Pearson's χ2 test. Continuous and categorical variables were compared using Mann-Whitney U Test assuming the non-parametric nature of all variables. Multivariate logistic regression was performed to evaluate predictors of major complications and acute kidney injury, multivariate Cox regression to evaluate predictors of clinically significant renal function loss at last follow-up. Covariates were selected in both multivariate analyses only if significant at univariate tests.
Additional comments	Surgical indications for partial nephrectomy were defined as elective (unilateral lesion with healthy contralateral kidney), relative (presence of severe diabetes, hypertension or lithiasis that could potentially affect kidney function in the future) and imperative (bilateral tumours, multiple tumours or tumours involving an anatomically or functionally solitary kidney)

Study arms

Laparoscopic radical nephrectomy (N = 123)

Laparoscopic partial nephrectomy (N = 120)

Robot-assisted partial nephrectomy (N = 145)

Characteristics

Arm-level characteristics

Characteristic	Laparoscopic radical nephrectomy (N = 123)	Laparoscopic partial nephrectomy (N = 120)	Robot-assisted partial nephrectomy (N = 145)
% Female No of events	n = 48 ; % = 39	n = 31 ; % = 25.8	n = 52 ; % = 35.9
Age Median (IQR)	65 (55 to 70)	64 (58 to 72)	64 (56 to 69)
TNM classification - T1a No of events	n = 56 ; % = 45.5	n = 69 ; % = 57.5	n = 78 ; % = 53.8
TNM classification - T1b No of events	n = 67 ; % = 54.5	n = 51 ; % = 42.5	n = 67 ; % = 46.2

Characteristic	Laparoscopic radical nephrectomy (N = 123)	Laparoscopic partial nephrectomy (N = 120)	Robot-assisted partial nephrectomy (N = 145)
Tumour size (mm) Median (IQR)	23 (15 to 43)	22 (12 to 37)	21 (13 to 35)
Baseline renal function - estimated Glomerular Filtration Rate (eGFR) Median (IQR)	80.1 (76.1 to 88.9)	79.8 (71.2 to 89.4)	77.5 (71.8 to 89.1)
BMI (kg/m2) Median (IQR)	32 (30.8 to 34.2)	32.4 (30.9 to 35.3)	32.1 (30.9 to 34.6)

Outcomes

Length of hospital stay

Outcome	Laparoscopic radical nephrectomy, , N = 123	Laparoscopic partial nephrectomy, , N = 120	Robot-assisted partial nephrectomy, , N = 145
Length of hospital stay Median (IQR)	4 (3 to 5)	4 (3 to 5)	3 (2 to 4)

Length of hospital stay - Polarity - Lower values are better

Surgical major postop complications

Outcome	Laparoscopic radical nephrectomy, , N = 120	Laparoscopic partial nephrectomy, , N = 123	Robot-assisted partial nephrectomy, , N = 145
Surgical major postop complications - Clavien Dindo 3a No of events	n = 10 ; % = 8.1	n = 7 ; % = 5.8	n = 7 ; % = 4.8
Surgical major postop complications - Clavien Dindo 3b No of events	n = 5 ; % = 4.2	n = 3 ; % = 2.5	n = 4 ; % = 2.8

Surgical major postop complications - Polarity - Lower values are better

We combined the arms (LPN and RAPN) to carry out the analysis in the Cochrane RevMan web

Renal function

Outcome	Laparoscopic radical nephrectomy, , N = 123	Laparoscopic partial nephrectomy, , N = 120	Robot-assisted partial nephrectomy, , N = 145
Significant renal function loss at last follow-up No of events	n = 37 ; % = 30.1	n = 20 ; % = 16.7	n = 15 ; % = 10.3

Significant renal function loss at last follow-up - Polarity - Lower values are better

Critical appraisal - GDT Crit App - ROBINS-I: a tool for non-randomised studies of interventions

Length of hospital stay Laparoscopic radical nephrectomy vs Laparoscopic partial nephrectomy vs Robot-assisted partial nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(Outcomes were not adjusted for all important confounding factors)*
Overall bias	Directness	Directly applicable

Luis-Cardo, 2022

Bibliographic Reference	Luis-Cardo, A; Herranz-Amo, F; Rodriguez-Cabero, M; Quintana-Alvarez, R; Esteban Labrador, L; Rodriguez-Fernandez, E; Mayor-de Castro, J; Barbas Bernardos, G; Ramirez Martin, D; Hernandez-Fernandez, C; Laparoscopic nephron sparing surgery and radical nephrectomy in cT1 renal tumors. Comparative analysis of complications and survival.; Actas urologicas espanolas; 2022; vol. 46 (no. 6); 340-347

Study details

Study type	Retrospective cohort study
Study location	Spain
Study setting	Hospital setting

Study dates	2005 to 2018
Sources of funding	No funding received.
Inclusion criteria	People with 2 kidneys Single tumour Preoperative GFR 60mL/min/1.72m2 cT1 renal tumours
Exclusion criteria	None reported
Intervention(s)	Laparoscopic partial nephrectomy ("nephron sparing surgery")
Comparator	Laparoscopic radical nephrectomy
Outcome measures	Overall survival Recurrence Complications Length of hospital stay
Number of participants	N = 372 Partial nephrectomy (laparoscopic): 216 Radical nephrectomy: 156
Duration of follow-up	Overall median follow-up: 57 (IQR 28-100) months. RN median follow-up: 72 (IQR 30−116) months PN median follow-up: 50 (26.5-86.5) months
Loss to follow-up	8/372 (2.2%) 2 died due to postoperative complications 6 did not attend any follow-up check-ups
Methods of analysis	Quantitative variables were represented by median and interquartile range (IQR) and qualitative variables by absolute frequencies and percentages. The Chi-2 test was used to contrast qualitative variables and Student's T-test for quantitative variables. Logistic regression was used to evaluate the possible predictor variables of complications.

	The differences in survival were evaluated using the Kaplan-Meier test and possible independent predictor variables were obtained using Cox regression.
Additional comments	T1 tumours only. Although survival data presented for 10 years, majority of participants did not provide data at this point (higher bound of IQR for follow-up is 116 months for RN and 86.5 months for PN). HR for overall survival was presented (table 4) but could not be extracted as it was incorrect: the HR did not lie within the 95% confidence intervals: HR 1.27 (95%CI 0.42 - 1.17)

Study arms

Partial nephrectomy (N = 216)

Laparoscopic

Radical nephrectomy (N = 156)

Characteristics

Arm-level characteristics

Characteristic	Partial nephrectomy (N = 216)	Radical nephrectomy (N = 156)
% Female No of events	n = 83 ; % = 38.4	n = 59 ; % = 37.8
Age Median (IQR)	58 (NR to NR)	64 (NR to NR)
Clear cell No of events	n = 110 ; % = 50.93	n = 100 ; % = 64.1
Papillary type 1 No of events	n = 34 ; % = 15.74	n = 13 ; % = 8.34
Papillary type 2 No of events	n = 8 ; % = 3.7	n = 9 ; % = 5.77

Characteristic	Partial nephrectomy (N = 216)	Radical nephrectomy (N = 156)
Chromophobe No of events	n = 29 ; % = 13.43	n = 23 ; % = 14.74
Oncocytoma No of events	n = 17 ; % = 7.87	n = 8 ; % = 5.13
Angiomyolipoma No of events	n = 12 ; % = 5.55	n = 0 ; % = 0
Other No of events	n = 6 ; % = 2.78	n = 3 ; % = 1.92
Baseline renal function (ml/min/1.73 m2) GFR Median (IQR)	92.6 (76.3 to 99.8)	88 (76.3 to 99.8)
Tumour size (Not reported, assumed cm) Estimated from CT Median (IQR)	2.5 (NR to NR)	5 (NR to NR)

Outcomes

Survival

Outcome	Partial nephrectomy, , N = 216	Radical nephrectomy, , N = 156
Overall survival - 5 years No of events	n = 195 ; % = 90.2	n = 127 ; % = 81.2
Overall survival - 10 years No of events	n = 164 ; % = 75.7	n = 89 ; % = 56.8
Recurrence - 5 years Of total at baseline No of events	n = 201 ; % = 93.5	n = 134 ; % = 86.1
Recurrence - 10 years Of total at baseline	n = 181 ; % = 83.6	n = 134 ; % = 86.1

Outcome	Partial nephrectomy, , N = 216	Radical nephrectomy, , N = 156
No of events		

Overall survival - 5 years - Polarity - Higher values are better
Overall survival - 10 years - Polarity - Higher values are better
Recurrence - 5 years - Polarity - Lower values are better
Recurrence - 10 years - Polarity - Lower values are better

Length of hospital stay

Outcome	Partial nephrectomy, , N = 216	Radical nephrectomy, , N = 156
Length of stay (days) Median (IQR)	3 (3 to 4)	4 (3 to 4)

Length of stay - Polarity - Lower values are better

Complications

Outcome	Partial nephrectomy, , N = 216	Radical nephrectomy, , N = 156
Clavien-Dindo I-II No of events	n = 35 ; % = 16.1	n = 15 ; % = 9.7
Clavien-Dindo III-V No of events	n = 10 ; % = 4.6	n = 6 ; % = 3.9

Clavien-Dindo I-II - Polarity - Lower values are better
Clavien-Dindo III-V - Polarity - Lower values are better

Survival

Outcome	Partial nephrectomy vs Radical nephrectomy, , N2 = 216, N1 = 156
Relapse free survival Hazard ratio/95% CI	1.34 (0.41 to 4.32)

Relapse free survival - Polarity - Lower values are better
Hazard ratios from multivariate analysis for predictive factors of overall survival

Critical appraisal - GDT Crit App - ROBINS-I: a tool for non-randomised studies of interventions

Overall survival-5years -Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(No adjustment for confounders)*
Overall bias	Directness	Partially Applicable *(T1 only, laparoscopic PN only)*

Overall survival-10years- Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(No adjustment for confounders)*
Overall bias	Directness	Partially Applicable *(T1 only, laparoscopic PN only)*

Recurrence-5years -Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(No adjustment for confounders)*
Overall bias	Directness	Partially Applicable *(T1 only, laparoscopic PN only)*

Recurrence 10 years -Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(No adjustment for confounders)*
Overall bias	Directness	Partially Applicable *(T1 only, laparoscopic PN only)*

Length of hospital stay- Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(No adjustment for confounders)*
Overall bias	Directness	Partially Applicable *(T1 only, laparoscopic PN only)*

Complications Clavien-Dindo I-II- Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(No adjustment for confounders)*
Overall bias	Directness	Partially Applicable *(T1 only, laparoscopic PN only)*

Complications Clavien-Dindo III-V- Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(No adjustment for confounders)*
Overall bias	Directness	Partially Applicable *(T1 only, laparoscopic PN only)*

Maurice, 2016

Bibliographic Reference	Maurice, M.J.; Zhu, H.; Kim, S.; Abouassaly, R.; Survival after partial and radical nephrectomy for high-risk disease: A propensity-matched comparison; Canadian Urological Association Journal; 2016; vol. 10 (no. 910); e282-e289

Study details

Study type	Retrospective cohort study
Study location	Data were collected from the National Cancer Data Base - US
Study dates	2003–2006
Sources of funding	The authors report no competing personal or financial interests.
Inclusion criteria	cT1 renal tumours cT2 renal tumours Non-metastatic Pathological T1-T3a
Intervention(s)	Partial nephrectomy (PN)
Comparator	Radical nephrectomy (RN)

Outcome measures	Overall survival
Number of participants	N = 1680 PN = 840 RN = 840
Duration of follow-up	Median follow-up was 69 months (interquartile range (IQR) = 48–83) in the PN group and 67 months (IQR = 43-68) in the RN group
Loss to follow-up	
Methods of analysis	A 1:1 propensity score-matching based on the nearest neighbour algorithm, 90% or more of cases were matched to controls, and no additional matches could be made with the given data, confirming the completeness of the match. Differences between the PN and RN groups were assessed by univariate analysis using the Mann-Whitney U-test for continuous variables and the chi-squared test for categorical variables. The PN and RN groups were compared in terms of OS using the Kaplan-Meier method and log-rank test. To adjust for covariates, which remained unbalanced after propensity-matching, the association between surgery type (PN or RN) and OS was analysed using a multivariable Cox proportional hazards model.
Additional comments	OS was measured in 5-year follow-up

Study arms

Partial nephrectomy (N = 840)

Radical nephrectomy (N = 840)

Characteristics

Arm-level characteristics

Characteristic	Partial nephrectomy (N = 840)	Radical nephrectomy (N = 840)
% Female No of events	n = 278 ; % = 33.1	n = 292 ; % = 34.8
Age Median (IQR)	61 (52 to 70)	61 (52 to 70)

Characteristic	Partial nephrectomy (N = 840)	Radical nephrectomy (N = 840)
White No of events	n = 671 ; % = 79.9	n = 673 ; % = 80.1
African-American No of events	n = 85 ; % = 10.1	n = 82 ; % = 9.8
Hispanic No of events	n = 47 ; % = 5.6	n = 50 ; % = 6
Other No of events	n = 37 ; % = 4.6	n = 35 ; % = 4.3
cT1 No of events	n = 894 ; % = 95.7	n = 2877 ; % = 68.2
cT2 No of events	n = 40 ; % = 4.3	n = 1339 ; % = 31.8
Tumour size Median (IQR)	3 (2.4 to 4.5)	3 (2.4 to 4.3)
Clear cell No of events	n = 279 ; % = 33.2	n = 268 ; % = 31.9
Papillary No of events	n = 133 ; % = 15.8	n = 145 ; % = 17.3
Chromophobe No of events	n = 65 ; % = 7.7	n = 59 ; % = 7
Aggressive type No of events	n = 6 ; % = 0.7	n = 3 ; % = 0.4
Unclassified RCC No of events	n = 317 ; % = 37.7	n = 298 ; % = 35.5
Other No of events	n = 40 ; % = 4.8	n = 67 ; % = 8

Outcomes

Overall survival

Outcome	Partial nephrectomy vs Radical nephrectomy, , N2 = 840, N1 = 840
Overall survival - 5-year follow-up Hazard ratio/95% CI	0.66 (0.53 to 0.82)

Overall survival - 5-year follow-up - Polarity - Higher values are better

Critical appraisal - GDT Crit App - ROBINS-I: a tool for non-randomised studies of interventions

Overall survival - 5-year follow-up

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(The outcome shows some concerns related to bias due to confounding)*
Overall bias	Directness	Partially Applicable

Mercimek, 2023

Bibliographic Reference	Mercimek, M.N.; Ozden, E.; Gulsen, M.; Yakupoglu, Y.K.; Bostanci, Y.; Sarikaya, S.; Comparison of Laparoscopic Partial Nephrectomy vs. Radical Nephrectomy for Renal Tumors with a Renal Nephrometry Score >=10: A Propensity Score Matched Analysis; Bulletin of Urooncology; 2023; vol. 23 (no. 4); 94-99

Study details

Study type	Retrospective cohort study
Study location	Turkey
Study setting	Hospital setting
Study dates	2009 to 2018
Sources of funding	No financial support received.
Inclusion criteria	Not reported

	All partial nephrectomy group had a radius of the tumour size, exophytic, nearness to collecting system, anterior, location (RENAL) nephrometry score (RNS) of ≥10. Unclear whether this was specified inclusion criteria or coincidence.
Exclusion criteria	Incomplete data
Intervention(s)	Laparoscopic partial nephrectomy. Clinical diagnoses and tumour anatomical characteristics were established using magnetic resonance imaging and/or contrast-enhanced computed tomography. The Urology Review Board was responsible for determining the treatment modality and specific surgical approach for all patients. Both LPNs and LRNs were conducted exclusively by a single surgeon.
Comparator	Laparoscopic radical nephrectomy.
Outcome measures	Overall survival Recurrence Complications eGFR Length of hospital stay
Number of participants	N=78 Laparoscopic partial nephrectomy: 39 Laparoscopic radical nephrectomy: 39 Participants were selected from the full group of people who had surgery between the study dates above. 41 LPN patients had full data. Propensity score matching conducted with final sample size 39 per arm.
Duration of follow-up	LPN: 28.43 months (SD 15.95) LRN: 56.05 months (SD 31.72)
Loss to follow-up	None - participants with complete data retrospectively selected.
Methods of analysis	1:1 propensity score matched analysis was conducted, aligning variables including age, gender, clinical tumour stage, tumour size, baseline renal function, American Society of Anesthesiologists (ASA) score, and pertinent comorbidities such as diabetes mellitus (DM), hypertension (HT), coronary

	artery disease (CAD), and final tumour pathology of renal cell carcinoma (RCC). For categorical data, the chi-square test was applied, and Fisher's exact test was used when cell counts were less than 5. Analytical outcomes are presented as mean ± standard deviation for quantitative data, and categorical data are expressed as frequency (percentage). A significance level of $p<0.05$ was considered significant. The computation of overall survival and recurrence-free survival was conducted using Kaplan-Meier analysis.
Additional comments	Characteristics below are for post-propensity score matched group.

Study arms

Partial nephrectomy (N = 39)

Laparoscopic

Radical nephrectomy (N = 39)

Laparoscopic

Characteristics

Arm-level characteristics

Characteristic	Partial nephrectomy (N = 39)	Radical nephrectomy (N = 39)
% Female No of events	n = 16 ; % = 41	n = 16 ; % = 41
Age Mean (SD)	52.26 (13.97)	54.15 (15.33)
TNM classification - T1a No of events	n = 23 ; % = 59	n = 23 ; % = 59
TNM classification - T1b No of events	n = 15 ; % = 38.5	n = 14 ; % = 35.9

Characteristic	Partial nephrectomy (N = 39)	Radical nephrectomy (N = 39)
TNM classification - T2a No of events	n = 1 ; % = 2.6	n = 2 ; % = 5.1
Baseline eGFR mL/min/1.73m2 Mean (SD)	94.55 (17.98)	89.85 (23.63)
Tumour size (unit not reported) Mean (SD)	38.9 (16.27)	44.44 (22.74)
RENAL score radius of the tumour size, exophytic, nearness to collecting system, anterior, location (RENAL) nephrometry score Mean (SD)	10.23 (0.42)	10.46 (0.68)

Outcomes

Long-term severe adverse events

Outcome	Partial nephrectomy, , N = 39	Radical nephrectomy, , N = 39
eGFR (<15 ml/min/1.73 m2) Change from baseline, at least 1 year post-surgery Mean (SD)	-11.18 (10.77)	-26.46 (18.11)

eGFR - Polarity - Higher values are better

Duration of hospital stay

Outcome	Partial nephrectomy, , N = 39	Radical nephrectomy, , N = 39
Length of stay (days) Mean (SD)	4.05 (2.6)	4.29 (6.45)

Length of stay - Polarity - Lower values are better

Complications

Outcome	Partial nephrectomy, , N = 39	Radical nephrectomy, , N = 39
Clavien-Dindo I	n = 3 ; % = 7.7	n = 0

Outcome	Partial nephrectomy, , N = 39	Radical nephrectomy, , N = 39
No of events		
Clavien-Dindo II No of events	n = 2 ; % = 5.1	n = 4 ; % = 10.3
Clavien-Dindo IIIa No of events	n = 4 ; % = 10.3	n = 0 ; % = 0
Clavien-Dindo Any No of events	n = 9 ; % = 23.1	n = 4 ; % = 10.3

Clavien-Dindo - Polarity - Lower values are better

Survival

Outcome	Partial nephrectomy, , N = 39	Radical nephrectomy, , N = 39
Overall survival Event data No of events	n = 37 ; % = 94.9	n = 32 ; % = 82.1
Overall survival Event data Sample size	n = 39 ; % = 100	n = 39 ; % = 100
Recurrence Of those who survived No of events	n = 1 ; % = 2.6	n = 4 ; % = 12.8
Recurrence Of those who survived Sample size	n = 37 ; % = 94.9	n = 32 ; % = 82.1

Critical appraisal - GDT Crit App - ROBINS-I: a tool for non-randomised studies of interventions

eGFR-Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Moderate
Overall bias	Directness	Partially Applicable *(Laparoscopic PN and RN only)*

Length of stay-Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(Small subset of cohort used due to missing data. Confounding present (adjusted for in propensity matching analysis); subjective outcome)*
Overall bias	Directness	Partially Applicable *(Laparoscopic PN and RN only)*

Clavien-Dindo I-Partial nephrectomy-Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Moderate *(Small subset of cohort used due to missing data. Confounding present (adjusted for in propensity matching analysis))*
Overall bias	Directness	Partially Applicable *(Laparoscopic PN and RN only)*

Clavien-Dindo II -Partial nephrectomy-Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Moderate *(Small subset of cohort used due to missing data. Confounding present (adjusted for in propensity matching analysis))*
Overall bias	Directness	Partially Applicable *(Laparoscopic PN and RN only)*

Clavien-Dindo IIIa- Partial nephrectomy-Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Moderate *(Small subset of cohort used due to missing data. Confounding present (adjusted for in propensity matching analysis))*
Overall bias	Directness	Partially Applicable *(Laparoscopic PN and RN only)*

Clavien-Dindo Any -Partial nephrectomy-Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Moderate *(Small subset of cohort used due to missing data. Confounding present (adjusted for in propensity matching analysis))*
Overall bias	Directness	Partially Applicable *(Laparoscopic PN and RN only)*

Overall survival Partial nephrectomy-Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Moderate *(Small subset of cohort used due to missing data. Confounding present (adjusted for in propensity matching analysis))*
Overall bias	Directness	Partially Applicable *(Laparoscopic PN and RN only)*

Recurrence Partial nephrectomy-Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Moderate
Overall bias	Directness	Partially Applicable *(Laparoscopic PN and RN only)*

Mir, 2020

Bibliographic Reference	Mir, Maria C; Pavan, Nicola; Capitanio, Umberto; Antonelli, Alessandro; Derweesh, Ithaar; Rodriguez-Faba, Oscar; Linares, Estefania; Takagi, Toshio; Rha, Koon H; Fiori, Christian; Maurer, Tobias; Zang, Chao; Mottrie, Alexandre; Umari, Paolo; Long, Jean-Alexandre; Fiard, Gaelle; De Nunzio, Cosimo; Tubaro, Andrea; Tracey, Andrew T; Ferro, Matteo; De Cobelli, Ottavio; Micali, Salvatore; Bevilacqua, Luigi; Torres, Joao; Schips, Luigi; Castellucci, Roberto; Dobbs, Ryan; Quarto, Giuseppe; Bove, Pierluigi; Celia, Antonio; De Concilio, Bernardino; Trombetta, Carlo; Silvestri, Tommaso; Larcher, Alessandro; Montorsi, Francesco; Palumbo, Carlotta; Furlan, Maria; Bindayi, Ahmet; Hamilton, Zachary; Breda, Alberto; Palou, Joan; Aguilera, Alfredo; Tanabe, Kazunari; Raheem, Ali; Amiel, Thomas; Yang, Bo; Lima, Estevao; Crivellaro, Simone; Perdona, Sisto; Gregorio, Caterina; Barbati, Giulia; Porpiglia, Francesco; Autorino, Riccardo; Partial versus radical nephrectomy in very elderly patients: a propensity score analysis of surgical, functional and oncologic outcomes (RESURGE project).; World journal of urology; 2020; vol. 38 (no. 1); 151-158

Study details

Trial registration number and/or trial name	RESURGE project
Study type	Retrospective cohort study
Study location	REnal SURgery in the Elderly - RESURGE project. 24 institutions from North America, Europe and Asia
Study setting	Hospital setting
Study dates	2000 to 2016
Sources of funding	None reported. Study reports that the authors declare no competing interests.
Inclusion criteria	cT1 renal tumours cT2 renal tumours >75 years old
Exclusion criteria	Metastatic cancer Non-malignant histology Clinical node positive disease (cN1+) Single kidney
Intervention(s)	Partial nephrectomy. No further information on intervention given. Likely to be all surgery types.
Comparator	Radical nephrectomy. No further information on control given. Likely to be all surgery types.
Outcome measures	Recurrence Complications eGFR Length of hospital stay Mortality
Number of participants	Total 1226 PN = 613

	RN = 613
Duration of follow-up	Median follow-up for the entire cohort: 35 months (IQR 13–63 months). Follow-up per arm not reported.
Loss to follow-up	Not reported
Methods of analysis	1:1 propensity score matched cohort. Covariates for inclusion in the propensity model were age at surgery, clinical T stage, Charlson score, and preoperative eGFR. >10% of data on ASA score and Fuhrman grading was missing, so dummy variables were constructed to indicate missingness. These variables were also included in PSM to ensure that the proportions of patients with missing data were balanced between propensity score-matched groups. Cox proportional hazards models were estimated to determine the relative change in hazard associated with PN vs RN on overall mortality, accounting for clustering at the centre level. Hazard ratios were adjusted for a list of potential confounders acting on the mortality risk (pathologic stage (pT), postoperative complications, presence of diabetes, presence of hypertension, and Fuhrman Grading).
Additional comments	Renal functional impairment outcomes not extracted, as they are included in an included systematic review (Ochoa-Arvizo 2023). Age not reported in baseline characteristics (adjusted for in Cox proportional hazard model). Events for recurrence outcome calculated from percentages reported in the paper.

