NATIONAL INSTITUTE FOR HEALTH AND CLINICAL EXCELLENCE

INTERVENTIONAL PROCEDURES PROGRAMME

Interventional procedure overview of laparoscopic deroofing of simple renal cysts

Solitary cysts in the kidney are common, but rarely cause any symptoms. Laparoscopic deroofing involves draining the cyst and removing part of the cyst wall, which is done through small cuts in the abdomen and using a fine telescope to see inside the body (‘keyhole surgery’).

Introduction

This overview has been prepared to assist members of the Interventional Procedures Advisory Committee (IPAC) in making recommendations about the safety and efficacy of an interventional procedure. It is based on a rapid review of the medical literature and specialist opinion. It should not be regarded as a definitive assessment of the procedure.

Date prepared

This overview was prepared in December 2006.

Procedure name

- Laparoscopic deroofing of renal cysts
- Laparoscopic unroofing of renal cysts
- Laparoscopic cyst decortication

Specialty societies

- British Association of Urological Surgeons
- The Association of Laparoscopic Surgeons of Great Britain and Ireland
- The Renal Association

Description

Indications

Simple renal cysts

Simple renal cysts typically have thin walls with no calcification, septation or enhancement shown on contrast studies. Solitary simple cysts are common and are often diagnosed incidentally. In the minority of patients who are symptomatic, pain is the most frequent complaint.

Polycystic kidney disease is an inherited condition characterised by the progressive formation of many fluid-filled cysts in the kidneys. The most common form of the disease is autosomal dominant polycystic kidney disease (ADPKD). The cysts can cause symptoms such as pain in the back or flank, bleeding, urinary tract infection, kidney stones and may eventually lead to renal failure.

Laparoscopic deroofing is not used when there is any suspicion of malignancy. The management of polycystic kidney disease is different to that of simple renal cysts.

Current treatment and alternatives

Symptomatic renal cysts can be managed with analgesic medication, needle aspiration (with or without administration of a sclerosant) and open surgical cyst deroofing if aspiration is unsuccessful at relieving symptoms in the long-term. In some patients, a nephrectomy may be necessary. Asymptomatic cysts do not usually require any treatment.

What the procedure involves

Laparoscopic deroofing of renal cysts is usually performed under general anaesthesia, using a transperitoneal or retroperitoneal approach. In the transperitoneal approach, the abdomen is insufflated with carbon dioxide and three or four small abdominal incisions are made to provide access for the laparoscope and surgical instruments. In the retroperitoneal approach, a small incision is made in the back and a dissecting balloon is inserted to create a retroperitoneal space. After insufflation with carbon dioxide, two or three additional small incisions are made in the back. Ultrasonography may be used during surgery to help locate the cyst. Once the cyst is identified, it is usually aspirated and part of the cyst wall is excised. Fat or omentum may be interposed to prevent recurrence.

Efficacy

Specialist Advisers listed the key efficacy outcomes as relief of symptoms (including pain, urinary tract infections and haematuria) and lack of cyst recurrence.

Symptom relief

In a non-randomised controlled trial of patients with symptomatic simple renal cysts, all 5 patients treated with cyst aspiration and sclerotherapy had recurrence of pain at a mean follow-up of 17 months, whereas all 7 patients treated with laparoscopic deroofing were pain-free at follow-up.[1]

In five case series, including a total of 155 patients with symptomatic, simple renal cysts, the proportion of patients who were symptom-free ranged from 91% (41/45) after a mean follow-up of 52 months to 100% (20/20) after a mean follow-up of 6 months.[2,4–7] In a case series of 29 patients with ADPKD, 81% of patients had at least 50% pain relief at 36 months.[3]

Recurrence of cyst

Four case series of patients with simple renal cysts reported rates of cyst recurrence as 0% (0/13) after 6 months' follow-up, 13% (3/23) after 34 months' follow-up, 4% (2/45) after 39 months' follow-up and 19% (7/36) after 67 months' follow-up.[4–7]

Operative time and length of hospital stay

In four case series and one non-randomised study including patients with simple renal cysts, mean operative time ranged from 35 to 106 minutes.[1,2,4,5,6] Mean length of hospital stay ranged from 1.1 to 3.4 days. In one case series of patients with ADPKD, the mean operative time was 4.9 hours and the mean hospital stay was 3.2 days.[3]

Safety

Specialist Advisers listed potential adverse events as haemorrhage, conversion to open surgery, bowel perforation, peritonitis, urinary fistula, postoperative pain, ileus and port site infection.