Study arms

Radical nephrectomy (N = 613)

No information on type

Partial nephrectomy (N = 613)

No information on type

Characteristics

Arm-level characteristics

Characteristic	Radical nephrectomy (N = 613)	Partial nephrectomy (N = 613)
% Female No of events	n = 268 ; % = 44	n = 294 ; % = 48
Primary RCC type - Clear cell No of events	n = 235 ; % = 40	n = 218 ; % = 41
Primary RCC type - Papillary No of events	n = 178 ; % = 30	n = 175 ; % = 32
Primary RCC type - Chromophobe No of events	n = 58 ; % = 10	n = 45 ; % = 9
Primary RCC type - other No of events	n = 120 ; % = 20	n = 90 ; % = 17
Baseline renal function - <60mL/min eGFR No of events	n = 254 ; % = 41.4	n = 245 ; % = 50
ASA score III-IV No of events	n = 328 ; % = 63	n = 191 ; % = 38

Outcomes

Survival

Outcome	Partial nephrectomy vs Radical nephrectomy, , N2 = 613, N1 = 613
Overall mortality PSM, and adjusted for (pathologic stage (pT),	0.71 (0.22 to 2.25)

Outcome	Partial nephrectomy vs Radical nephrectomy, , N2 = 613, N1 = 613
postoperative complications, presence of diabetes, presence of hypertension, and Fuhrman Grading Hazard ratio/95% CI	

Overall mortality - Polarity - Lower values are better

Survival

Outcome	Radical nephrectomy, , N = 613	Partial nephrectomy, , N = 613
Recurrence No of events	n = 50 ; % = 8	n = 25 ; % = 4

Recurrence - Polarity - Lower values are better

Complications

Outcome	Radical nephrectomy, , N = 613	Partial nephrectomy, , N = 613
Overall complications Clavien-Dindo (grades unclear) No of events	n = 160 ; % = 27	n = 188 ; % = 34
Major complications Clavien-Dindo (grades unclear) No of events	n = 21 ; % = 12	n = 42 ; % = 24

Overall complications - Polarity - Lower values are better
Major complications - Polarity - Lower values are better

Duration of hospital stay

Outcome	Radical nephrectomy, , N = 613	Partial nephrectomy, , N = 613
Duration of hospital stay Median (IQR)	6 (4 to 9)	6 (5 to 9)

Duration of hospital stay - Polarity - Lower values are better

Critical appraisal - GDT Crit App - ROBINS-I: a tool for non-randomised studies of interventions

Overall mortality- Radical nephrectomy vs Partial nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(Insufficient adjustment)*
Overall bias	Directness	Partially Applicable *(Age 75+ only)*

Recurrence-Radical nephrectomy vs Partial nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(No adjustment for confounders)*
Overall bias	Directness	Partially Applicable *(Age 75+ only)*

Overall complications-Radical nephrectomy vs Partial nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(No adjustment for confounders)*
Overall bias	Directness	Partially Applicable *(Age 75+ only)*

Major complications Radical nephrectomy vs Partial nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(No adjustment for confounders, possible bias from measurement of outcomes)*
Overall bias	Directness	Partially Applicable *(Age 75+ only)*

Duration of hospital stay -Radical nephrectomy vs Partial nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(No adjustment for confounders, possible bias from measurement of outcomes)*

Section	Question	Answer
Overall bias	Directness	Partially Applicable *(Age 75+ only)*

Nayan, 2020

Bibliographic Reference	Nayan, Madhur; Saarela, Olli; Lawson, Keith; Martin, Lisa; Komisarenko, Maria; Finelli, Antonio; Long-term outcomes after radical or partial nephrectomy for T1a renal cell carcinoma: A population-based study.; Canadian Urological Association journal = Journal de l'Association des urologues du Canada; 2020; vol. 14 (no. 12); 392-397

Study details

Other publications associated with this study included in review	Uses several databases which are also used in Breau 2020. Breau study dates are narrower (2002 to 2010).
Study type	Retrospective cohort study
Study location	Canada
Study setting	Hospital setting. Several national databases (some validated) used to obtain information on demographics and medical history.
Study dates	1995 to 2014
Sources of funding	No funding received. See "additional comments" for competing interests.
Inclusion criteria	T1a renal tumours Histology consistent with RCC Tumours ≤4.0cm
Exclusion criteria	People with any nephrectomy prior to or following the relevant nephrectomy for kidney cancer
Intervention(s)	Partial nephrectomy (PN). Further detail not specified.
Comparator	Radical nephrectomy (RN). Further detail not specified.
Outcome measures	Overall survival
Number of participants	N = 5670 PN: 2503 RN: 3167

Duration of follow-up	Median overall follow-up 77 months. Interquartile range not reported. Follow-up at arm level not reported.
Loss to follow-up	Not reported.
Methods of analysis	Cox proportional hazard regression conducted to estimate the association of type of nephrectomy on the risk of the primary and secondary outcomes. The proportional hazards assumption was verified by evaluating Schoenfield residuals. Covariates in the multivariable model were chosen a priori and included age, income quintile, Charlson score, year of surgery, tumour size, and histology.
Additional comments	One author has been an advisory board member for AbbVie, Astellas, Bayer, Ipsen, Janssen, Sanofi, and TerSera; and has participated in clinical trials supported by Astellas, Bayer, and Janssen. No conflicts from other authors. Only records with a kidney cancer diagnosis date within 14 days of nephrectomy date were kept. Renal functional outcomes and cardiovascular events reported. Not extracted as included in an included systematic review (Ochoa-Arvizo 2023).

Study arms

Partial nephrectomy (N = 2503)

Surgery type not specified

Radical nephrectomy (N = 3167)

Surgery type not specified

Characteristics

Arm-level characteristics

Characteristic	Partial nephrectomy (N = 2503)	Radical nephrectomy (N = 3167)
% Female No of events	n = 959 ; % = 38.3	n = 1354 ; % = 42.8
Age: 18-39 No of events	n = 191 ; % = 7.6	n = 148 ; % = 4.7
Age: 40-44 No of events	n = 153 ; % = 6.1	n = 181 ; % = 5.7
Age: 45-49 No of events	n = 277 ; % = 11.1	n = 249 ; % = 7.9
Age: 50-54 No of events	n = 348 ; % = 13.9	n = 311 ; % = 9.8
Age: 55-59 No of events	n = 366 ; % = 14.6	n = 428 ; % = 13.5
Age: 60-64 No of events	n = 353 ; % = 14.1	n = 447 ; % = 14.1
Age: 65-69 No of events	n = 337 ; % = 13.5	n = 507 ; % = 16
Age: 70-74 No of events	n = 248 ; % = 9.9	n = 386 ; % = 12.5
Age: 75-79 No of events	n = 161 ; % = 6.4	n = 322 ; % = 10.2
Age: 80+ No of events	n = 69 ; % = 2.8	n = 178 ; % = 5.6
Tumour size cm Median (IQR)	2.5 (2 to 3.2)	3 (2.5 to 3.6)
Primary RCC type - Clear cell	n = 1817 ; % = 73	n = 2510 ; % = 79

Characteristic	Partial nephrectomy (N = 2503)	Radical nephrectomy (N = 3167)
No of events		
Primary RCC type - Papillary No of events	n = 527 ; % = 17	n = 402 ; % = 13
Primary RCC type - Chromophobe No of events	n = 157 ; % = 6	n = 150 ; % = 5
Primary RCC type - other No of events	n = 102 ; % = 4	n = 105 ; % = 3

Outcomes

Survival

Outcome	Partial nephrectomy vs Radical nephrectomy, , N2 = 2503, N1 = 3167
Overall survival Adjusted for age, income quintile, Charlson score, year of surgery, tumour size, and histology Hazard ratio/95% CI	0.73 (0.63 to 0.84)

Overall survival - Polarity - Lower values are better

Critical appraisal - GDT Crit App - ROBINS-I: a tool for non-randomised studies of interventions

Overall survival-Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(Incomplete adjustment for confounders (no renal function).)*
Overall bias	Directness	Partially Applicable *(T1a only)*

O'Malley, 2015

Bibliographic Reference	O'Malley, Rebecca L; Hayn, Matthew H; Brewer, Katherine A; Underwood, Willie 3rd; Hellenthal, Nicholas J; Kim, Hyung L; Sorokin, Igor; Schwaab, Thomas; Cancer control of partial nephrectomy for high-risk localized renal cell carcinoma: population-based and single-institutional analysis.; World journal of urology; 2015; vol. 33 (no. 11); 1807-14

Study details

Study type	Retrospective cohort study
Study location	USA
Study setting	Hospital setting. Data from an institutional renal tumour database.
Study dates	1997 to 2010
Sources of funding	No sources of funding declared. Authors report that they have no conflicts of interest.
Inclusion criteria	Single tumour Tumour diameter <7cm Localised tumour Normal contralateral tumour Preoperative creatinine <1.7ml/dl High risk disease: pathologic stage ≥pT3 and/or Fuhrman grade ≥3
Exclusion criteria	None reported
Intervention(s)	Partial nephrectomy (PN). Type of nephrectomy performed (laparoscopic or open and partial or radical) was at the discretion of the surgeon, but in general, partial nephrectomy was preferred whenever surgically feasible and oncologically sound.
Comparator	Radical nephrectomy.
Outcome measures	Complications
Number of participants	N=108 PN: 52 RN: 56
Duration of follow-up	Median 32 months (IQR 19 to 51). Follow-up at arm level not reported.

Loss to follow-up	Not reported
Methods of analysis	Complication outcome extracted is count data - no adjustments made and no statistical analysis undertaken.
Additional comments	Cohort is of high risk disease patients only (see inclusion criteria). Study also reports results for a cohort from the SEER database (Surveillance, Epidemiology and End Results). All outcomes are within the scope of included systematic reviews and so are not extracted. Overall survival and recurrence free survival also reported for the relevant institutional cohort, these are not extracted as within search period of an included systematic review (Gu 2016).

Study arms

Partial nephrectomy (N = 52)

Surgery type not reported

Radical nephrectomy (N = 56)

Surgery type not reported

Characteristics

Arm-level characteristics

Characteristic	Partial nephrectomy (N = 52)	Radical nephrectomy (N = 56)
% Female No of events	n = 17 ; % = 33	n = 24 ; % = 43
Age Mean (SD)	60.3 (11.9)	62.7 (12.1)
Ethnicity- Caucasian No of events	n = 48 ; % = 92	n = 56 ; % = 100
pT1 and high grade (risk) No of events	n = 41 ; % = 79	n = 35 ; % = 62
pT2 and high grade (risk) No of events	n = 2 ; % = 4	n = 5 ; % = 9

Characteristic	Partial nephrectomy (N = 52)	Radical nephrectomy (N = 56)
pT3 and high grade (risk) No of events	n = 9 ; % = 17	n = 16 ; % = 29
Tumour size Mean (SD)	3.5 (1.4)	5.1 (1.6)
Primary RCC type - clear cell No of events	n = 40 ; % = 77	n = 47 ; % = 84
Primary RCC type - Papillary No of events	n = 6 ; % = 12	n = 5 ; % = 9
Primary RCC type - Chromophobe No of events	n = 5 ; % = 10	n = 3 ; % = 5
Primary RCC type - unclassified No of events	n = 1 ; % = 1	n = 1 ; % = 2

Outcomes

Complications

Outcome	Partial nephrectomy, , N = 52	Radical nephrectomy, , N = 56
Clavien-Dindo 3 No of events	n = 3 ; % = 6	n = 0 ; % = 0

Clavien-Dindo 3 - Polarity - Lower values are better

Critical appraisal - GDT Crit App - ROBINS-I: a tool for non-randomised studies of interventions

Clavien-Dindo I-III Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(No adjustment for confounding, slight risk of bias from lack of blinding)*

Section	Question	Answer
Overall bias	Directness	Partially Applicable *(>7cm tumour, high risk patients only)*

Reix, 2018

Bibliographic Reference	Reix, B; Bernhard, J-C; Patard, J-J; Bigot, P; Villers, A; Suer, E; Vuong, N S; Verhoest, G; Alimi, Q; Beauval, J-B; Benoit, T; Nouhaud, F-X; Lenormand, C; Hamidi, N; Cai, J; Eto, M; Larre, S; El Bakhri, A; Ploussard, G; Hung, A; Koutlidis, N; Schneider, A; Carrouget, J; Droupy, S; Marchal, S; Doerfler, A; Seddik, S; Matsugasumi, T; Orsoni, X; Descazeaud, A; Pfister, C; Bensalah, K; Soulie, M; Gill, I; Flamand, V; Overall survival and oncological outcomes after partial nephrectomy and radical nephrectomy for cT2a renal tumors: A collaborative international study from the French kidney cancer research network UroCCR.; Progres en urologie : journal de l'Association francaise d'urologie et de la Societe francaise d'urologie; 2018; vol. 28 (no. 3); 146-155

Study details

Study type	Retrospective cohort study
Study location	France, America, Japan, Turkey
Study setting	Hospital setting. Data from the French kidney cancer research network (UroCCR), one American centre, one Japanese centre, and one Turkish centre.
Study dates	2000 to 2014
Sources of funding	Paper states that the authors have not supplied their declaration of competing interest.
Inclusion criteria	Adults 18 and over Localised renal cancer cT2a stage
Exclusion criteria	Non-malignant histology pT≥3b tumours Patients N+ or M+ on staging or final histological analysis
Intervention(s)	Partial nephrectomy (PN). Surgery type open or laparoscopic (robotic or conventional). The therapeutic decision was taken by the surgeon and validated in multi-disciplinary consultation meeting
Comparator	Radical nephrectomy (RN). Surgery type laparoscopic (robotic or conventional).
Outcome measures	Overall survival Cancer free survival

Number of participants	N=267 PN: 91 RN: 176
Duration of follow-up	Median follow up of 24 months (IQR: 12-43) for overall survival. Median follow up for PN was 23 months (IQR:12-48) for CFS Median follow up for RN was 19 months (IQR: 9.5-37) for CFS
Loss to follow-up	Not reported.
Methods of analysis	OS and CFS were estimated and compared between PN and RN using the Kaplan-Meier and log-rank test. Comparisons were adjusted using a Cox model for: age, gender, histological type, tumour size, stage pT of TNM classification, ISUP grade and ASA score. The adjustment was done by including a propensity score as a covariate in the Cox model. Fine—Gray regression model was used to adjust the difference between the groups on the propensity score. Cox and Fine—Gray models used with PN as the reference group.
Additional comments	Of the partial nephrectomy group (n=91), 12 had bilateral tumours, 14 had solitary kidney, 6 had chronic kidney disease. (No data for radical nephrectomy on these characteristics - could be because they weren't present in the control arm, but not explicit in the paper).

Study arms

Partial nephrectomy (N = 91)

Open surgery, robotic or conventional laparoscopy

Radical nephrectomy (N = 176)

Robotic or conventional laparoscopy

Characteristics

Arm-level characteristics

Characteristic	Partial nephrectomy (N = 91)	Radical nephrectomy (N = 176)
% Female No of events	n = 30 ; % = 33	n = 58 ; % = 32.9

Characteristic	Partial nephrectomy (N = 91)	Radical nephrectomy (N = 176)
Age Median (IQR)	59.4 (50 to 68)	60.5 (51 to 71)
Surgery technique used - open No of events	n = 61 ; % = 67	n = 0 ; % = 0
Surgery technique used - pure laparoscopy No of events	n = 6 ; % = 6.6	n = 161 ; % = 91.5
Surgery technique used - robot-assisted laparoscopy No of events	n = 24 ; % = 26.4	n = 15 ; % = 8.5
Tumour size (cm) Mean (SD)	8.17 (8)	8.51 (8.5)
Performance status at baseline - ECOG PS 0 No of events	n = 40 ; % = 66.7	n = 85 ; % = 69.1
Performance status at baseline - ECOG PS ≥1 No of events	n = 20 ; % = 33.3	n = 38 ; % = 30.9
ASA score ≤ 2 No of events	n = 57 ; % = 80.3	n = 114 ; % = 84.5
ASA score ≥3 No of events	n = 14 ; % = 19.7	n = 21 ; % = 15.5

Outcomes

Overall survival

Outcome	Radical nephrectomy vs Partial nephrectomy, , N2 = 176, N1 = 91
Overall survival Propensity score adjusted Hazard ratio/95% CI	0.87 (0.37 to 2.05)

Outcome	Radical nephrectomy vs Partial nephrectomy, , N2 = 176, N1 = 91
Cancer free survival Propensity score adjusted Hazard ratio/95% CI	1.02 (0.5 to 2.09)

Overall survival - Polarity - Lower values are better
Cancer free survival - Polarity - Lower values are better

Critical appraisal - GDT Crit App - ROBINS-I: a tool for non-randomised studies of interventions

Overall survival Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Moderate *(Mostly appropriate adjustment, some risk of bias from selection of participants into study based on characteristics post-surgery)*
Overall bias	Directness	Partially Applicable *(cT2a only)*

Cancer free survival Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Moderate *(Mostly appropriate adjustment, some risk of bias from selection of participants into study based on characteristics post-surgery)*
Overall bias	Directness	Partially Applicable *(cT2a only)*

Ren, 2024

Bibliographic Reference	Ren, K.; Wu, F.; Wu, H.; Ning, H.; Lyu, J.; Partial versus radical nephrectomy for T1b renal cell carcinoma: A comparison of efficacy and prognostic factors based on the Surveillance, Epidemiology, and End Results database; Current Urology; 2024; vol. 18 (no. 4); 328

Study details

Study type	Retrospective cohort study
Study location	China (using data from USA)

Study setting	Data were obtained from 17 registries of the Surveillance, Epidemiology, and End Results (SEER) database
Study dates	2010 - 2019
Sources of funding	This project was supported by the Shandong Provincial Nature Science Foundation (ZR2020QH240), the National Nature Science Foundation of China (NSFC82002719), the Clinical Medicine Innovation Program of Jinan City (202019125), and the China Postdoctoral Science Foundation (2022M711977).
Inclusion criteria	diagnosed between 2010 and 2019 histologically confirmed RCC Pathological diagnosis of T1bN0M0
Exclusion criteria	Surgery other than partial nephrectomy or radical nephrectomy Important information unknown such as pathological grade, tumour size, and diagnosis; Rare pathological types (such as collecting duct carcinoma, renal medullary carcinoma, and cystic RCC Bilateral tumours Adjuvant therapy (patients with T1b RCC are not sensitive to adjuvant therapy) Combination of other tumours
Intervention(s)	Partial nephrectomy
Comparator	Radical nephrectomy
Outcome measures	Mortality
Number of participants	N = 7634 Partial nephrectomy = 3817 Radical nephrectomy = 3817
Duration of follow-up	Median follow-up durations were 49 (95% confidence interval [CI], 47–50) months and 54 (95% CI, 52–56) months for the partial nephrectomy and radical nephrectomy groups, respectively.
Loss to follow-up	Not reported
Methods of analysis	Propensity score matching matched patients to the partial nephrectomy or radical nephrectomy group in a 1:1 ratio with a calibre of 0.05.

	Kaplan-Meier survival analysis was used to compare overall survival, and log-rank tests were used to determine the significance of the differences. The cumulative incidence function was used to compare the renal cell carcinoma cancer-specific mortality (RCC-CSM) and noncancer-specific mortality (NCSM), and the Fine and Gray test was used to determine the significance of the differences. Multivariate Cox proportional hazards regression analyses were used to analyse the risk factors for all-cause mortality, and competing risk proportional hazards regressions were used to analyse the risk factors for RCC-related mortality. Tumour size was grouped for subgroup analysis to compare the risk factors affecting survival.
Additional comments	

Study arms

Radical nephrectomy (N = 3817)

Partial nephrectomy (N = 3817)

Characteristics

Arm-level characteristics

Characteristic	Radical nephrectomy (N = 3817)	Partial nephrectomy (N = 3817)
% Female No of events	n = 1304 ; % = 34.2	n = 1303 ; % = 34.1
Tumour size - 40–55 mm No of events	n = 2599 ; % = 68.1	n = 2600 ; % = 68.1
Tumour size - 56–70 mm No of events	n = 1218 ; % = 31.9	n = 1217 ; % = 31.9
Primary RCC type - Clear-cell No of events	n = 2601 ; % = 68.1	n = 2576 ; % = 67.5
Primary RCC type - Papillary No of events	n = 648 ; % = 17	n = 650 ; % = 17

Characteristic	Radical nephrectomy (N = 3817)	Partial nephrectomy (N = 3817)
Primary RCC type - Chromophobe No of events	n = 199 ; % = 5.2	n = 202 ; % = 5.3
Primary RCC type - Renal-cell No of events	n = 369 ; % = 9.7	n = 389 ; % = 10.2

Outcomes

Mortality

Outcome	Partial nephrectomy vs Radical nephrectomy, , N2 = 3817, N1 = 3817
All-cause mortality Hazard ratio/95% CI	0.67 (0.58 to 0.78)
Renal cell carcinoma-related mortality Hazard ratio/95% CI	0.8 (0.62 to 1.03)
Renal cell carcinoma-related mortality - age >65 years Hazard ratio/95% CI	2.51 (1.94 to 3.23)

All-cause mortality - Polarity - Lower values are better
Renal cell carcinoma-related mortality - Polarity - Lower values are better
Renal cell carcinoma-related mortality - age >65 years - Polarity - Lower values are better

Critical appraisal - GDT Crit App - ROBINS-I: a tool for non-randomised studies of interventions

Mortality

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(Outcomes were not adjusted for all important confounding factors)*
Overall bias	Directness	Directly applicable

Rinott Mizrahi, 2018

Bibliographic Reference	Rinott Mizrahi, Gal; Freifeld, Yuval; Klein, Ilan; Boyarsky, Leonid; Zreik, Rani; Orlin, Ido; Friedman, Boris; Stein, Avi; Yoram, Dekel; Comparison of Partial and Radical Laparascopic Nephrectomy: Perioperative and Oncologic Outcomes for Clinical T2 Renal Cell Carcinoma.; Journal of endourology; 2018; vol. 32 (no. 10); 950-954

Study details

Study type	Retrospective cohort study
Study location	Data were collected from the hospital database retrospectively - Israel
Study setting	Hospital setting
Study dates	2012 to 2017
Sources of funding	No competing financial interests exist.
Inclusion criteria	cT2 renal tumours Renal masses of ≥7cm
Intervention(s)	Laparoscopic partial nephrectomy (LPN)
Comparator	Laparoscopic radical nephrectomy (LRN)
Outcome measures	Recurrence
Number of participants	N = 29 LPN = 13 LRN = 16
Duration of follow-up	Mean follow-up of 44.5 months
Loss to follow-up	
Methods of analysis	Student’s t tests and Pearson’s chi-squared tests were used for statistical hypothesis testing for normally distributed and categorical data, respectively
Additional comments	All cases were managed laparoscopically with no conversions to an open technique

Study arms

Laparoscopic partial nephrectomy (N = 13)

Laparoscopic radical nephrectomy (N = 16)

Characteristics

Arm-level characteristics

Characteristic	Laparoscopic partial nephrectomy (N = 13)	Laparoscopic radical nephrectomy (N = 16)
% Female No of events	n = 6 ; % = 36.8	n = 6 ; % = 34.5
Age Mean (SD)	64.5 (NR)	64.5 (NR)
Tumour size (cm) Mean (p value)	7.7 (*empty data*)	8.3 (0.13)
Clear cell tumours No of events	n = 6 ; % = 46	n = 14 ; % = 87.5
Baseline renal function (cc/(min/1.73 m2)) Mean (p value)	83 (NR)	83 (NR)

Outcomes

Recurrence

Outcome	Laparoscopic partial nephrectomy, , N = 13	Laparoscopic radical nephrectomy, , N = 16
Recurrence locally No of events	n = 1 ; % = 8	n = 0 ; % = 0
Metastases of renal cell carcinoma No of events	n = 0 ; % = 0	n = 2 ; % = 13

Recurrence - Polarity - Lower values are better
Metastases of renal cell carcinoma - Polarity - Lower values are better

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Recurrence

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(The outcome shows some concerns related to bias due to confounding and none univariate nor multivariate analysis were carried out for important confounding variables)*
Overall bias	Directness	Indirectly Applicable

Recurrence - Metastases of renal cell carcinoma

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(The outcome shows some concerns related to bias due to confounding and none univariate nor multivariate analysis were carried out for important confounding variables)*
Overall bias	Directness	Indirectly Applicable

Ristau, 2018

Bibliographic Reference	Ristau, Benjamin T; Handorf, Elizabeth A; Cahn, David B; Kutikov, Alexander; Uzzo, Robert G; Smaldone, Marc C; Partial nephrectomy is not associated with an overall survival advantage over radical nephrectomy in elderly patients with stage Ib-II renal masses: An analysis of the national cancer data base.; Cancer; 2018; vol. 124 (no. 19); 3839-3848

Study details

Study location	USA
Study setting	Hospital setting. The National Cancer Data Base (NCDB) was used as a data source. National cancer registry.
Study dates	2004 to 2014
Sources of funding	No funding was reported.

Inclusion criteria	Stage I and II RCC
Exclusion criteria	Non-malignant histology Any neoadjuvant therapy
Intervention(s)	Partial nephrectomy (PN). Surgery type not specified, likely all types.
Comparator	Radical nephrectomy (RN). Surgery type not specified, likely all types.
Outcome measures	Overall survival
Number of participants	212,016. Participants and outcomes reported by T1a vs T1b and T2 tumours. PN: N=90076 RN: N=121940 T1a PN: 73378 (59.7% of T1a patients) T1a RN: 49586 (40.3% of T1a patients) T1b-T2 PN: 16698 (18.8% of T1b-T2 patients) T1b-T2 RN: 72354 (81.2% of T1b-T2 patients)
Duration of follow-up	Not reported
Loss to follow-up	Not reported
Methods of analysis	The authors looked at the association between receipt of PN or RN and patient demographic/clinicopathologic factors across patients with any stage tumour using multivariable logistic regression adjusting for age, sex, race (white, black, or other), ethnicity (Hispanic, non-Hispanic, or unknown), year of diagnosis, comorbidities, urban/rural hospital, tumour (T)-classification, tumour histology, tumour grade (1 and 2 vs 3 and 4), facility location, facility type, income, education, and payer group. To account for clustering within hospitals, they used robust standard errors with generalized estimating equations Differences in OS by treatment were evaluated separately for the T1a and T1b/T2 groups. A propensity-score inverse probability of treatment weighting approach was used, estimating the probability of receiving PN based on patient and tumour factors through logistic regression.

	The relation between PN/RN and OS was evaluated using weighted Kaplan Meier curves and Cox proportional hazards regression models
Additional comments	Overall survival was reported overall for T1a, and for T1b-Tc. Forest plots displaying hazard ratios for overall survival for T1a and T1b-T2 were also presented split by age (18-44, 45-64, 65-75, 75+) and follow up (0-12, 12-36, 36-60 and 60+ months). Precise numbers for these outcomes were not displayed. Hazard ratios were presented in narrative sections for some of these subgroups, and are extracted here. To note that these are likely to be the notable outcomes (especially significant, or unexpectedly not significant) and therefore reporting bias is present.

Study arms

Partial nephrectomy (N = 90076)

All surgery types

Radical nephrectomy (N = 121940)

All surgery types

Characteristics

Arm-level characteristics

Characteristic	Partial nephrectomy (N = 90076)	Radical nephrectomy (N = 121940)
% Female T1a No of events	n = 29199 ; % = 23.8	n = 20814 ; % = 16.9
% Female T1b-T2 No of events	n = 5572 ; % = 6.26	n = 27831 ; % = 31.3
Age <50 T1a No of events	n = 16426 ; % = 13.4	n = 9134 ; % = 7.43
Age <50 T1b-T2 No of events	n = 3094 ; % = 3.46	n = 13275 ; % = 14.9
Age 51-60 T1a No of events	n = 19470 ; % = 15.8	n = 12311 ; % = 10

Characteristic	Partial nephrectomy (N = 90076)	Radical nephrectomy (N = 121940)
Age 51-60 T1b-T2 No of events	n = 4440 ; % = 4.99	n = 18678 ; % = 21
Age 61-70 T1a No of events	n = 21874 ; % = 17.8	n = 14362 ; % = 11.7
Age 61-70 T1b-T2 No of events	n = 4945 ; % = 5.55	n = 25508 ; % = 28.6
Age 71+ T1a No of events	n = 15608 ; % = 12.7	n = 13799 ; % = 11.2
Age 71+ T1b-T2 No of events	n = 4219 ; % = 4.74	n = 19838 ; % = 22.3
Primary RCC type chromophobe T1a No of events	n = 4304	n = 2347
Primary RCC type chromophobe T1b-T2 No of events	n = 1260	n = 5115
Primary RCC type clear cell T1a No of events	n = 55483	n = 39259
Primary RCC type clear cell T1b-T2 No of events	n = 11379	n = 56957
Primary RCC type papillary T1a No of events	n = 12066	n = 6804
Primary RCC type papillary T1b-T2 No of events	n = 3586	n = 8069
Primary RCC type sarcomatoid T1a No of events	n = 112	n = 127

Characteristic	Partial nephrectomy (N = 90076)	Radical nephrectomy (N = 121940)
Primary RCC type sarcomatoid T1b-T2 No of events	n = 53	n = 577
Primary RCC type not specified T1a No of events	n = 1413	n = 1049
Primary RCC type not specified T1b-T2 No of events	n = 420	n = 1673

Outcomes

Survival

Outcome	Partial nephrectomy vs Radical nephrectomy, , N2 = 90076, N1 = 121940
Overall survival - T1a Propensity score weighted. At 5 years. Sample size	n1 = 49586 ; %1 = 40.3, n2 = 73378 ; %2 = 59.7
Overall survival - T1a Propensity score weighted. At 5 years. Hazard ratio/95% CI	0.73 (0.7 to 0.75)
Overall survival - T1a Patients ages 18 to 44, ≥60 months after diagnosis Hazard ratio/95% CI	0.63 (0.52 to 0.74)
Overall survival - T1a Patients ages ≥75, >5 years after diagnosis Hazard ratio/95% CI	0.97 (0.9 to 1.06)
Overall survival - T1b-T2 Propensity score weighted. At 5 years. Sample size	n1 = 72354 ; %1 = 81.2, n2 = 16698 ; %2 = 18.8

Outcome	Partial nephrectomy vs Radical nephrectomy, , N2 = 90076, N1 = 121940
Overall survival - T1b-T2 Propensity score weighted. At 5 years. Hazard ratio/95% CI	0.88 (0.83 to 0.94)
Overall survival - T1b-T2 Patients ages 65-74, up to 1 year after diagnosis Hazard ratio/95% CI	0.84 (0.72 to 0.99)
Overall survival - T1b-T2 Patients ages 65-74, 3 years after diagnosis Hazard ratio/95% CI	0.88 (0.78 to 1)
Overall survival - T1b-T2 Patients ages 65-74, 5 years after diagnosis Hazard ratio/95% CI	0.97 (0.86 to 1.13)

Overall survival - T1a - Polarity - Lower values are better
Overall survival - T1b-T2 - Polarity - Lower values are better

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Overall survival -T1a Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(Bias from selection of reported result and insufficient adjustment for confounding)*
Overall bias	Directness	Partially Applicable *(T1a and T1b-T2 presented separately)*

Overall survival -T1b-T2 Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious
Overall bias	Directness	Partially Applicable *(T1a and T1b-T2 presented separately)*

Overallsurvival-T1a-18-44 60 months post diagnosis - Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious
Overall bias	Directness	Partially Applicable *(T1a and T1b-T2 presented separately)*

Overall survival-T1a->75 60 months post diagnosis - Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious
Overall bias	Directness	Partially Applicable *(T1a and T1b-T2 presented separately)*

Overall survival-T1b-T2-65-75 1 year post diagnosis - Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious
Overall bias	Directness	Partially Applicable *(T1a and T1b-T2 presented separately)*

Overall survival-T1b-T2-65-75 3 years post diagnosis - Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious
Overall bias	Directness	Partially Applicable *(T1a and T1b-T2 presented separately)*

Overall survival-T1b-T2-65-75 5 years post diagnosis - Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious
Overall bias	Directness	Partially Applicable *(T1a and T1b-T2 presented separately)*

Takagi, 2024

Bibliographic Reference	Takagi, Toshio; Omae, Kenji; Yoshida, Kazuhiko; Fukuda, Hironori; Kobari, Yuki; Ishihara, Hiroki; Iizuka, Junpei; Kondo, Tsunenori; Ishida, Hideki; Comparisons of survival and surgical outcomes between minimally invasive partial nephrectomy and radical nephrectomy in elderly patients with stage 1 renal cell carcinoma.; Geriatrics & gerontology international; 2024; vol. 24 (no. 3); 269-274

Study details

Study type	Retrospective cohort study
Study location	Japan
Study setting	Data were obtained from electronic databases and patient medical records from the Tokyo Women's Medical University Hospital
Study dates	2001 - 2020
Sources of funding	None
Inclusion criteria	Patients over 70 years with sporadic renal cell carcinoma (RCC) who underwent robot-assisted laparoscopic partial nephrectomy (RAPN) or laparoscopic radical nephrectomy (LRN) for stage 1 RCC
Exclusion criteria	Patients with insufficient medical records
Intervention(s)	Robot-assisted laparoscopic partial nephrectomy
Comparator	Laparoscopic radical nephrectomy
Outcome measures	Overall survival Recurrence Adverse events
Number of participants	N = 304 Robot-assisted laparoscopic partial nephrectomy = 260 Laparoscopic radical nephrectomy = 44
Duration of follow-up	Mean (standard deviation) follow-up was 34 (22) months in the robot-assisted laparoscopic partial nephrectomy group and 70 (37) months in the laparoscopic radical nephrectomy group
Loss to follow-up	Not reported
Methods of analysis	Overall survival and recurrence-free survival were calculated using the Kaplan–Meier method, and statistical significance was determined using the log-rank test. A multivariable Cox regression analysis was performed to

	investigate independent predictors of overall survival. The inverse probability of treatment weighting analysis was conducted to balance patient characteristics between the robot-assisted laparoscopic partial nephrectomy and laparoscopic radical nephrectomy groups.
Additional comments	A multivariable logistic regression model was used to compute the propensity scores using the following covariates that were potentially associated with survival outcomes of patients who underwent laparoscopic radical nephrectomy: age, sex, body mass index (BMI), preoperative eGFR, tumour size, and the presence of diabetes mellitus, hypertension, and cardiovascular disease

Study arms

Laparoscopic radical nephrectomy (N = 44)

Robot-assisted laparoscopic partial nephrectomy (N = 260)

Characteristics

Arm-level characteristics

Characteristic	Laparoscopic radical nephrectomy (N = 44)	Robot-assisted laparoscopic partial nephrectomy (N = 260)
% Female No of events	n = 22 ; % = 50	n = 81 ; % = 31
Age Mean (SD)	78 (5.1)	76 (4.3)
Tumour size Mean (SD)	46 (12)	31 (13)
Baseline renal function - Preop eGFR, ml/min/1.73 m2 Mean (SD)	62 (24)	56 (16)

Outcomes

Survival

Outcome	Laparoscopic radical nephrectomy vs Robot-assisted laparoscopic partial nephrectomy, , N2 = 260, N1 = 44
Overall survival Hazard ratio/95% CI	3.39 (1.21 to 9.49)
Recurrence-free survival Hazard ratio/95% CI	1.64 (0.64 to 4.23)

Overall survival - Polarity - Higher values are better
Recurrence-free survival - Polarity - Higher values are better

Adverse events

Outcome	Laparoscopic radical nephrectomy, , N = 44	Robot-assisted laparoscopic partial nephrectomy, , N = 260
Complications - Clavien Dindo - Overall No of events	n = 10 ; % = 22	n = 26 ; % = 10
Complications - Clavien Dindo - Grade 3 No of events	n = 0 ; % = 0	n = 10 ; % = 4

Complications - Clavien Dindo - Polarity - Lower values are better

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Survival – Overall survival - Laparoscopic radical nephrectomy vs Robot-assisted laparoscopic partial nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(Outcomes were not adjusted for all important confounding factors)*
Overall bias	Directness	Directly applicable

Tappero, 2024

Bibliographic Reference	Tappero, Stefano; Bravi, Carlo Andrea; Khene, Zine Eddine; Campi, Riccardo; Pecoraro, Angela; Diana, Pietro; Re, Chiara; Giulioni, Carlo; Beksac, Alp T; Bertolo, Riccardo; Ajami, Tarek; Okhawere, Kennedy E; Meagher, Margaret; Alimohammadi, Arman; Terrone, Carlo; Mari, Andrea; Amparore, Daniele; Da Pozzo, Luigi; Anceschi, Umberto; Suardi, Nazareno; Galfano, Antonio; Larcher, Alessandro; Schiavina, Riccardo; Canda, Erdem; Zhang, Xu; Shariat, Shahrokh; Porpiglia, Francesco; Antonelli, Alessandro; Kaouk, Jihad; Badani, Ketan; Derweesh, Ithaar; Breda, Alberto; Mottrie, Alexander; Dell'Oglio, Paolo; Assessing Functional Outcomes of Partial Versus Radical Nephrectomy for T1b-T2 Renal Masses: Results from a Multi-institutional Collaboration.; Annals of surgical oncology; 2024; vol. 31 (no. 8); 5465-5472

Study details

Study type	Retrospective cohort study
Study location	23 high-volume institutions including different countries in Europe such as Italy, France, Spain, Belgium, Austria, Netherlands, and the UK
Study setting	Hospital
Study dates	2010 - 2021
Sources of funding	The research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest
Inclusion criteria	Patients 18 years of age or older with a single, unilateral primary renal mass Patients who had a cT1b-2 renal mass with no evidence of systemic disease
Exclusion criteria	Patients with missing data regarding baseline, clinical, or surgical characteristics Patients with preoperative stage 5 chronic kidney disease
Intervention(s)	Partial nephrectomy
Comparator	Radical nephrectomy
Outcome measures	eGFR
Number of participants	N = 1293 Partial nephrectomy = 968 Radical nephrectomy = 325
Duration of follow-up	1-year

Loss to follow-up	Not reported
Methods of analysis	Multivariable logistic regression models tested the association between partial nephrectomy versus radical nephrectomy. Furthermore, multivariable logistic regression models tested the association between partial nephrectomy and radical nephrectomy and recovery of at least 90% of preoperative eGFR and eGFR decline of 45 ml/min/1.73 m2 or less, calculated 1 year after surgery. The same multivariable modelling approach was applied to two sensitivity analyses specifically performed according to cT1b and cT2 stages. All multivariable regression models were fitted after adjustment for clustering at a single hospital level using generalised estimation equation (GEE) functions.
Additional comments	Covariates consisted of age at surgery, Charlson Comorbidity Index, preoperative serum creatinine, cT stage, and PADUA score.

Study arms

Partial nephrectomy (N = 968)

Radical nephrectomy (N = 325)

Characteristics

Arm-level characteristics

Characteristic	Partial nephrectomy (N = 968)	Radical nephrectomy (N = 325)
% Female No of events	n = 328 ; % = 34	n = 98 ; % = 27
Age Median (IQR)	63 (53 to 72)	62 (52 to 71)
Surgery technique used - open No of events	n = 0 ; % = 0	n = 196 ; % = 63
Surgery technique used - Laparoscopic No of events	n = 762 ; % = 79	n = 41 ; % = 10
Surgery technique used - robot-assisted	n = 206 ; % = 21	n = 88 ; % = 26

Characteristic	Partial nephrectomy (N = 968)	Radical nephrectomy (N = 325)
No of events		
TNM classification - T1b No of events	n = 852 ; % = 88	n = 170 ; % = 51
TNM classification - T2a No of events	n = 97 ; % = 10	n = 107 ; % = 31
TNM classification - T2b No of events	n = 19 ; % = 2	n = 48 ; % = 15
Tumour size Median (IQR)	5.1 (4.5 to 6)	7 (5.6 to 9)
Baseline renal function Median (IQR)	81 (63 to 94)	80 (64 to 94)

Outcomes

eGFR

Outcome	Partial nephrectomy vs Radical nephrectomy, , N2 = 325, N1 = 968
eGFR decline ≤45 ml/ min/1.73 m2 - Overall population - Overall population Odds ratio/95% CI	2.36 (1.4 to 3.97)
eGFR decline ≤45 ml/ min/1.73 m2 - Clinical T stage - cT1b Odds ratio/95% CI	2.26 (1.2 to 4.24)
eGFR decline ≤45 ml/ min/1.73 m2 - Clinical T stage - cT2 Odds ratio/95% CI	2.85 (1.16 to 5.53)
Recovery of ≥90% of baseline eGFR - Overall population Odds ratio/95% CI	0.3 (0.2 to 0.46)
Recovery of ≥90% of baseline eGFR - Clinical T stage - cT1b Odds ratio/95% CI	0.28 (0.16 to 0.47)

Outcome	Partial nephrectomy vs Radical nephrectomy, , N2 = 325, N1 = 968
Recovery of ≥90% of baseline eGFR - Clinical T stage - cT2 Odds ratio/95% CI	0.36 (0.17 to 0.76)

eGFR decline ≤45 ml/ min/1.73 m2 - Polarity - Higher values are better
Recovery of ≥90% of baseline eGFR - Polarity - Higher values are better

Critical appraisal - GDT Crit App - ROBINS-I: a tool for non-randomised studies of interventions

eGFR - Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(The outcomes were not adjusted for all important confounder factors)*
Overall bias	Directness	Directly applicable

van den Brink, 2024

Bibliographic Reference	van den Brink, L.; van den Kroonenberg, D.L.; Graafland, N.M.; Bex, A.; Beerlage, H.P.; van Moorselaar, J.R.A.; Zondervan, P.J.; Comparison of Oncological and Functional Outcomes of Radical Versus Partial Nephrectomy for cT1b Renal Cell Carcinoma: A Two-Centre, Matched Analysis; Kidney Cancer; 2024; vol. 8 (no. 1); 51

Study details

Study type	Retrospective cohort study
Study location	Netherlands and the UK
Study setting	Hospital
Study dates	2010 - 2022
Sources of funding	The authors report no funding
Inclusion criteria	Patients with clinical suspicion for RCC staged cT1bN0/xM0/x Patients ≥18 years of age at the time of surgery and who underwent elective partial nephrectomy or radical nephrectomy

Exclusion criteria	Histologically proven N1 or M1 before surgery Focal treatment for renal cell carcinoma before surgery Bilateral renal cell carcinoma tumours Multiple unilateral renal cell carcinoma tumours Single kidney Patients with hereditary renal cell carcinoma Atrophic kidney Renal cell carcinoma in kidney transplant
Intervention(s)	Radical nephrectomy
Comparator	Partial nephrectomy
Outcome measures	Recurrence Complications Length of hospital stay Mortality
Number of participants	N = 200 Radical nephrectomy = 100 Partial nephrectomy = 100
Duration of follow-up	The median follow-up was 38 months (95%CI: [17–66) in the radical nephrectomy group and 42 months (14-74) in the partial nephrectomy group
Loss to follow-up	Not reported
Methods of analysis	A propensity score was generated including age, sex, BMI, RENAL-score, PADUA-score, ASA classification, Charlson Comorbidity Index age-adjusted (CCI-A) and preoperative eGFR to reduce differences due to selection bias and confounding. Survival analyses were conducted using Kaplan-Meier estimates with a paired log-rank test. Additionally, univariate and multivariate Cox regression were conducted to determine predictors of overall survival, cancer-specific survival, and recurrence-free survival. For multivariate Cox regression, the backward elimination method was used.

Study arms

Radical nephrectomy (N = 100)

Partial nephrectomy (N = 100)

Characteristics

Arm-level characteristics

Characteristic	Radical nephrectomy (N = 100)	Partial nephrectomy (N = 100)
% Female No of events	n = 60 ; % = 60	n = 71 ; % = 71
Age Mean (SD)	60.7 (12.2)	60 (10.2)
Tumour size Median (IQR)	55 (48 to 60)	49 (45 to 55)
Baseline renal function - Preoperative eGFR (ml/min/1.73 m2) Median (IQR)	83 (69 to 95)	84 (72 to 95)
Performance status at baseline - ASA score 1 No of events	n = 19 ; % = 19	n = 21 ; % = 21
Performance status at baseline - ASA score 2 No of events	n = 56 ; % = 56	n = 62 ; % = 62
Performance status at baseline - ASA score 3 No of events	n = 25 ; % = 25	n = 17 ; % = 17

Outcomes

Survival

Outcome	Partial nephrectomy vs Radical nephrectomy, , N2 = 100, N1 = 100
Recurrence-free survival Hazard ratio/95% CI	2.23 (0.85 to 5.36)

Recurrence-free survival - Polarity - Higher values are better

Length of stay (days)

Outcome	Radical nephrectomy, , N = 100	Partial nephrectomy, , N = 100
Length of stay (days) Median (IQR)	4 (3 to 5)	4 (4 to 6)

Length of stay (days) - Polarity - Lower values are better

Complications (Clavien-Dindo Score)

Outcome	Radical nephrectomy, , N = 100	Partial nephrectomy, , N = 100
Complications (Clavien-Dindo Score) - Clavien-Dindo Score I No of events	n = 12 ; % = 12	n = 14 ; % = 14
Complications (Clavien-Dindo Score) - Clavien-Dindo Score II No of events	n = 10 ; % = 10	n = 24 ; % = 24
Complications (Clavien-Dindo Score) - Clavien-Dindo Score III No of events	n = 2 ; % = 2	n = 8 ; % = 8
Complications (Clavien-Dindo Score) - Clavien-Dindo Score IV No of events	n = 0 ; % = 0	n = 2 ; % = 2
Complications (Clavien-Dindo Score) - Clavien-Dindo Score V No of events	n = 0 ; % = 0	n = 0 ; % = 0

Complications (Clavien-Dindo Score) - Polarity - Lower values are better

Mortality

Outcome	Radical nephrectomy, , N = 100	Partial nephrectomy, , N = 100
Mortality - 10-year follow-up No of events	n = 7 ; % = 7.3	n = 9 ; % = 9.4

Mortality - 10-year follow-up - Polarity - Lower values are better

Renal function change - eGFR

Outcome	Radical nephrectomy, , N = 100	Partial nephrectomy, , N = 100
Median change eGFR Median (IQR)	28 (18 to 34)	8 (2 to 16)
New-onset chronic kidney disease≥ 3b No of events	n = 18 ; % = 22	n = 3 ; % = 4

Median change eGFR - Polarity - Higher values are better
New-onset chronic kidney disease≥ 3b - Polarity - Lower values are better

Critical appraisal - GDT Crit App - ROBINS-I: a tool for non-randomised studies of interventions

Survival - Recurrence-free survival - Radical nephrectomy vs Partial nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(The outcomes were not adjusted for all important confounder factors)*
Overall bias	Directness	Directly applicable

Wang, 2021

Bibliographic Reference	Wang, Zhixian; Wang, Jing; Zhu, Yunpeng; Liu, Chang; Li, Xing; Zeng, Xiaoyong; Cause-Specific Mortality Among Survivors From T1N0M0 Renal Cell Carcinoma: A Registry-Based Cohort Study.; Frontiers in oncology; 2021; vol. 11; 604724

Study details

Study type	Retrospective cohort study
Study location	USA. Data taken from the SEER-18 registry database (Surveillance, Epidemiology, and End Results-18).
Study setting	Hospital setting.
Study dates	2000 to 2015
Sources of funding	National Natural Science Foundation of China (grant 31570988).
Inclusion criteria	>14 years of age Localised first primary RCC Tumour diameter <7cm
Exclusion criteria	Other interventions for RCC (e.g. ablation)
Intervention(s)	Partial nephrectomy (PN). No further detail specified.
Comparator	Radical nephrectomy (RN). No further detail specified.
Outcome measures	Mortality
Number of participants	N = 68612 PN: 27985 (40.8%) RN: 40627 (69.2%)
Duration of follow-up	Not reported
Loss to follow-up	Not reported - data likely to be complete
Methods of analysis	Percentages of deaths among patients with RCC were reported. Crude cumulative incidence functions were used to calculate and plot cumulative cause-specific mortality, overall mortality, and mortality stratified by treatment. Causes of death included cardiovascular disease [(CVD), including heart disease, hypertension without heart disease, cerebrovascular disease, atherosclerosis, or aortic aneurysm], other non-cancer-related diseases (diseases except for cancer and CVD), RCC, other cancer-related diseases (all cancers except RCC), and non-disease events (accidents and adverse effects, suicide and self-inflicted injury, homicide and legal intervention, and others).

	Cox proportion risk regression was employed to predict all-cause mortality.
Additional comments	Study primarily considers specific causes of death rather than overall mortality. Death (by cause) reported by age, year group of diagnosis and various other factors. Only "all deaths" reported by surgery type is relevant for this review question and therefore extracted. Unclear what was adjusted for in the cox proportion risk regression. adjusted HR inverted by NICE team. Cardiovascular events reported. Not extracted as included in an included systematic review (Ochoa-Arvizo 2023).

Study arms

Partial nephrectomy (N = 27985)

Radical nephrectomy (N = 40627)

Characteristics

Study-level characteristics

Characteristic	Study (N = 68612)
% Female No of events	n = 27138 ; % = 39.6
Age Median (IQR)	60 (51 to 68)
Ethnicity: white No of events	n = 55840 ; % = 81.4
Ethnicity: black No of events	n = 8180 ; % = 11.9
Primary RCC type - Clear cell No of events	n = 39015 ; % = 56.9

Characteristic	Study (N = 68612)
Primary RCC type - Papillary No of events	n = 8390 ; % = 12.2
Primary RCC type - Chromophobe No of events	n = 3719 ; % = 5.4
Primary RCC type - undefined No of events	n = 13758 ; % = 20.1
Primary RCC type - other No of events	n = 3730 ; % = 5.4
Tumour size <2cm No of events	n = 11944 ; % = 17.4
Tumour size 2-3cm No of events	n = 16863 ; % = 24.6
Tumour size 3-4cm No of events	n = 15006 ; % = 21.9
Tumour size 4-5cm No of events	n = 11454 ; % = 16.7
Tumour size 5-7cm No of events	n = 13345 ; % = 19.4

Outcomes

Survival

Outcome	Partial nephrectomy, , N = 27985	Radical nephrectomy, , N = 40627
Mortality: all-cause No of events	n = 3135 ; % = 11.1	n = 10912 ; % = 27.1

Mortality: all-cause - Polarity - Lower values are better

Survival

Outcome	Partial nephrectomy vs Radical nephrectomy, , N2 = 27985, N1 = 40627
All mortality Hazard ratio/95% CI	0.72 (0.69 to 0.75)

All mortality - Polarity - Lower values are better

Critical appraisal - GDT Crit App - ROBINS-I: a tool for non-randomised studies of interventions

Mortality: all-cause - Partial nephrectomy vs Radical nephrectomy

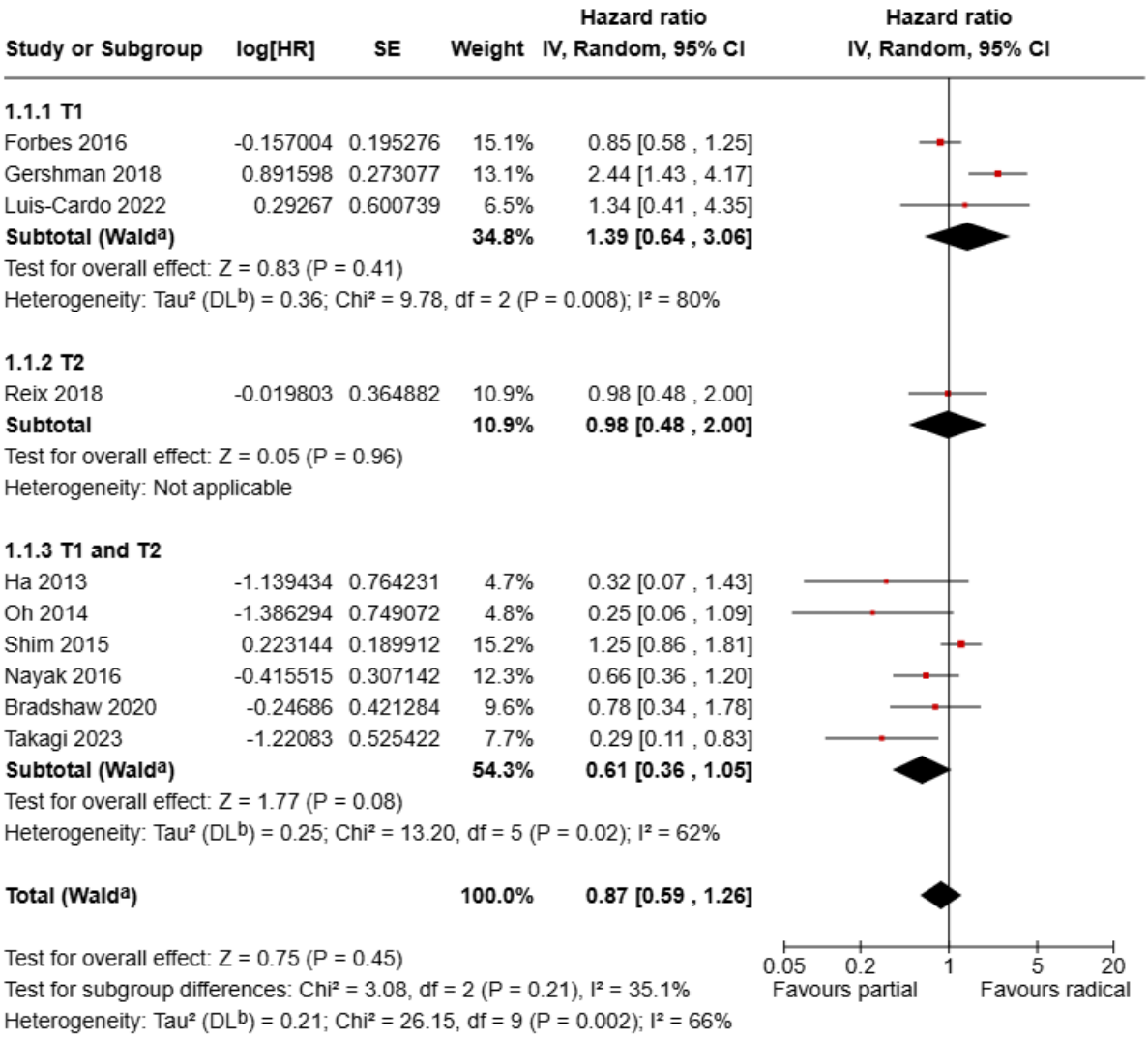
Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(Risk of bias from confounders)*
Overall bias	Directness	Partially Applicable *(T1 only)*

All mortality-Partial nephrectomy vs Radical nephrectomy

Section	Question	Answer
Overall bias	Risk of bias judgement	Serious *(Risk of bias from confounders)*
Overall bias	Directness	Partially Applicable *(T1 only)*

Appendix E – Forest plots

Figure 2 Disease-free survival



Footnotes

[a]CI calculated by Wald-type method.

[b]Tau² calculated by DerSimonian and Laird method.

Figure 3 Metastases-free survival

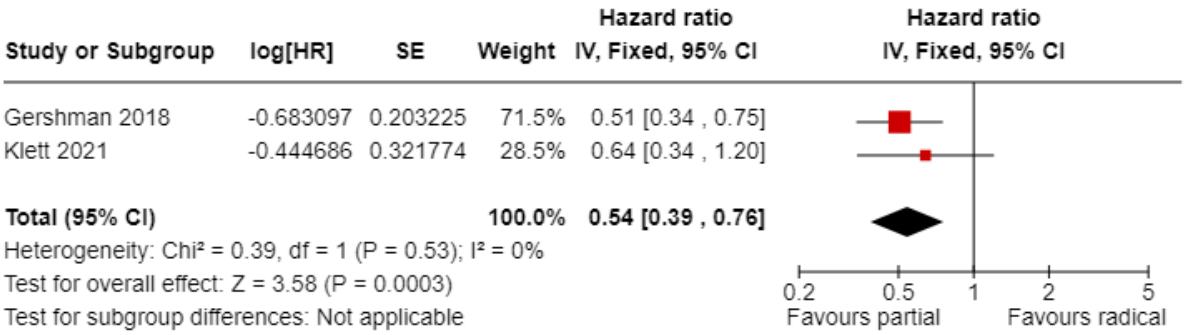


Figure 4 Recurrence ≤5 years

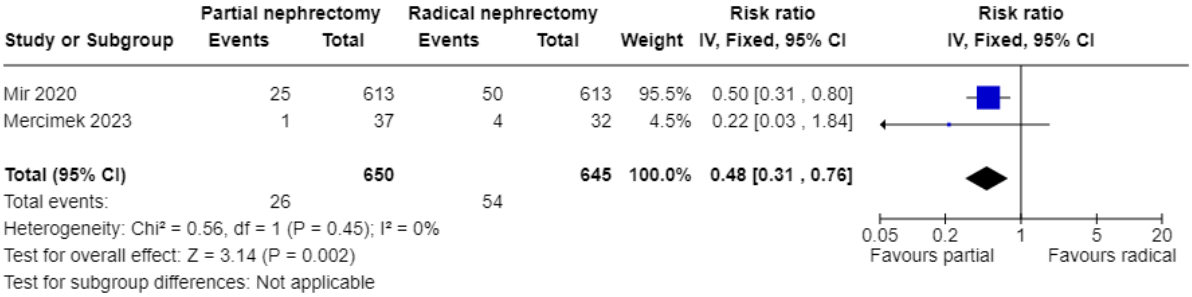


Figure 5 Recurrence >5-≤10 years

Figure 6 Local recurrence – RCT

Figure 7 Local recurrence – non-randomised evidence

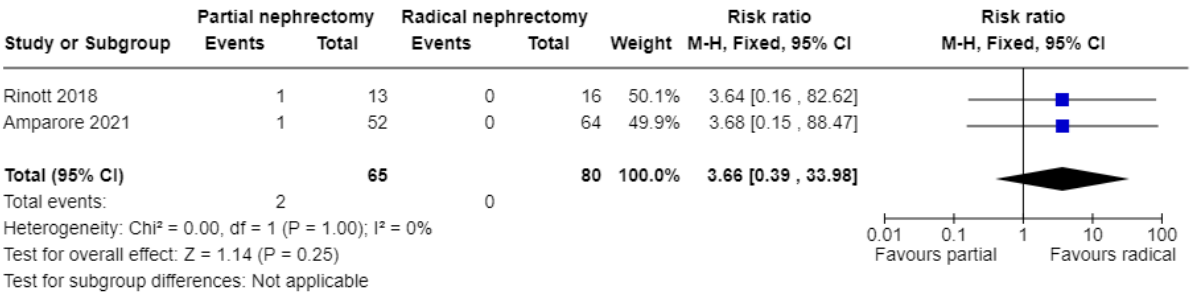
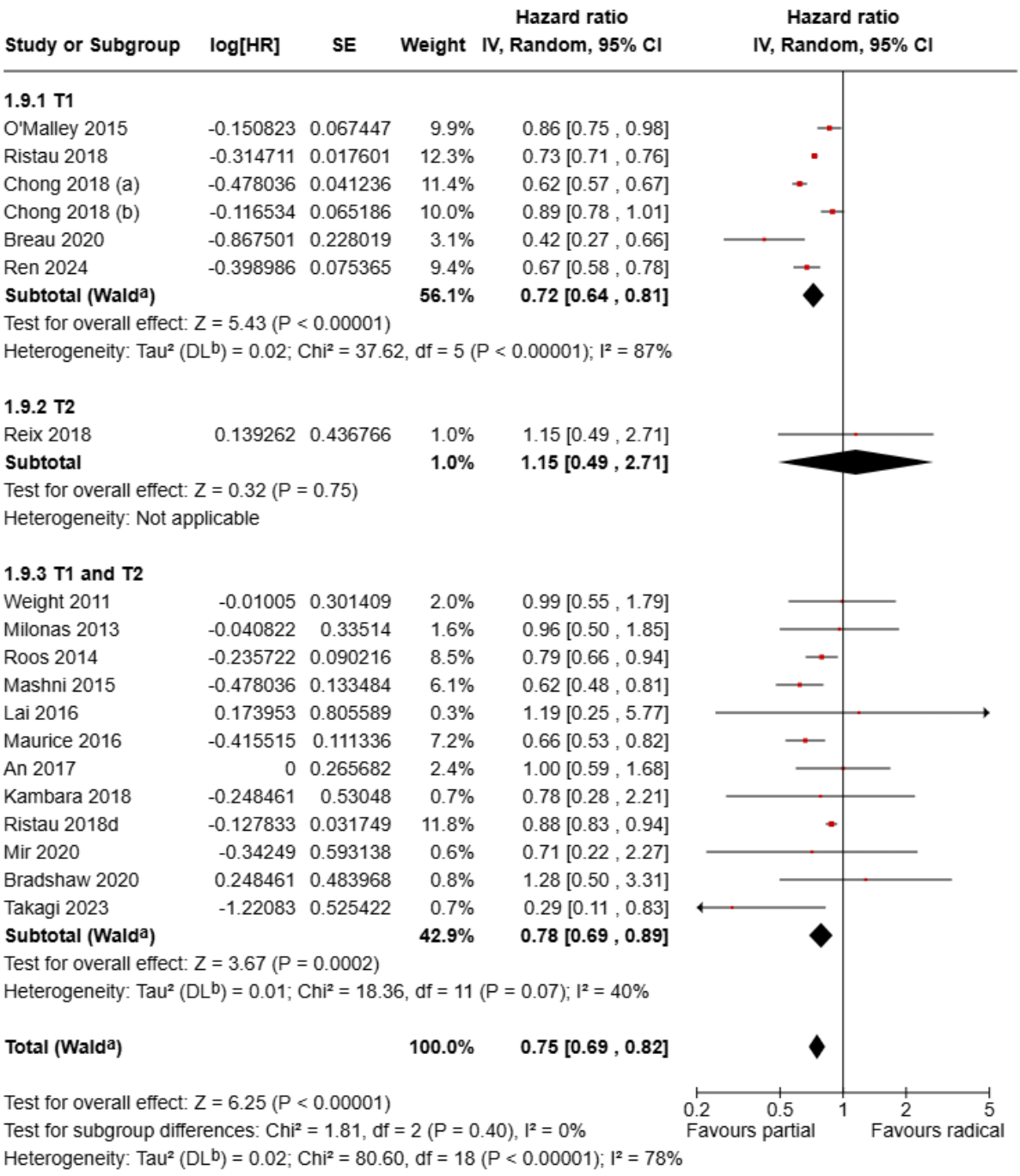


Figure 8 Distant metastases – RCT

Figure 9 Distant metastases – non-randomised evidence

Figure 10 Overall survival ≤5 years



Footnotes

[a]CI calculated by Wald-type method.

[b]Tau² calculated by DerSimonian and Laird method.

Figure 11 Overall survival >5-≤10 years - non-randomised evidence

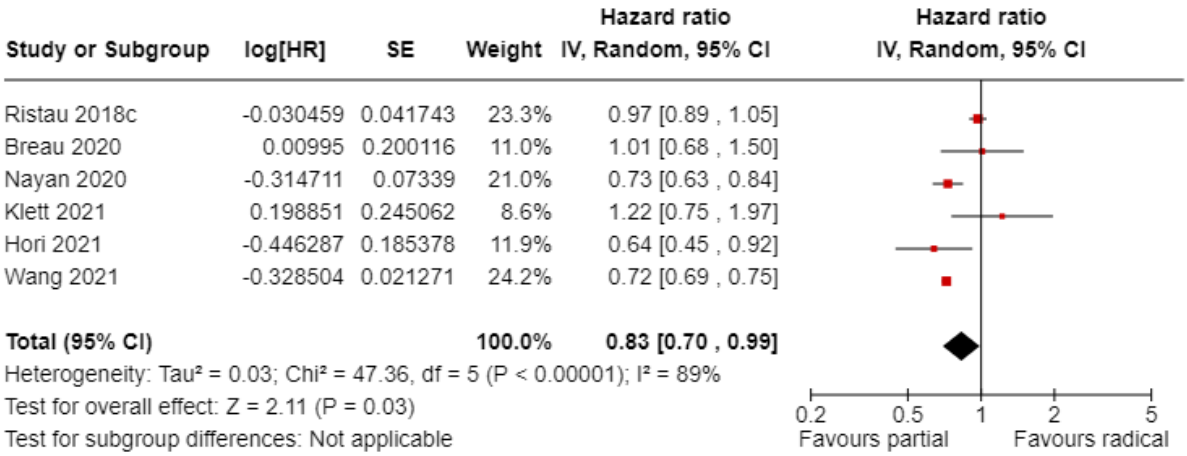


Figure 12 Overall survival >5-≤10 years - RCT

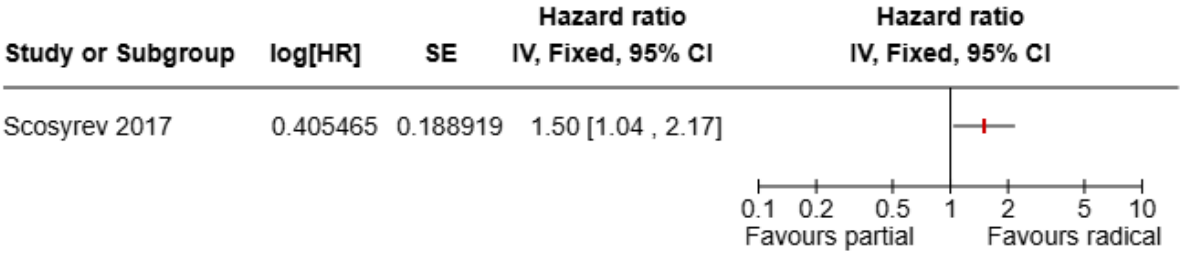


Figure 13 All-cause mortality ≤5 years

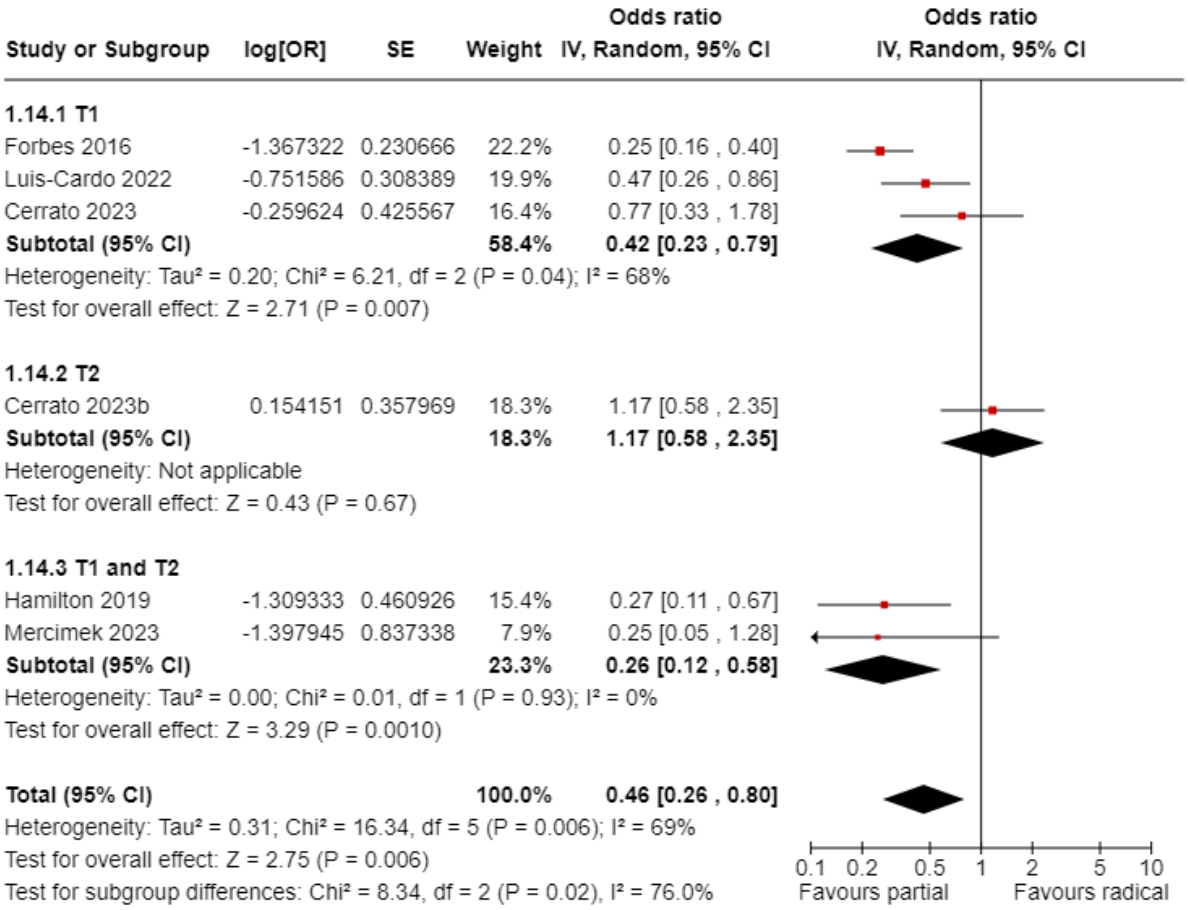


Figure 14 All-cause mortality >5-≤10 years

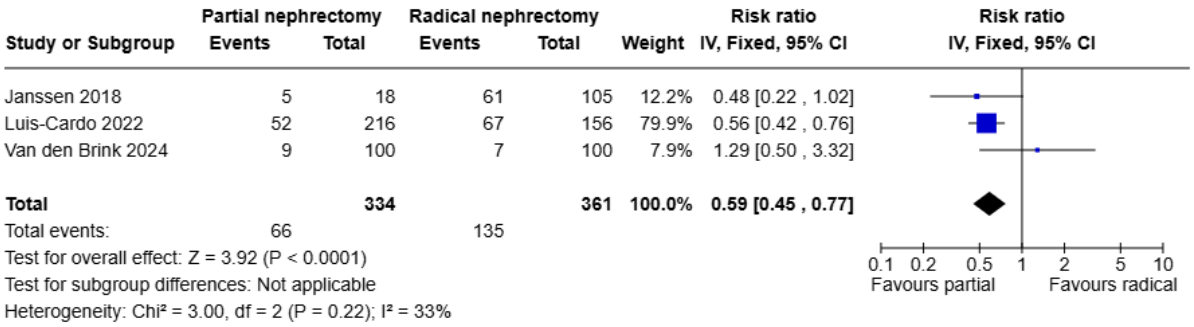
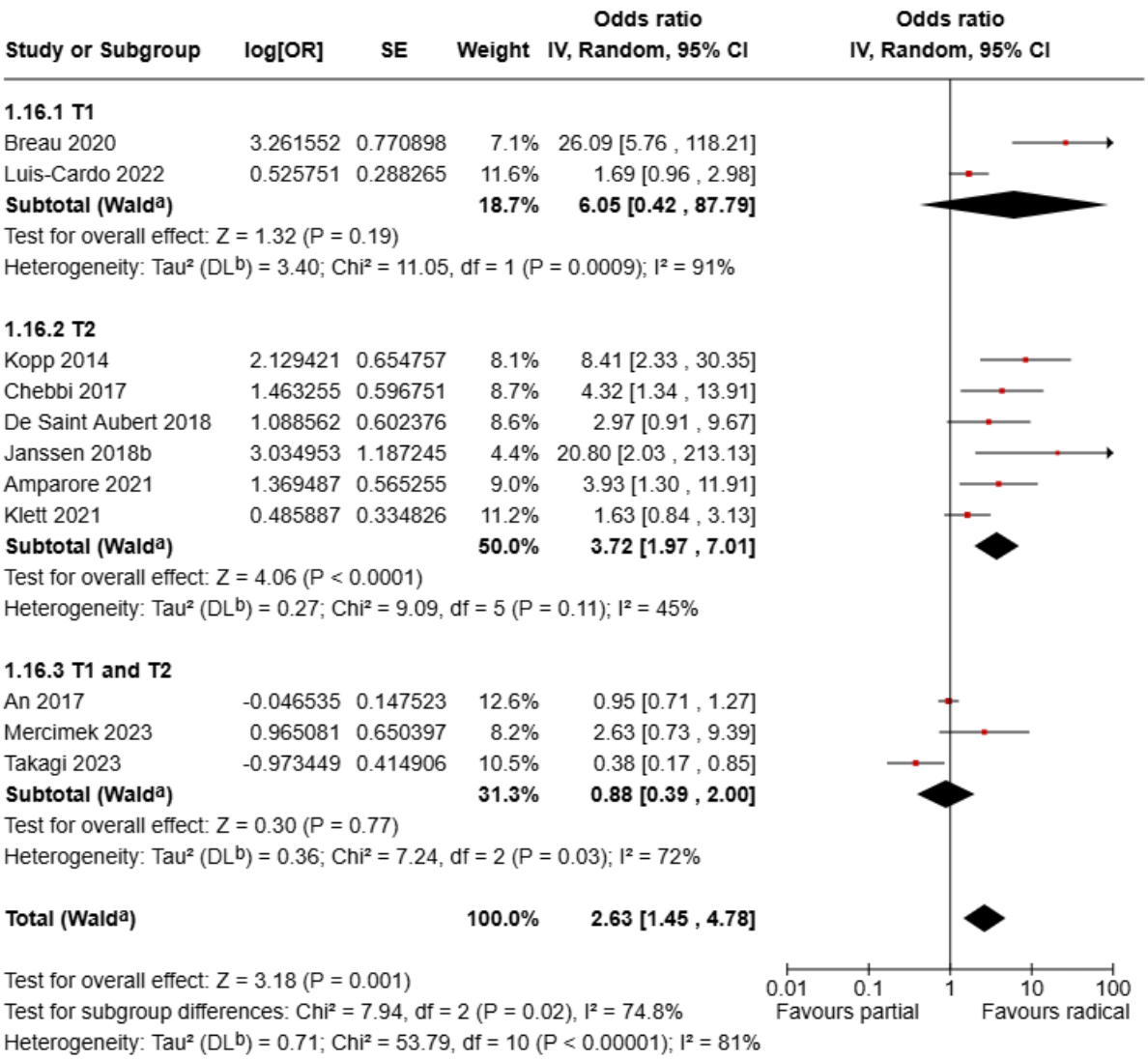


Figure 15 Postoperative severe adverse events – Clavien-Dindo I-V

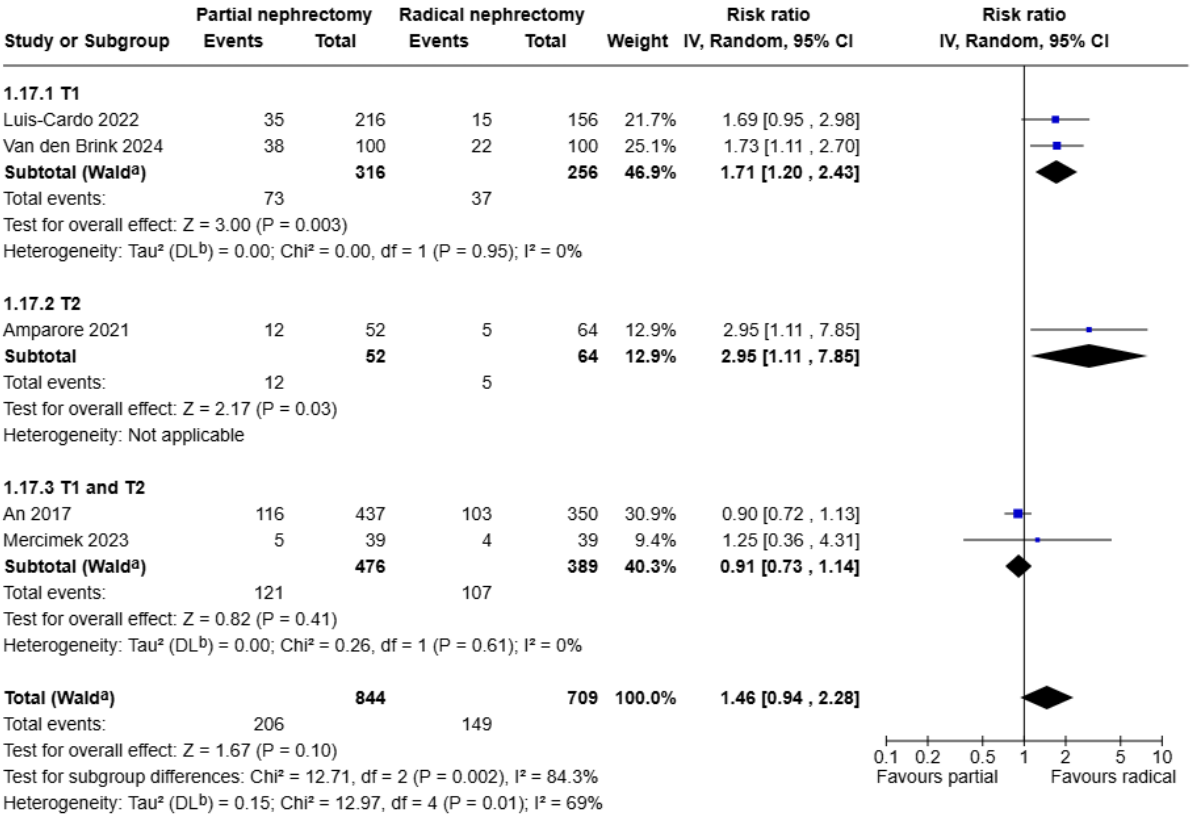


Footnotes

[a]CI calculated by Wald-type method.

[b]Tau² calculated by DerSimonian and Laird method.

Figure 16 Postoperative severe adverse events – Clavien-Dindo I-II



Footnotes

[a]CI calculated by Wald-type method.

[b]Tau² calculated by DerSimonian and Laird method.

Figure 17 Postoperative severe adverse events – Clavien-Dindo III-V

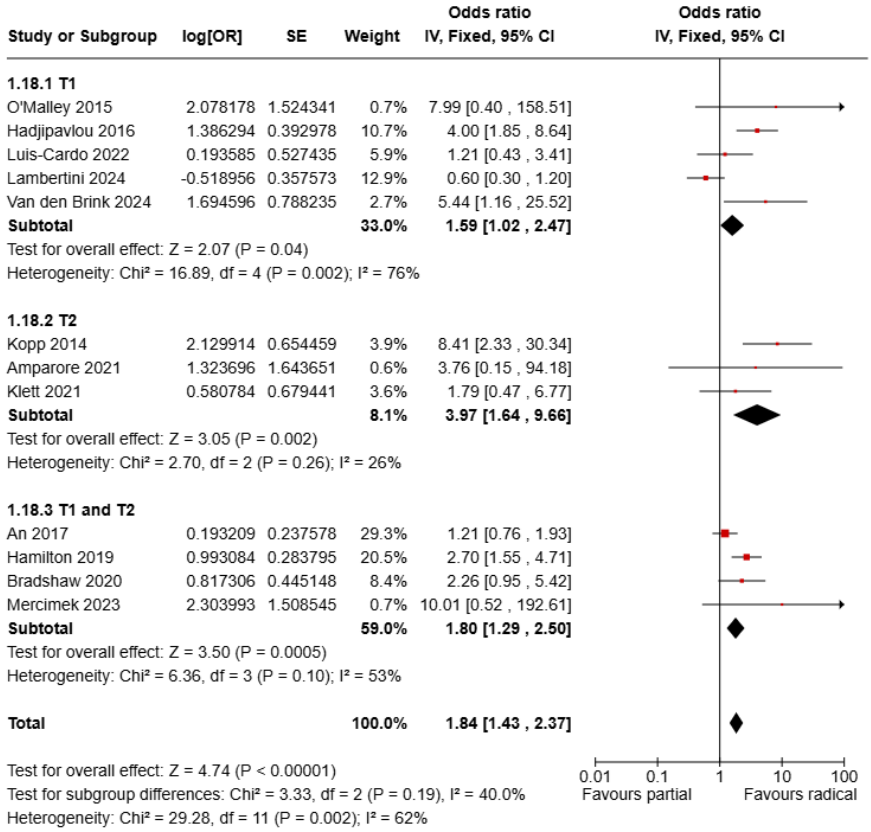


Figure 18 Renal function impairment: New onset eGFR<60 mL/min.1.73m2 – non-randomised evidence (HR)

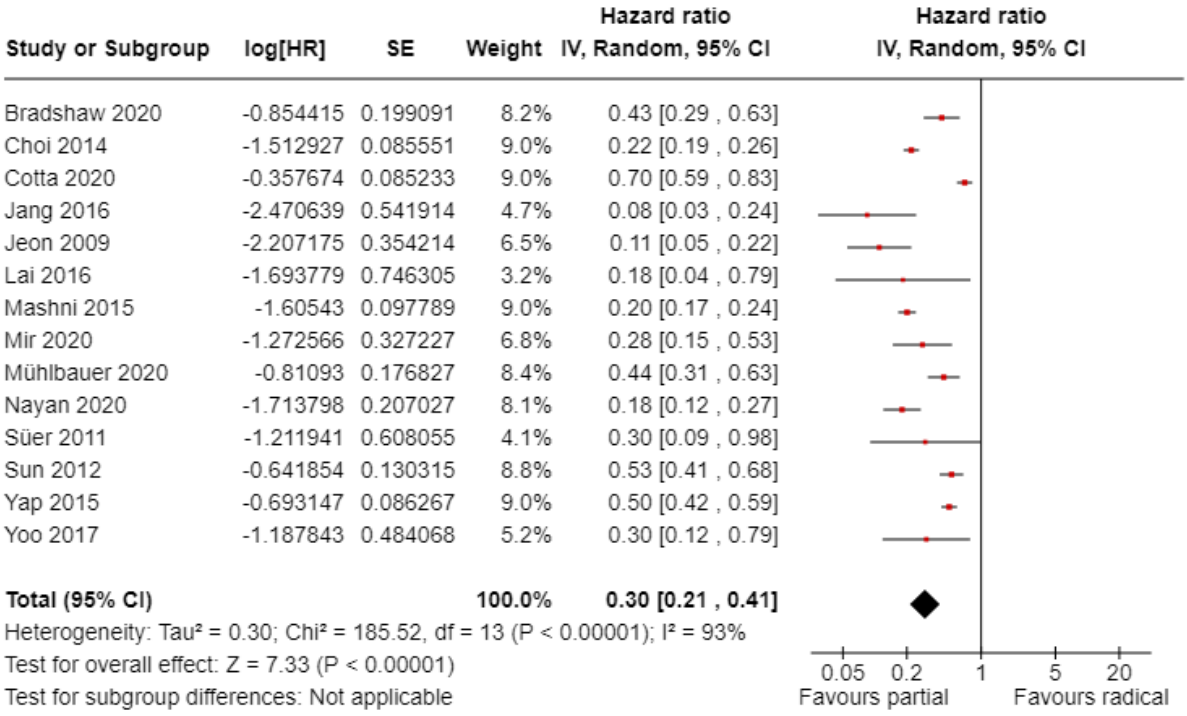


Figure 19 Renal function impairment: New onset eGFR<60 mL/min.1.73m2 – non-randomised evidence (OR)

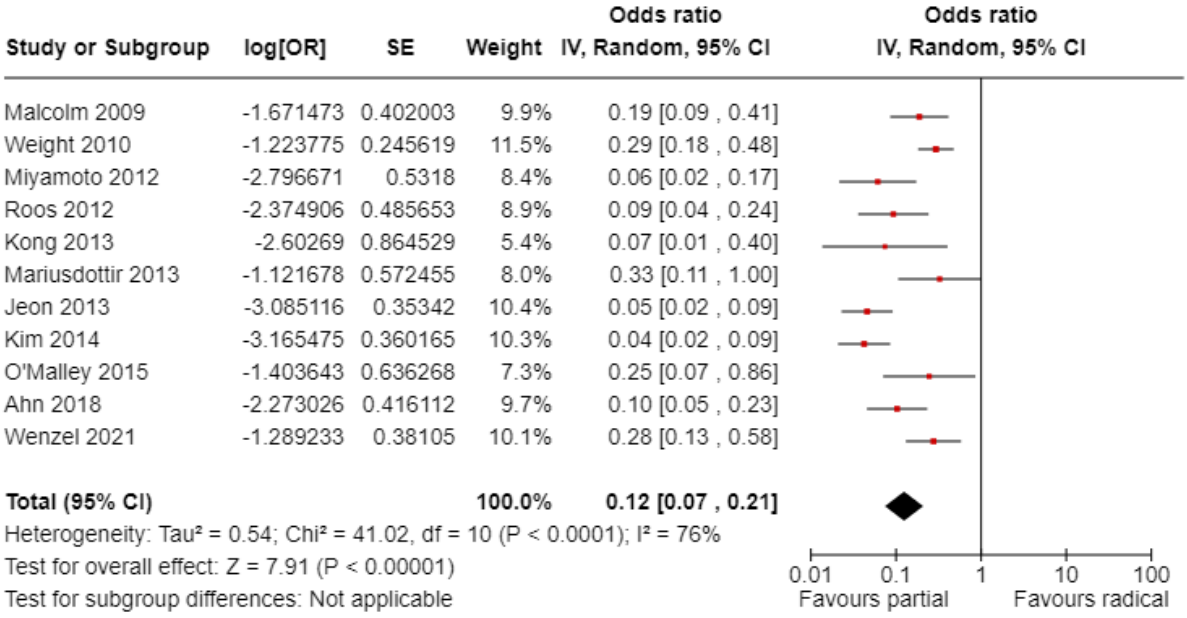


Figure 20 Renal function impairment: New onset eGFR <60 mL/min.1.73m2 – RCT

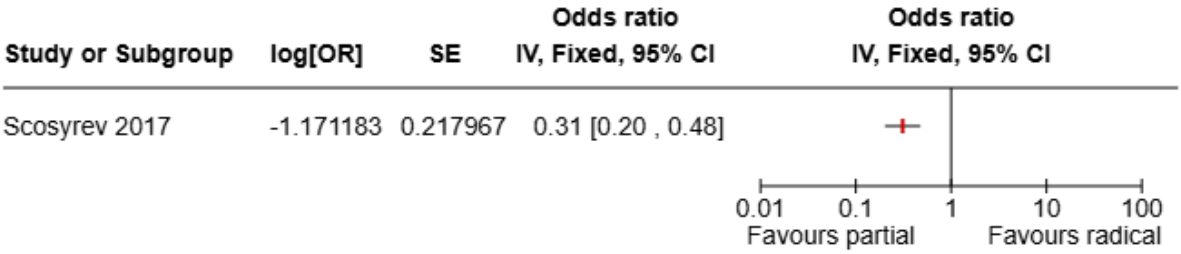


Figure 21 Renal function impairment: New onset eGFR <45 mL/min.1.73m2 – non-randomised evidence

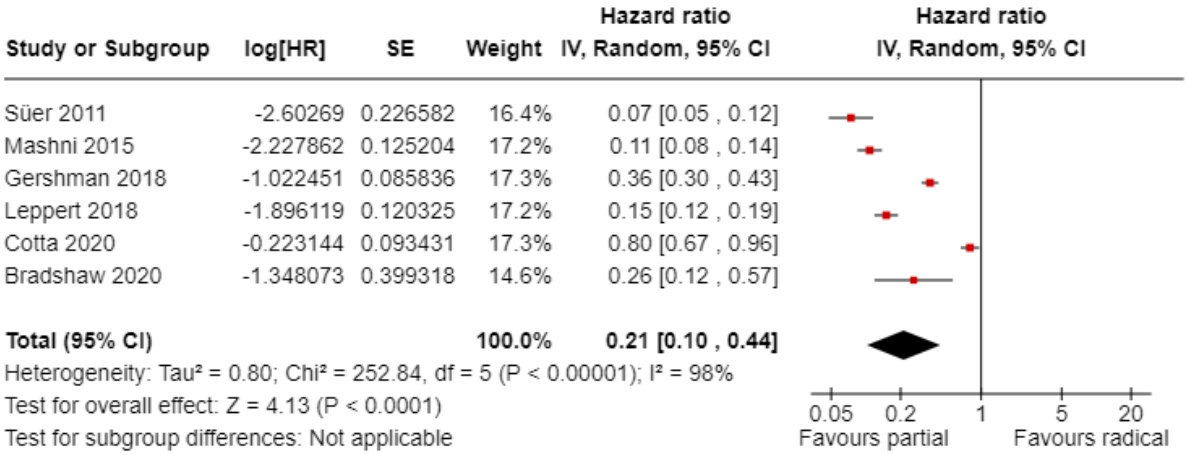


Figure 22 Renal function impairment: eGFR decline ≤45 ml/ min/1.73 m2

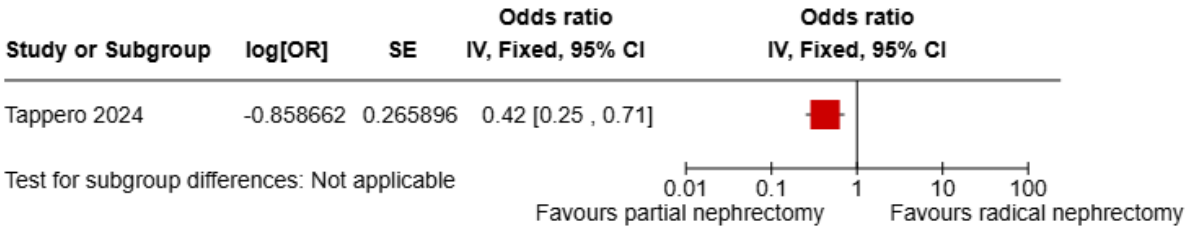


Figure 23 Renal function impairment: New onset eGFR <45 mL/min.1.73m2 – RCT

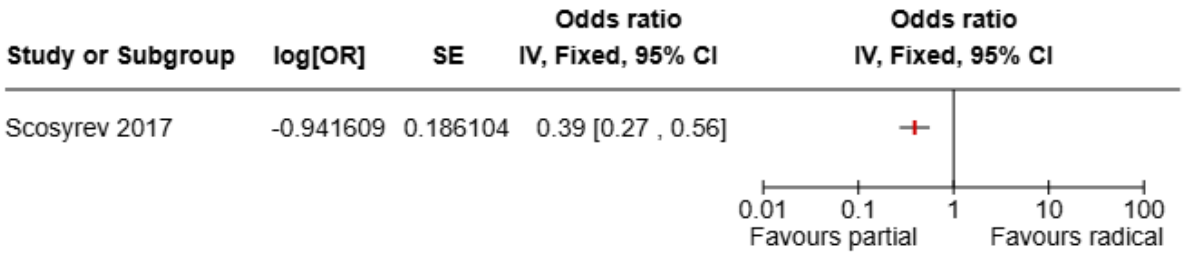


Figure 24 Renal function impairment: New onset eGFR <30 mL/min.1.73m2 – non-randomised evidence

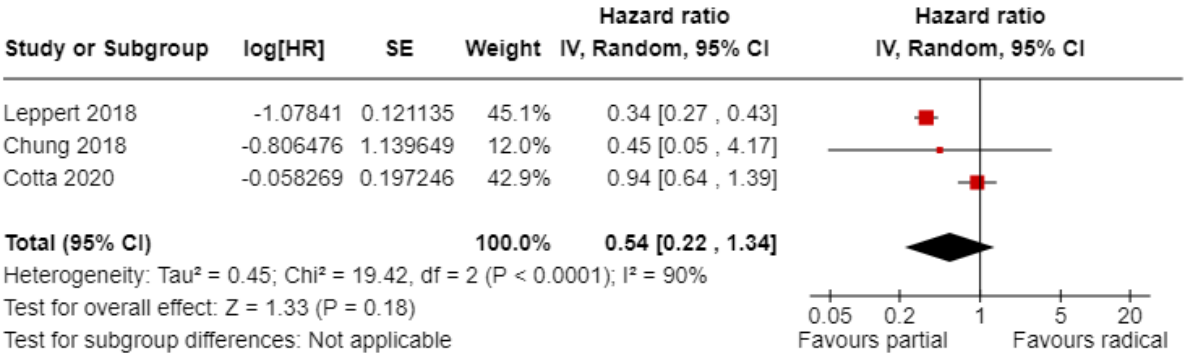


Figure 25 Renal function impairment: New onset eGFR <30 mL/min.1.73m2 – RCT

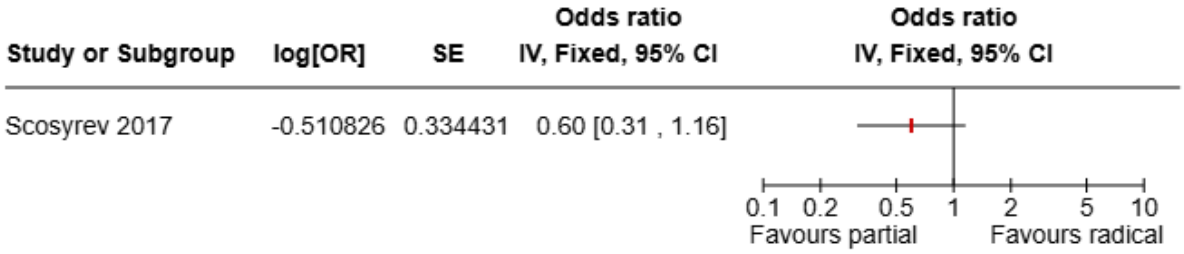


Figure 26 Renal function impairment: New onset eGFR <15 mL/min.1.73m2 – non-randomised evidence

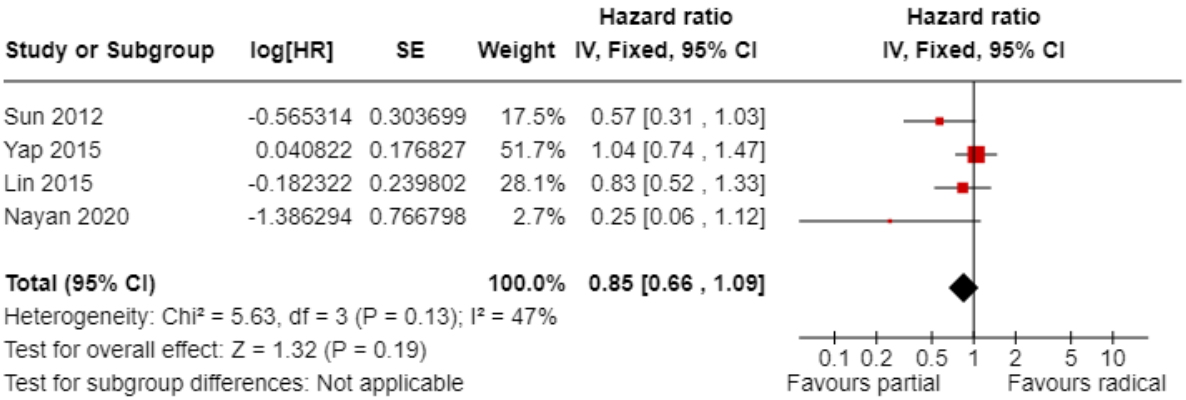
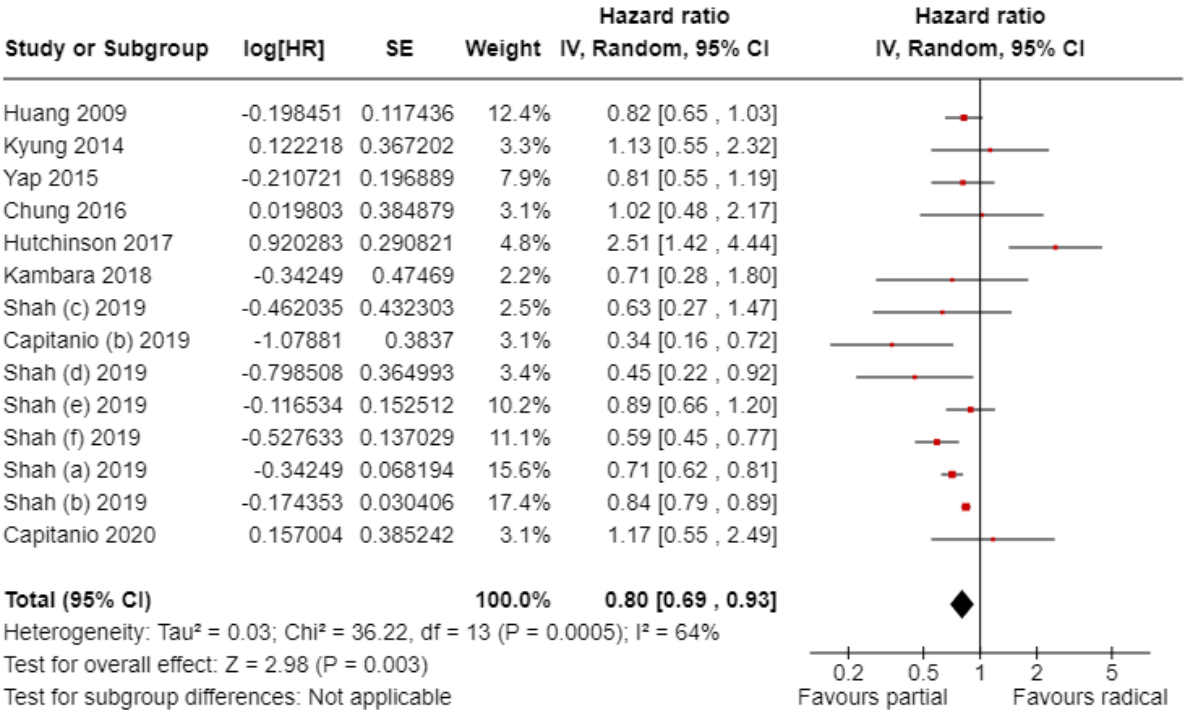


Figure 27 Cardiovascular events ≤5 years



Note: Capitanio 2019: de novo major cardiovascular events; Capitanio (b) 2019: de novo hypertension; Shah (a) 2019: new onset hypertension in people without previous history of hypertension; Shah (b) 2019: worsened hypertension in people with previous history of hypertension; Shah (c) 2019: myocardial infarction in people without previous history of hypertension; Shah (d) 2019: stroke in people without previous history of hypertension; Shah (e) 2019: myocardial infarction in people with preexisting hypertension; Shah (f) 2019: stroke in people with preexisting hypertension

Figure 28 Cardiovascular events >5-≤10 years

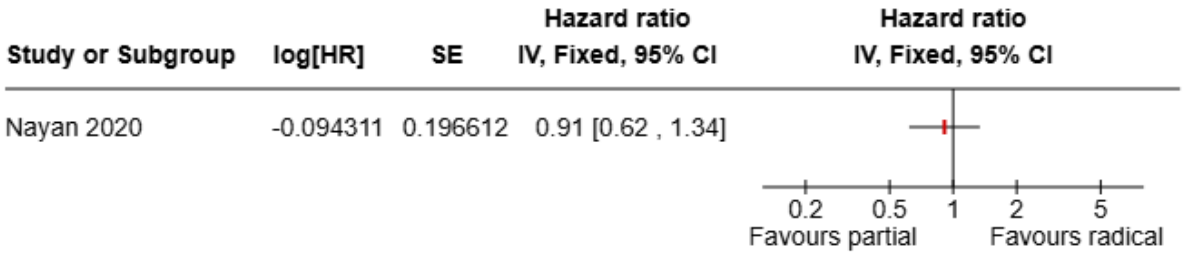
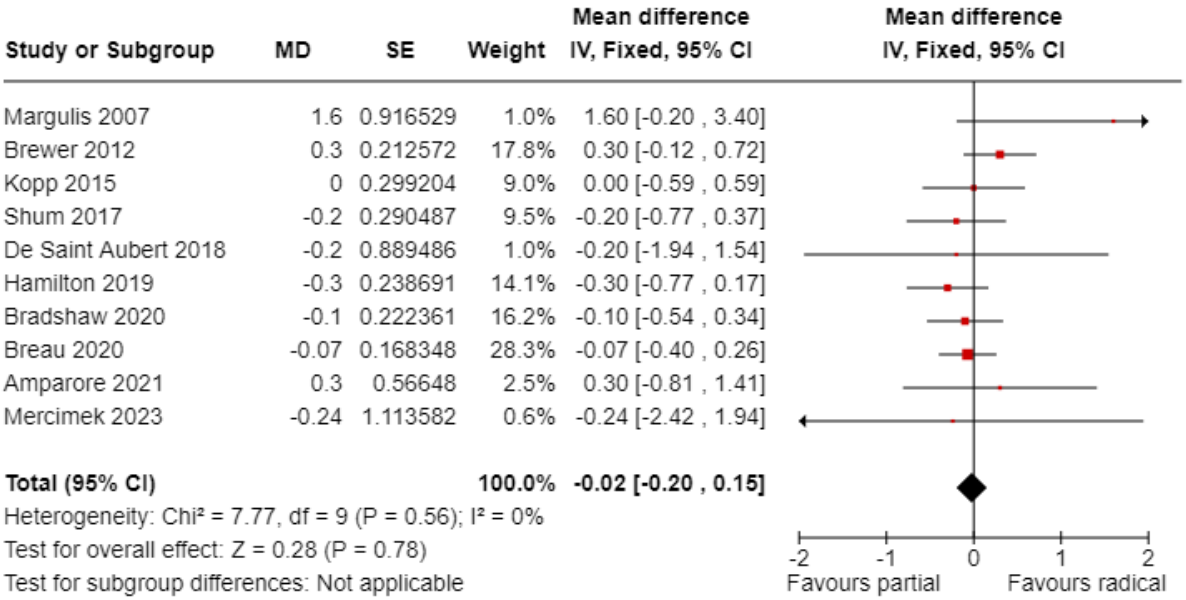


Figure 29 Duration of hospital stay



Appendix F – GRADE tables

Table 14 Clinical evidence profile for partial nephrectomy vs radical nephrectomy - disease-free survival and recurrence

Certainty assessment							№ of patients		Effect		Certainty
№ of studies	**Study design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Partial nephrectomy**	**Radical nephrectomy**	**Relative (95% CI)**	**Absolute (95% CI)**	
Disease-free survival											
10[1] (n=9611)	non-randomised studies	very serious[g]	very serious[a]	not serious	serious[b]	none	5432	4179	**HR 0.87** (0.59 to 1.26)	**NR**	Very low
Metastases-free survival											
2[2] (n=2404)	non-randomised studies	serious[d]	not serious	not serious	not serious	none	1217	1187	**HR 0.54** (0.39 to 0.76)	**NR**	Moderate
Recurrence ≤5 years											
2[3] (n=1304)	non-randomised studies	very serious[g]	not serious	not serious	not serious	none	652	625	**RR 0.48** (0.31 to 0.76)	**NR**	Low
Recurrence >5-≤10 years											
1[4] (n=123)	non-randomised studies	very serious[g]	serious[c]	not serious	very serious[e]	none	18	105	**RR 0.28** (0.07 to 1.05)	**NR**	Very low

Certainty assessment							№ of patients		Effect		Certainty
№ of studies	**Study design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Partial nephrectomy**	**Radical nephrectomy**	**Relative (95% CI)**	**Absolute (95% CI)**	
Local recurrence - RCT											
1[5] (n=541)	randomised trials	serious[d]	serious[c]	not serious	serious[b]	none	6/268 (2.2%)	1/273 (0.4%)	**RR 6.11** (0.74 to 50.43)	**19 more per 1,000** (from 1 fewer to 181 more)	Very low
Local recurrence - non-randomised evidence											
2[6] (n=145)	non-randomised studies	very serious[g]	not serious	not serious	very serious[f]	none	2/65 (3.1%)	0/80 (0.0%)	**RR 3.66** (0.39 to 33.98)	**NA**	Very low
Distant metastases - RCT											
1[7] (n=541)	randomised trials	serious[d]	serious[c]	not serious	serious[b]	none	6/268 (2.2%)	7/273 (2.6%)	**RR 0.87** (0.30 to 2.56)	**3 fewer per 1,000** (from 18 fewer to 40 more)	Very low
Distant metastases - non-randomised evidence											

Certainty assessment							№ of patients		Effect		Certainty
№ of studies	**Study design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Partial nephrectomy**	**Radical nephrectomy**	**Relative (95% CI)**	**Absolute (95% CI)**	
1[8] (n=29)	non-randomised studies	very serious[g]	serious[c]	not serious	very serious[e]	none	0/13 (0.0%)	2/16 (12.5%)	**RR 0.24** (0.01 to 4.65)	**95 fewer per 1,000** (from 124 fewer to 456 more)	Very low

CI: confidence interval; **HR:** hazard ratio; N**R:** not reported; **RR:** risk ratio

1. Bradshaw et al. (2020), Forbes et al. (2016), Gershman et al. (2018), Ha et al. (2013), Luis-Cardo et al. (2022), Nayak et al. (2016), Oh et al. (2014), Reix et al. (2018), Shim et al. (2015), Takagi et al. (2023)
2. Gershman et al. (2018), Klett et al. (2021)
3. Mercimek et al. (2023), Mir et al. (2020)
4. Janssen et al. (2018)
5. Scosyrev et al. (2017)
6. Amparore et al. (2021), Rinott et al. (2018)
7. Scosyrev et al. (2017)
8. Rinott et al. (2018)

Explanations

a. Downgraded twice for inconsistency as I^2 was greater than 60%
b. Downgraded once for imprecision as 95% confidence interval for the effect size crossed the line of no effect
c. Downgraded once for inconsistency as analysis included a single study
d. Downgraded once for risk of bias as greater than 50% of the weight in meta-analysis came from studies with moderate/serious risk of bias

e. Downgraded twice for imprecision as 95% confidence interval for the effect size crossed the line of no effect and result comes from a study with a small sample size (sample size <420 participants)
f. Downgraded twice for imprecision as 95% confidence interval for the effect size crossed the line of no effect and result comes from an analysis with a small sample size (sample size <420 participants)
g. Downgraded twice for risk of bias as greater than 50% of the weight in meta-analysis came from studies with serious risk of bias

Table 15 Clinical evidence profile for partial nephrectomy vs radical nephrectomy - overall survival and mortality

Certainty assessment							№ of patients		Effect		Certainty
№ of studies	**Study design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Partial nephrectomy**	**Radical nephrectomy**	**Relative (95% CI)**	**Absolute (95% CI)**	
Overall survival ≤5 years											
19[1] (n=296752)	non-randomised studies	very serious[c]	very serious[a]	not serious	not serious	none	157722	139030	**HR 0.75** (0.69 to 0.82)	**NR**	Very low
Overall survival >5-≤10 years – non-randomised evidence											
6[2] (n=37530)	non-randomised studies	very serious[c]	very serious[a]	not serious	not serious	none	18915	18615	**HR 0.83** (0.70 to 0.99)	**NR**	Very low
Overall survival >5-≤10 years – RCT											
1[3] (n=514)	randomised trials	serious[d]	serious[b]	not serious	serious[e]	none	268	273	**HR 1.50** (1.04 to 2.17)	**NR**	Very low
All-cause mortality ≤5 years											
6[4] (n=4598)	non-randomised studies	very serious[c]	very serious[a]	not serious	not serious	none	2894	1704	**OR 0.46** (0.26 to 0.80)	**N**R	Very low
All-cause mortality >5-≤10 years											

Certainty assessment							№ of patients		Effect		Certainty
№ of studies	**Study design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Partial nephrectomy**	**Radical nephrectomy**	**Relative (95% CI)**	**Absolute (95% CI)**	
3[5] (n=695)	non-randomised studies	very serious[c]	not serious	not serious	serious[e]	none	334	361	**RR 0.59** (0.45 to 0.77)	**NR**	Very low

CI: confidence interval; **HR:** hazard ratio; NR: not reported; **OR:** odds ratio; **RR:** risk ratio

1. An et al. (2017), Bradshaw et al. (2020), Breau et al. (2020), Chong et al. (2018a), Chong et al. (2018b), Kambara et al. (2018), Lai et al. (2016), Mashni et al. (2015), Maurice et al. (2016), Milonas et al. (2013), Mir et al. (2020), O'Malley et al. (2015), Reix et al. (2018), Ren et al. (2024), Ristau et al. (2018), Ristau et al. (2018d), Roos et al. (2014), Takagi et al. (2024), Weight et al. (2011)
2. Breau et al. (2020), Hori et al. (2021), Klett et al. (2021), Nayan et al. (2020), Ristau et al. (2018c), Wang et al. (2021)
3. Scosyrev et al. (2017)
4. Cerrato et al. 2023, Cerrato et al. (2023b), Forbes et al. (2016), Hamilton et al. (2019), Luis-Cardo et al. (2022), Mercimek et al. (2023)
5. Janssen et al. (2018), Luis-Cardo et al (2022), Van den Brink et al. (2024)

Explanations

a. Downgraded twice for inconsistency as I^2 was greater than 60%
b. Downgraded once for inconsistency as analysis included a single study
c. Downgraded twice for risk of bias as greater than 50% of the weight in meta-analysis came from studies at serious or high risk of bias
d. Downgraded once for risk of bias as greater than 50% of the weight in meta-analysis came from studies with moderate/serious risk of bias
e. Downgraded once for imprecision as analysis sample size less than 1300 people for survival outcome

Table 16 Clinical evidence profile for partial nephrectomy vs radical nephrectomy - postoperative severe adverse event Clavien-Dindo

Certainty assessment							№ of patients		Effect		Certainty
№ of studies	**Study design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Partial nephrectomy**	**Radical nephrectomy**	**Relative (95% CI)**	**Absolute (95% CI)**	
Postoperative severe adverse events – Clavien-Dindo I-V											
11[1] (n=3718)	non-randomised studies	very serious[c]	very serious[a]	not serious	not serious	none	671	1179	**OR 2.63** (1.45 to 4.78)	**NR**	Very low
Postoperative severe adverse events – Clavien-Dindo I-II											
5[2] (n=1553)	non-randomised studies	very serious[c]	very serious[a]	not serious	serious[b]	none	206/844 (24.4%)	149/709 (21%)	**RR 1.46** (0.94 to 2.28)	**97 more per 1,000** (from 13 fewer to 269 more)	Very low
Postoperative severe adverse events – Clavien-Dindo III-V											
12[3] (n=6331)	non-randomised studies	very serious[c]	serious[d]	not serious	not serious	none	2747	3584	**OR 1.84** (1.43 to 2.37)	**NR**	Very low

CI: confidence interval; NR: not reported; **OR:** odds ratio; **RR:** risk ratio

1. Amparore et al. (2021), An et al. (2017), Breau et al. (2020), Chebbi et al. (2017), De Saint Aubert et al. (2018), Janssen et al. (2018b), Klett et al. (2021), Kopp et al. (2014), Mercimek et al. (2023), Luis-Cardo et al. (2022), Takagi et al. (2024)
2. Amparore et al. (2021), An et al. (2017), Luis-Cardo et al. (2022), Mercimek et al. (2023), Van den Brink et al. (2024)
3. Amparore et al. (2021), An et al. (2017), Bradshaw et al. (2020), Hadjipavlou et al. (2016), Hamilton et al. (2019), Klett et al. (2021), Kopp et al. (2014), Lambertini et al. (2024), Luis-Cardo et al. (2022), Mercimek et al. (2023), O'Malley et al. (2015), Van den Brink et al. (2024)

Explanations

a. Downgraded twice for inconsistency as I^2 was greater than 60%
b. Downgraded once for imprecision as 95% confidence interval for the effect size crossed the line of no effect
c. Downgraded twice for risk of bias as greater than 50% of the weight in meta-analysis came from studies at serious or high risk of bias
d. Downgraded once for inconsistency as I^2 was between 41 and 60%

Table 17 Clinical evidence profile for partial nephrectomy vs radical nephrectomy - renal function impairment

Certainty assessment							№ of patients		Effect		Certainty
№ of studies	**Study design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Partial nephrectomy**	**Radical nephrectomy**	**Relative (95% CI)**	**Absolute (95% CI)**	
Renal function impairment: New onset eGFR <60 mL/min/1.73 m2 non-randomised evidence (HR)											
14[1] (n=29682)	non-randomised studies	very serious[d]	very serious[a]	not serious	not serious	none	NR	NR	**HR 0.30** (0.21 to 0.41)	**NR**	Very low
Renal function impairment: New onset eGFR <60 mL/min/1.73 m2 non-randomised evidence (OR)											
11[2] (n=3549)	non-randomised studies	very serious[d]	very serious[a]	not serious	not serious	none	NR	NR	**OR 0.12** (0.07 to 0.21)	**NR**	Very low
Renal function impairment: New onset eGFR <60 mL/min/1.73 m2 – RCT											
1[3] (n=541)	randomised trials	serious[f]	serious[c]	not serious	not serious	none	268	273	**OR 0.31** (0.20 to 0.48)	**NR**	Low
Renal function impairment: New onset eGFR <45 mL/min/1.73 m2 non-randomised evidence											

Certainty assessment							№ of patients		Effect		Certainty
№ of studies	**Study design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Partial nephrectomy**	**Radical nephrectomy**	**Relative (95% CI)**	**Absolute (95% CI)**	
6[4] (n=12750)	non-randomised studies	very serious[d]	very serious[a]	not serious	not serious	none	NR	NR	**HR 0.21** (0.10 to 0.44)	**NR**	Very low
Renal function impairment: eGFR decline ≤45 ml/ min/1.73 m2 non-randomised evidence											
1[5] (n=1293)	non-randomised studies	very serious[d]	serious[c]	not serious	not serious	none	NR	NR	**OR 0.42** (0.25 to 0.71)	**NR**	Very low
Renal function impairment: New onset eGFR <45 mL/min/1.73 m2 – RCT											
1[6] (n=541)	randomised trials	serious[f]	serious[c]	not serious	not serious	none	268	273	**OR 0.39** (0.27 to 0.56)	**NR**	Low
Renal function impairment: New onset eGFR <30 mL/min/1.73 m2 – non-randomised evidence											
3[7] (n=8500)	non-randomised studies	very serious[d]	very serious[a]	not serious	serious[b]	none	NR	NR	**HR 0.54** (0.22 to 1.34)	**NR**	Very low

Certainty assessment							№ of patients		Effect		Certainty
№ of studies	**Study design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Partial nephrectomy**	**Radical nephrectomy**	**Relative (95% CI)**	**Absolute (95% CI)**	
Renal function impairment: New onset eGFR <30 mL/min/1.73 m2 – RCT											
1[8] (n=541)	randomised trials	serious[f]	serious[c]	not serious	serious[b]	none	268	273	**OR 0.60** (0.31 to 1.16)	**NR**	Very low
Renal function impairment: New onset eGFR <15 mL/min/1.73 m2 non-randomised evidence											
4[9] (n=22917)	non-randomised studies	very serious[d]	serious[e]	not serious	serious[b]	none	NR	NR	**HR 0.85** (0.66 to 1.09)	**NR**	Very low

CI: confidence interval; **HR:** hazard ratio; NR: not reported; **OR:** odds ratio; **RR:** risk ratio

1. Bradshaw et al. (2020), Choi et al. (2014), Cotta et al. (2020), Jang et al. (2016), Jeon et al. (2009), Lai et al. (2016), Mashni et al. (2015), Mir et al. (2020), Muhlbauer et al. (2020), Nayan et al. (2020), Suer et al. (2011), Sun et al. (2012), Yap et al. (2015), Yoo et al. (2017)
2. Ahh et al. (2018), Jeon et al. (2013), Kim et al. (2014), Kong et al. (2013), Malcolm et al. (2019), Mariusdottir et al. (2013), Miyamoto et al. (2012), O'Malley et al. (2015), Roos et al. (2012), Weight et al. (2010), Wenzel et al. (2021)
3. Scosyrev et al. (2017)
4. Bradshaw et al. (2020), Cotta et al. (2020), Gershman et al. (2018), Leppert et al. (2018), Mashni et al. (2015), Suer et al. (2011)
5. Tappero et al. (2024)
6. Scosyrev et al. (2017)
7. Chung et al. (2018), Cotta et al. (2020), Leppert et al. (2018)

8. Scosyrev et al. (2017)
9. Lin et al. (2015), Nayan et al. (2020), Sun et al. (2012), Yap et al. (2015)

Explanations

a. Downgraded twice for inconsistency as I^2 was greater than 60%
b. Downgraded once for imprecision as 95% confidence interval for the effect size crossed the line of no effect
c. Downgraded once for inconsistency as analysis included a single study
d. Downgraded twice for risk of bias as greater than 50% of the weight in meta-analysis came from studies at serious or high risk of bias
e. Downgraded once for inconsistency because I^2 was between 41 and 60%
f. Downgraded once for risk of bias as greater than 50% of the weight in meta-analysis came from studies with moderate/serious risk of bias.

Table 18 Clinical evidence profile for partial nephrectomy vs radical nephrectomy - cardiovascular events

Certainty assessment							№ of patients		Effect		Certainty
№ of studies	**Study design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Partial nephrectomy**	**Radical nephrectomy**	**Relative (95% CI)**	**Absolute (95% CI)**	
Cardiovascular events ≤5 years											
14[1] (n=28933)	non-randomised studies	very serious[d]	very serious[a]	not serious	not serious	none	NR	NR	**HR 0.80** (0.69 to 0.93)	**NR**	Very low
Cardiovascular events >5-≤10 years											
1[2] (n=5670)	non-randomised studies	very serious[d]	serious[c]	serious[e]	serious[b]	none	2503	3167	**HR 0.91** (0.62 to 1.34)	**NR**	Very low

CI: confidence interval; **HR:** hazard ratio; NR: not reported

1. Capitanio et al. (2020), Capitanio et al. (2019b), Chung et al. (2016), Huang et al. (2009), Hutchinson et al. (2017), Kambara et al. (2018), Kyung et al. (2014), Shah et al. (2019a), Shah et al. (2019b), Shah et al. (2019c), Shah et al. (2019d), Shah et al. (2019e), Shah et al. (2019f), Yap et al. (2015)
2. Nayan et al. (2020)

Explanations

a. Downgraded twice for inconsistency as I^2 was greater than 60%b. Downgraded once for imprecision as 95% confidence interval for the effect size crossed the line of no effect

c. Downgraded once for inconsistency as analysis included a single study

d. Downgraded twice for risk of bias as greater than 50% of the weight in meta-analysis came from studies at serious or high risk of bias

e. Downgraded once for indirectness as studies contributing to the outcome have assessed only one subgroup

Table 19 Clinical evidence profile for partial nephrectomy vs radical nephrectomy - duration of hospital stay

Certainty assessment							№ of patients		Effect		Certainty
№ of studies	**Study design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Partial nephrectomy**	**Radical nephrectomy**	**Relative (95% CI)**	**Absolute (95% CI)**	
Duration of hospital stay (days)											
10[1] (n=4525)	non-randomised studies	very serious[b]	not serious	not serious	serious[a]	none	NR	NR	-	MD 0.02 lower (0.2 lower to 0.15 higher)	Very low

CI: confidence interval; **MD:** mean difference

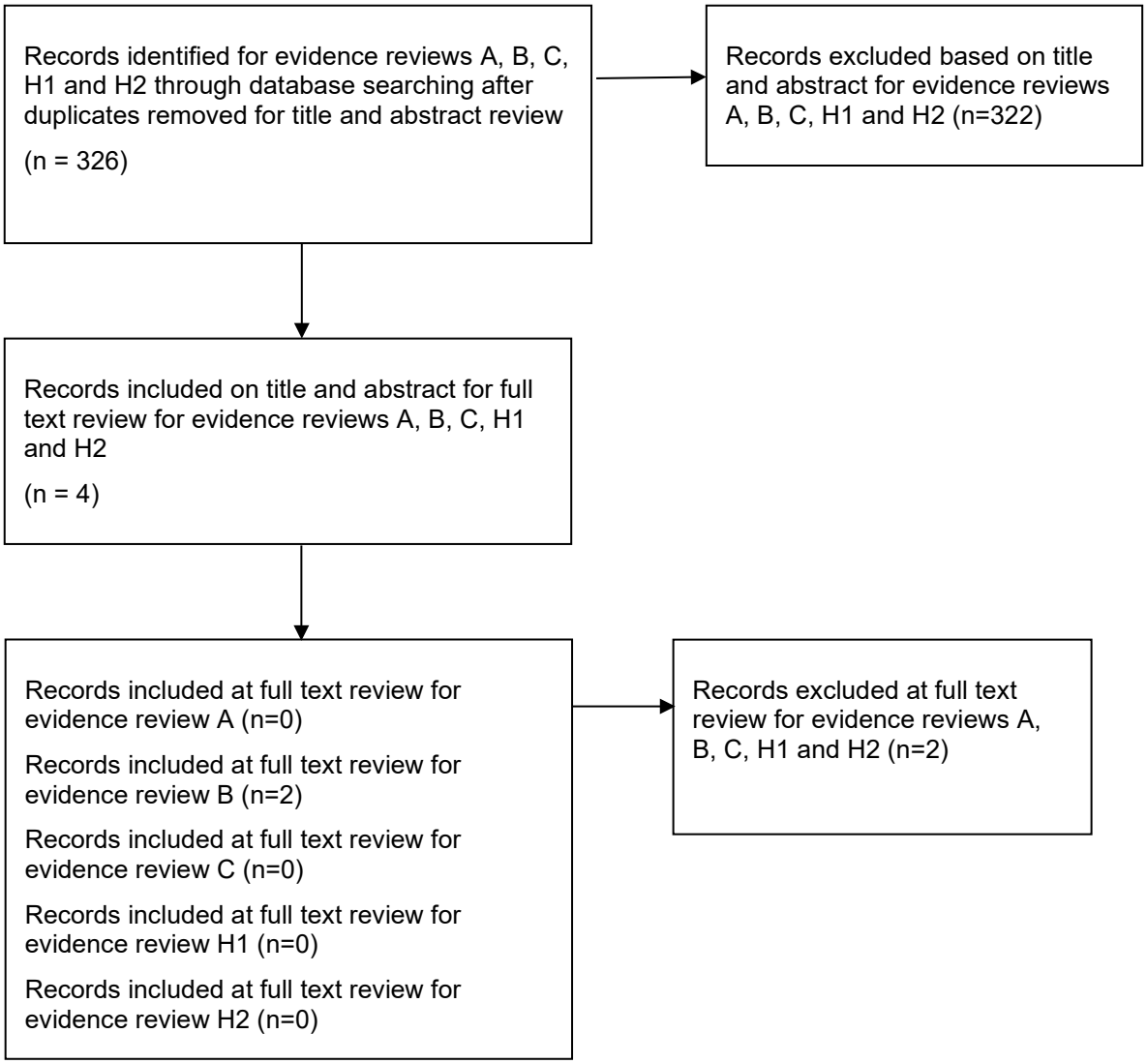
1. Amparore et al. (2021), Bradshaw et al. (2020), Breau et al. (2020), Brewer et al. (2012), De Saint Aubert et al. (2018), Hamilton et al. (2019), Kopp et al. (2015), Margulis et al. (2007), Mercimek et al. (2023), Shum et al. (2017)

Explanations

a. Downgraded once for imprecision as 95% confidence interval for the effect size crossed the line of no effect
b. Downgraded twice for risk of bias as greater than 50% of the weight in meta-analysis came from studies at serious or high risk of bias

Appendix G – Economic evidence study selection

Figure 30: Economic evidence study selection



Appendix H – Economic evidence tables

No economic evidence was identified for this review question.

Appendix I – Health economic model

No original economic modelling was conducted for this review question. A cost analysis was conducted to aid in decision making for this review question, see the accompanying cost analysis report for more details.

Appendix J – Excluded studies

Effectiveness studies

References excluded at full text (n = 82)

Study	Reason for exclusion
Ahn, Thomas, Ellis, Robert J, White, Victoria M et al. (2018) Predictors of new-onset chronic kidney disease in patients managed surgically for T1a renal cell carcinoma: An Australian population-based analysis. Journal of surgical oncology 117(7): 1597-1610	-Non-OECD study
Aeppli, S., Engeler, D.S., Fischer, S. et al. (2022) Incidence and outcome of patients with renal cell carcinoma treated with partial or radical nephrectomy in the Cantons St Gallen and Appenzell 2009-2018. Swiss Medical Weekly 152(2324): w30175	- Data not reported in an extractable format *Data was not reported by stage of kidney cancer*
Alshyarba, M.H.M., Alamri, A., Assiri, J.M.M. et al. (2020) Treatment and overall survival in renal cell carcinoma. Bahrain Medical Bulletin 42(2): 113-115	- Data not reported in an extractable format *Kaplan-Meier for overall survival*
Althaus, Adam B, Chang, Peter, Mao, Jialin et al. (2020) Patient-Reported Quality of Life and Convalescence After Minimally Invasive Kidney Cancer Surgery. Urology 144: 123-129	- Data not reported in an extractable format *Data was not reported by stage of kidney cancer*
Antonelli, Alessandro, Palumbo, Carlotta, Sandri, Marco et al. (2020) Renal Function Impairment Below Safety Limits Correlates With Cancer-specific Mortality in Localized Renal Cell Carcinoma: Results From a Single-center Study. Clinical genitourinary cancer 18(4): e360-e367	- Study does not contain a relevant outcome
Antonelli, Alessandro, Veccia, Alessandro, Pavan, Nicola et al. (2019) Outcomes of Partial and Radical Nephrectomy in Octogenarians - A Multicenter International Study (Resurge). Urology 129: 139-145	- Data not reported in an extractable format *Data was not reported by stage of kidney cancer*
Baio, Raffaele, Molisso, Giovanni, Caruana, Christian et al. (2023) "Could Patient Age and Gender, along with Mass Size, Be Predictive Factors for Benign Kidney Tumors?": A Retrospective Analysis of 307 Consecutive Single Renal Masses Treated with Partial or Radical Nephrectomy. Bioengineering (Basel, Switzerland) 10(7)	- Study does not contain a relevant outcome
Baudo, A., Incesu, R.-B., Morra, S. et al. (2023) Other-Cause Mortality, According to Partial vs.	- Study does not contain a relevant outcome

Study	Reason for exclusion
Radical Nephrectomy: Age and Stage Analyses. Clinical Genitourinary Cancer	
Britton, Cameron J, Sharma, Vidit, Lohse, Christine M et al. (2022) Progression of Chronic Kidney Disease Following Radical and Partial Nephrectomy. Urology 169: 125-133	- Data not reported in an extractable format *Data was not reported by stage of kidney cancer*
Cai, Yi; Li, Han-Zhong; Zhang, Yu-Shi (2018) Comparison of Partial and Radical Laparascopic Nephrectomy: Long-Term Outcomes for Clinical T1b Renal Cell Carcinoma. Urology journal 15(2): 16-20	-Non-OECD study
Capitanio, U., Larcher, A., Cianflone, F. et al. (2020) Hypertension and Cardiovascular Morbidity Following Surgery for Kidney Cancer. European Urology Oncology 3(2): 209-215	- Primary study covered fully by an included systematic review
Cerrato, Clara, Meagher, Margaret F, Autorino, Riccardo et al. (2023) Partial versus radical nephrectomy for complex renal mass: multicenter comparative analysis of functional outcomes (Rosula collaborative group). Minerva urology and nephrology 75(4): 425-433	- Study does not contain a relevant outcome *Outcomes presented for T1, T2 and T3 combined*
Chang, Ying-Hsu, Chang, Su-Wei, Liu, Chung-Yi et al. (2018) Demographic characteristics and complications of open and minimally invasive surgeries for renal cell carcinoma: a population-based case-control study in Taiwan. Therapeutics and clinical risk management 14: 1235-1241	-Non-OECD study
Chung, Jae-Seung, Son, Nak Hoon, Lee, Sang Eun et al. (2018) Partial versus Radical Nephrectomy for T1-T2 Renal Cell Carcinoma in Patients with Chronic Kidney Disease Stage III: a Multiinstitutional Analysis of Kidney Function and Survival Rate. Journal of Korean medical science 33(43): e277	- More recent systematic review included that covers the same topic *already included by Ochoa but also reports HR in people with CKD 30 ≤ eGFR < 60 in table 2 Looks like Ochoa only included new onset CKD which is why they've only used the stage i-iii values - can exclude*
Cotta, Brittney H, Meagher, Margaret F, Patil, Dattatraya et al. (2021) Elevated preoperative C-reactive protein is associated with renal functional decline and non-cancer mortality in surgically treated renal cell carcinoma: analysis from the INternational Marker Consortium for Renal Cancer (INMARC). BJU international 127(3): 311-317	- Primary study covered fully by an included systematic review
Dash, A., Vickers, A.J., Schachter, L.R. et al. (2006) Comparison of outcomes in elective partial vs radical nephrectomy for clear cell renal	- Study published before 2016 (search date for disease-free survival)

Study	Reason for exclusion
cell carcinoma of 4-7 cm. BJU International 97(5): 939-945	
de Saint Aubert, N, Audenet, F, Mccaig, F et al. (2018) Nephron sparing surgery in tumours greater than 7cm. Progres en urologie : journal de l'Association francaise d'urologie et de la Societe francaise d'urologie 28(6): 336-343	- Primary study covered fully by an included systematic review
Deng, Wen, Zhou, Zhengtao, Zhong, Jian et al. (2020) Retroperitoneal laparoscopic partial versus radical nephrectomy for large (>= 4 cm) and anatomically complex renal tumors: A propensity score matching study. European journal of surgical oncology : the journal of the European Society of Surgical Oncology and the British Association of Surgical Oncology 46(7): 1360-1365	-Non-OECD study
Gao, X., Hu, L., Pan, Y. et al. (2018) Surgical outcomes of nephrectomy for elderly patients with renal cell carcinoma. Pakistan Journal of Medical Sciences 34(2): 288-293	- Data not reported in an extractable format *Data was not reported by stage of kidney cancer*
Gupta, K., Omil-Lima, D., Sheyn, D. et al. (2021) Temporal improvements in renal surgery outcomes across surgical approaches. International Urology and Nephrology 53(7): 1311-1316	- Study does not contain a relevant outcome
Hakam, Nizar, Heidar, Nassib Abou, El-Asmar, Jose et al. (2023) Comparative analysis of partial versus radical nephrectomy for renal cell carcinoma: Is oncologic safety compromised during nephron sparing in higher stage disease?. Urology annals 15(2): 226-231	-Non-OECD study
Hutchinson, Ryan, Singla, Nirmish, Krabbe, Laura-Maria et al. (2017) Increased use of antihypertensive medications after partial nephrectomy vs. radical nephrectomy. Urologic oncology 35(11): 660e17-660e25	- Primary study covered fully by an included systematic review
Izol, Volkan, Gokalp, Fatih, Sozen, Sinan et al. (2021) Factors affecting long-term renal functions after partial vs radical nephrectomy for clinical T1 renal masses: A Multicentre Study of the Urooncology Association, Turkey. International journal of clinical practice 75(5): e13960	- More recent systematic review included that covers the same topic *'requirement of dialysis' could mean eGFR <15see rec 1.1.3 within NG107 also from Ochoa: "Due to the heterogeneity of defining CKD across studies, we pooled the studies for stages III-V or IV-V as determined by the EGFR or by renal replacement therapy and kidney transplant". Not included in Ochoa most likely because data not reported as HR/OR - to exclude*

Study	Reason for exclusion
Jang, Hoon Ah, Kim, Jin Wook, Byun, Seok Soo et al. (2016) Oncologic and Functional Outcomes after Partial Nephrectomy Versus Radical Nephrectomy in T1b Renal Cell Carcinoma: A Multicenter, Matched Case-Control Study in Korean Patients. Cancer research and treatment 48(2): 612-20	-Non-OECD study
Ji, B., Li, D., Fu, S. et al. (2020) Propensity-score matched comparison of partial versus radical nephrectomy for T1N0M0 sarcomatoid renal cell carcinoma. Translational Andrology and Urology 9(2): 250-257	-Non-OECD study
Jiang, Yu-Li, Peng, Cheng-Xia, Wang, Heng-Zi et al. (2019) Comparison of the long-term follow-up and perioperative outcomes of partial nephrectomy and radical nephrectomy for 4 cm to 7 cm renal cell carcinoma: a systematic review and meta-analysis. BMC urology 19(1): 48	- Systematic review used as source of primary studies
Junker, Theresa, Duus, Louise, Rasmussen, Benjamin S B et al. (2022) Quality of life and complications after nephron-sparing treatment of renal cell carcinoma stage T1-a systematic review. Systematic reviews 11(1): 4	- Systematic review used as source of primary studies
Kalogirou, Charis, Fender, Hendrik, Muck, Patricia et al. (2017) Long-Term Outcome of Nephron-Sparing Surgery Compared to Radical Nephrectomy for Renal Cell Carcinoma >=4 cm - A Matched-Pair Single Institution Analysis. Urologia internationalis 98(2): 138-147	- Data not reported in an extractable format *Data was not reported by stage of kidney cancer*
Kim, Na Young, Lee, Hye Sun, Park, Jin Ha et al. (2022) Influence of age on gender-related differences in acute kidney injury after minimally invasive radical or partial nephrectomy. Surgical endoscopy 36(5): 2962-2972	- Study does not contain a relevant outcome
Kim, Simon P, Thompson, R Houston, Boorjian, Stephen A et al. (2012) Comparative effectiveness for survival and renal function of partial and radical nephrectomy for localized renal tumors: a systematic review and meta-analysis. The Journal of urology 188(1): 51-7	- Systematic review used as source of primary studies
Kim, Sung Han, Park, Boram, Hwang, Eu Chang et al. (2021) A Retrospective, Multicenter, Long-Term Follow-Up Analysis of the Prognostic Characteristics of Recurring Non-Metastatic Renal Cell Carcinoma After Partial or Radical Nephrectomy. Frontiers in oncology 11: 653002	- Data not reported in an extractable format *Data was not reported by stage of kidney cancer*

Study	Reason for exclusion
Kopp, Ryan P, Mehrazin, Reza, Palazzi, Kerrin L et al. (2014) Survival outcomes after radical and partial nephrectomy for clinical T2 renal tumours categorised by R.E.N.A.L. nephrometry score. BJU international 114(5): 708-18	- Secondary publication of an included study that does not provide any additional relevant information
Kunath, Frank, Schmidt, Stefanie, Krabbe, Laura-Maria et al. (2017) Partial nephrectomy versus radical nephrectomy for clinical localised renal masses. The Cochrane database of systematic reviews 5: cd012045	- Systematic review used as source of primary studies
Lai, G.-S., Li, J.-R., Wang, S.-S. et al. (2020) Survival analysis of pathological T3a upstaging in clinical T1 renal cell carcinoma. In Vivo 34(2): 799-805	-Non-OECD study
Lai, T.C.T.; Ma, W.K.; Yiu, M.K. (2016) Partial nephrectomy for t1 renal cancer can achieve an equivalent oncological outcome to radical nephrectomy with better renal preservation: The way to go. Hong Kong Medical Journal 22(1): 39-45	-Non-OECD study
Lam, Jing Kai Jackie; Tan, Sher Yin; Chong, Kian Tai (2020) Is partial nephrectomy worth performing compared to radical nephrectomy for small, localised renal cortical tumours in geriatric patients?. Singapore medical journal 61(4): 190-193	- Data not reported in an extractable format
Li, G, Luo, Q, Lang, Z et al. (2018) Histopathologic analysis of stage pT1b kidney neoplasms for optimal surgical margins of nephron-sparing surgery. Clinical & translational oncology : official publication of the Federation of Spanish Oncology Societies and of the National Cancer Institute of Mexico 20(9): 1196-1201	- Study does not contain a relevant outcome
Li, Jingdong, Zhang, Yanping, Teng, Zhihai et al. (2019) Partial nephrectomy versus radical nephrectomy for cT2 or greater renal tumors: a systematic review and meta-analysis. Minerva urologica e nefrologica = The Italian journal of urology and nephrology 71(5): 435-444	- Systematic review used as source of primary studies
Li, Wentao, Cheng, Yanlei, Cheng, Yi et al. (2014) Clinical efficacy of radical nephrectomy versus nephron-sparing surgery on localized renal cell carcinoma. European journal of medical research 19: 58	- Systematic review used as source of primary studies
Liek, Elisabeth, Elsebach, Klaus, Gobel, Hubert et al. (2018) The Overall Survival Benefit for	- Data not reported in an extractable format

Study	Reason for exclusion
Patients with T1 Renal Cell Carcinoma after Nephron-Sparing Surgery Depends on Gender and Age. Urologia internationalis 100(3): 309-316	*Overall survival reported as Kaplan-Meier and P values*
Lin, Wenhao, Yang, Zhenggang, Yan, Ling et al. (2023) Comparison of partial nephrectomy and radical nephrectomy for cystic renal cell carcinoma: a SEER-based and retrospective study. Scientific reports 13(1): 8052	-Non-OECD study
Luo, You, Chen, San-San, Bai, Liang et al. (2017) Nephron Sparing Surgery Has Better Oncologic Outcomes Than Extirpative Nephrectomy in T1a but Not in T1b or T2 Stage Renal Cell Carcinoma. Medical science monitor : international medical journal of experimental and clinical research 23: 3480-3488	-Non-OECD study
MacLennan, Steven, Imamura, Mari, Lapitan, Marie C et al. (2012) Systematic review of oncological outcomes following surgical management of localised renal cancer. European urology 61(5): 972-93	- Systematic review used as source of primary studies
Manikandan, R; Srinivasan, V; Rane, A (2004) Which is the real gold standard for small-volume renal tumors? Radical nephrectomy versus nephron-sparing surgery. Journal of endourology 18(1): 39-44	- More recent systematic review included that covers the same topic
Marchioni, Michele, Preisser, Felix, Bandini, Marco et al. (2019) Comparison of Partial Versus Radical Nephrectomy Effect on Other-cause Mortality, Cancer-specific Mortality, and 30-day Mortality in Patients Older Than 75 Years. European urology focus 5(3): 467-473	- Study does not contain a relevant outcome
Maric, P., Jovanovic, M., Milovic, N. et al. (2017) Complications of radical and partial nephrectomy for renal cell carcinoma up to 7 cm. Vojnosanitetski Pregled 74(7): 639-643	- Data not reported in an extractable format *Severe complications (Clavien-Dindo ≥III) were only reported in a graph. Duration of hospital stay was reported as median and range*
Mir, Maria Carmen, Derweesh, Ithaar, Porpiglia, Francesco et al. (2017) Partial Nephrectomy Versus Radical Nephrectomy for Clinical T1b and T2 Renal Tumors: A Systematic Review and Meta-analysis of Comparative Studies. European urology 71(4): 606-617	- Systematic review used as source of primary studies
Muhlbauer, Julia, Kowalewski, Karl-Friedrich, Walach, Margarete T et al. (2020) Partial nephrectomy preserves renal function without increasing the risk of complications compared with radical nephrectomy for renal cell	- Data not reported in an extractable format *Data was not reported by stage of kidney cancer*

Study	Reason for exclusion
carcinomas of stages pT2-3a. International journal of urology : official journal of the Japanese Urological Association 27(10): 906-913	
Nandanan, N., Veccia, A., Antonelli, A. et al. (2020) Outcomes and predictors of benign histology in patients undergoing robotic partial or radical nephrectomy for renal masses: A multicenter study. Central European Journal of Urology 73(1): 33-38	- Study does not contain a relevant outcome
Nayak, J.G., Patel, P., Saarela, O. et al. (2016) Pathological Upstaging of Clinical T1 to Pathological T3a Renal Cell Carcinoma: A Multi-institutional Analysis of Short-term Outcomes. Urology 94: 154-160	- Primary study covered fully by an included systematic review
Nguyen, D.P., Vertosick, E.A., Corradi, R.B. et al. (2016) Histological subtype of renal cell carcinoma significantly affects survival in the era of partial nephrectomy. Urologic Oncology: Seminars and Original Investigations 34(6): e1-259	- Data not reported in an extractable format *Data was not reported by stage of kidney cancer*
Palacios, Diego Aguilar, Zabor, Emily C, Munoz-Lopez, Carlos et al. (2021) Does Reduced Renal Function Predispose to Cancer-specific Mortality from Renal Cell Carcinoma?. European urology 79(6): 774-780	- Data not reported in an extractable format *No denominators for recurrence data*
Pecoraro, A., Roussel, E., Amparore, D. et al. (2023) New-onset Chronic Kidney Disease After Surgery for Localised Renal Masses in Patients with Two Kidneys and Preserved Renal Function: A Contemporary Multicentre Study. European Urology Open Science 52: 100-108	- Data not reported in an extractable format *No information on participant split between I and C, or baseline characteristics by intervention.*
Pierorazio, Phillip M, Johnson, Michael H, Patel, Hiten D et al. (2016) Management of Renal Masses and Localized Renal Cancer: Systematic Review and Meta-Analysis. The Journal of urology 196(4): 989-99	- Data not reported in an extractable format *Data was not reported by stage of kidney cancer*
Pignot, Geraldine, Mejean, Arnaud, Bernhard, Jean-Christophe et al. (2015) The use of partial nephrectomy: results from a contemporary national prospective multicenter study. World journal of urology 33(1): 33-40	- Does not contain a population of people with kidney cancer *population has kidney cancer but >10% of participants have stage 3 or higher*
Pyrgidis, N., Schulz, G.B., Stief, C. et al. (2024) Surgical Trends and Complications in Partial and Radical Nephrectomy: Results from the GRAND Study. Cancers 16(1): 97	- Data not reported in an extractable format *no info on tumour stage (see highlighted text on page 9)study reports length of hospital stay (table 3)we could include and downgrade for*

Study	Reason for exclusion
	applicability To exclude - as there is no information on tumour characteristics
Roussel, Eduard, Laenen, Annouschka, Bhindi, Bimal et al. (2023) Predicting short- and long-term renal function following partial and radical nephrectomy. Urologic oncology 41(2): 110e1-110e6	- Study does not contain a relevant outcome
Russo, P., Blum, K.A., Weng, S. et al. (2022) Outcomes for Atypical Tumor Recurrences Following Minimally Invasive Kidney Cancer Operations. European Urology Open Science 40: 125-132	- Does not contain a population of people with kidney cancer *All participants were treated for recurrence after partial or radical nephrectomy*
Scosyrev, Emil, Messing, Edward M, Sylvester, Richard et al. (2014) Renal function after nephron-sparing surgery versus radical nephrectomy: results from EORTC randomized trial 30904. European urology 65(2): 372-7	- Secondary publication of an included study that does not provide any additional relevant information
Scosyrev, Emil, Wu, Kevin, Levey, Helen R et al. (2014) Overall Survival after Partial Versus Radical Nephrectomy for a Small Renal Mass: Systematic Review of Observational Studies. Urology practice 1(1): 27-34	- More recent systematic review included that covers the same topic
Selim, A.M., Zaghloul, A.S., Aboulkassem, H.A. et al. (2020) Minimally invasive approach in surgical management of renal neoplasms national cancer institute experience. Open Access Macedonian Journal of Medical Sciences 8(b): 1071-1076	- Study does not contain a relevant intervention *Laparoscopic & robotic compared to open nephrectomy irrespective of being partial or radical*
Shah, Paras H, Leibovich, Bradley C, Van Houten, Holly et al. (2019) Association of Partial versus Radical Nephrectomy with Subsequent Hypertension Risk Following Renal Tumor Resection. The Journal of urology 202(1): 69-75	- Primary study covered fully by an included systematic review
Shinohara, N, Harabayashi, T, Sato, S et al. (2001) Impact of nephron-sparing surgery on quality of life in patients with localized renal cell carcinoma. European urology 39(1): 114-9	- Data not reported in an extractable format
Simone, Giuseppe, Tuderti, Gabriele, Anceschi, Umberto et al. (2017) Oncological outcomes of minimally invasive partial versus minimally invasive radical nephrectomy for cT1-2/N0/M0 clear cell renal cell carcinoma: a propensity score-matched analysis. World journal of urology 35(5): 789-794	- Data not reported in an extractable format
Suk-Ouichai, Chalairat, Tanaka, Hajime, Wang, Yanbo et al. (2019) Renal Cancer Surgery in	- Data not reported in an extractable format *Stage of kidney cancer was not reported*

Study	Reason for exclusion
Patients without Preexisting Chronic Kidney Disease-Is There a Survival Benefit for Partial Nephrectomy?. The Journal of urology 201(6): 1088-1096	
Sun, Zi-Jun, Liu, Feng, Wei, Hai-Bin et al. (2023) Laparoscopic partial versus radical nephrectomy for localized renal cell carcinoma over 4 cm. Journal of cancer research and clinical oncology 149(20): 17837-17848	-Non-OECD study
Takagi, T., Kondo, T., Iizuka, J. et al. (2016) Comparison of survival rates in stage 1 renal cell carcinoma between partial nephrectomy and radical nephrectomy patients according to age distribution: A propensity score matching study. BJU International 117(6): e52-e59	- Study published before 2016 (search date for overall survival)
Takagi, Toshio, Kondo, Tsunenori, Omae, Kenji et al. (2016) Comparison of progression to end-stage renal disease requiring dialysis after partial or radical nephrectomy for renal cell carcinoma in patients with severe chronic kidney disease. International urology and nephrology 48(9): 1421-7	- Study does not contain a relevant outcome
Tarkowska, M., Glowacka-Mrotek, I., Peterson, D. et al. (2023) Quality of life at 3 to 5 years after surgical treatment of renal cell carcinoma - a pilot cross-sectional study. Nowotwory 73(4): 201-212	- Study does not contain a relevant outcome *Quality of life was measured with the WHOQOL-BREF questionnaire*
Tobert, Conrad M; Riedinger, Christopher B; Lane, Brian R (2014) Do we know (or just believe) that partial nephrectomy leads to better survival than radical nephrectomy for renal cancer?. World journal of urology 32(3): 573-9	- Review article but not a systematic review
Veccia, Alessandro, Dell'oglio, Paolo, Antonelli, Alessandro et al. (2020) Robotic partial nephrectomy versus radical nephrectomy in elderly patients with large renal masses. Minerva urologica e nefrologica = The Italian journal of urology and nephrology 72(1): 99-108	- Data not reported in an extractable format *Data was not reported by stage of kidney cancer*
Venkatramani, Vivek, Koru-Sengul, Tulay, Miao, Feng et al. (2018) A comparison of overall survival and perioperative outcomes between partial and radical nephrectomy for cT1b and cT2 renal cell carcinoma-Analysis of a national cancer registry. Urologic oncology 36(3): 90e9-90e14	- Secondary publication of an included study that does not provide any additional relevant information
Veys, Ralf, Abdollah, Firas, Briganti, Alberto et al. (2018) Oncological and functional efficacy of	-Does not contain a population of people with kidney cancer

Study	Reason for exclusion
nephron-sparing surgery versus radical nephrectomy in renal cell carcinoma stages >=cT1b: a single institution, matched analysis. Central European journal of urology 71(1): 48-57	*>10% of sample with cT3+*
Wang, Zheng, Wang, Ganggang, Xia, Qinghua et al. (2016) Partial nephrectomy vs. radical nephrectomy for renal tumors: A meta-analysis of renal function and cardiovascular outcomes. Urologic oncology 34(12): 533e11-533e19	- More recent systematic review included that covers the same topic
Yang, Chao and Liao, Zhaolin (2018) Comparison of Radical Nephrectomy and Partial Nephrectomy for T1 Renal Cell Carcinoma: A Meta-Analysis. Urologia internationalis 101(2): 175-183	- Systematic review used as source of primary studies
Yang, Yong (2020) Partial Versus Radical Nephrectomy in Patients with Renal Cell Carcinoma: A Systematic Review and Meta-analysis. Urology journal 17(2): 109-117	- More recent systematic review included that covers the same topic
Yang, Chuance, Wang, Zhenlong, Huang, Shanlong et al. (2018) Retroperitoneal Laparoscopic Partial Nephrectomy Versus Radical Nephrectomy for Clinical T1 Renal Hilar Tumor: Comparison of Perioperative Characteristics and Short-Term Functional and Oncologic Outcomes. Journal of laparoendoscopic & advanced surgical techniques. Part A 28(10): 1183-1187	-Non-OECD study
Yang, F.; Zhou, Q.; Xing, N. (2020) Comparison of survival and renal function between partial and radical laparoscopic nephrectomy for T1b renal cell carcinoma. Journal of Cancer Research and Clinical Oncology 146(1): 261-272	-Non-OECD study
Yu, Kun, Liu, Meiping, Xie, Zhenguo et al. (2020) Comparison of efficacy and long-term survival of laparoscopic radical nephrectomy with partial nephrectomy in the treatment of patients with early renal cell carcinoma Running title: laparoscopic radical nephrectomy. Journal of B.U.ON. : official journal of the Balkan Union of Oncology 25(2): 1155-1160	-Non-OECD study
Zhang, M., Zhao, Z., Duan, X. et al. (2018) Partial versus radical nephrectomy for T1b-2N0M0 renal tumors: A propensity score matching study based on the SEER database. PLoS ONE 13(2): e0193530	-Non-OECD study

Study	Reason for exclusion
Yoo, Sangjun, You, Dalsan, Jeong, In Gab et al. (2017) Preserving Renal Function through Partial Nephrectomy Depends on Tumor Complexity in T1b Renal Tumors. Journal of Korean medical science 32(3): 495-501	- Primary study covered fully by an included systematic review
Zhang, Yucong, Long, Gongwei, Shang, Haojie et al. (2021) Comparison of the oncological, perioperative and functional outcomes of partial nephrectomy versus radical nephrectomy for clinical T1b renal cell carcinoma: A systematic review and meta-analysis of retrospective studies. Asian journal of urology 8(1): 117-125	- Systematic review used as source of primary studies

Economic studies

References excluded at full text (n=2)

Study	Reason for exclusion
Health Improvement Scotland (2011) Evidence Note: Is radiofrequency ablation treatment a clinically and cost effective treatment to be offered to people with renal cancer in NHS Scotland? Is radiofrequency ablation treatment a clinically and cost effective treatment to be offered to people with renal cancer in NHSScotland? (york.ac.uk)	-Based on a US health economics study with a quasi-societal perspective and US costs.
Iossa, Vincenzo, Pandolfo, Savio Domenico, Buonopane, Roberto et al. (2025) Robot-assisted partial nephrectomy vs. percutaneous cryoablation for T1a renal tumors: a single-center retrospective analysis of outcomes and costs. International urology and nephrology 57(4): 1097-1104	- Exclude - cost analysis only, did not have a QoL outcome