Four studies of 7, 9, 30 and 45 patients with simple renal cysts each reported one case of haemorrhage, one requiring conversion to open surgery.[1,2,6,8] One of these studies also reported a single case of transperitoneal puncture in 30 patients (3%) and another reported that 1 of 9 patients had prolonged ileus. One study reported wound infection in 8% (2/24) of patients and urine leak in 4% (1/24).[4]

A case series of 29 patients with ADPKD reported urinoma in 10% (3/29) of patients, atelectasis in 7% (2/29), and one case each (3%) of ileus, urinary retention and severe postoperative pain.[3]

In one case series of 17 patients, a cyst wall carcinoma was identified during one procedure and an immediate open nephrectomy was performed.[8] A second case series of 29 patients stated that all cyst walls that were sent for pathology examination were benign.[3] A third case series of 20 patients stated that there were no cases of carcinoma.[5] A fourth case series of 36 patients reported that all patients had negative pathological findings for malignancy.[7]

Literature review

Rapid review of literature

The medical literature was searched to identify studies and reviews relevant to laparoscopic deroofing of renal cysts. Searches were conducted via the following databases, covering the period from their commencement to 17/11/2006: Medline, PreMedline, EMBASE, Cochrane Library and other databases. Trial registries and the Internet were also searched. No language restriction was applied to the searches. (See appendix C for details of search strategy.)

The following selection criteria (table 1) were applied to the abstracts identified by the literature search. Where these criteria could not be determined from the abstracts, the full paper was retrieved.

Table 1 Inclusion criteria for identification of relevant studies

Characteristic	Criteria
Publication type	Clinical studies were included. Emphasis was placed on identifying good-quality studies. Abstracts were excluded where no clinical outcomes were reported, or where the paper was a review or editorial, or a laboratory or animal study. Conference abstracts were also excluded because of the difficulty of appraising methodology.
Patient	Patients with renal cysts
Intervention/test	Laparoscopic deroofing of renal cysts
Outcome	Articles were retrieved if the abstract contained information relevant to the safety and/or efficacy.
Language	Non-English-language articles were excluded unless they were thought to add substantively to the English-language evidence base.

List of studies included in the overview

This overview is based on one small non-randomised controlled trial and seven small case series.[1–8] The non-randomised controlled trial compared laparoscopic deroofing with percutaneous aspiration and sclerotherapy. One case series included only patients with ADPKD, one included patients with polycystic renal disease and other types of cystic renal disease; the remaining studies only included patients with symptomatic simple renal cysts.

Other studies that were considered to be relevant to the procedure but were not included in the main extraction table (table 2) have been listed in appendix A.

Existing reviews on this procedure

There were no published reviews identified at the time of the literature search.

Related NICE guidance

Below is a list of NICE guidance related to this procedure. Appendix B details the recommendations made in each piece of guidance listed below.

Interventional procedures

- Laparoscopic nephrectomy (including nephroureterectomy). *NICE Interventional Procedure Guidance 136* (August 2005).
  See http://www.nice.org.uk/guidance/IPG136 for further information.

Clinical guidelines

- Chronic kidney disease: early identification and management of adults with chronic kidney disease in primary and secondary care. *NICE clinical guideline in progress*. (Publication expected September 2008.) Consultation on draft of guideline with stakeholders is expected March–May 2008.
  See http://www.nice.org.uk/page.aspx?o=ChronicKidneyDisease for further information.

Table 2 Summary of key efficacy and safety findings on laparoscopic deroofing of renal cysts

Abbreviations used: ADPKD, autosomal dominant polycystic kidney disease; CT, computerised tomography			
Study details	**Key efficacy findings**	**Key safety findings**	**Comments**
Okeke AA (2003)[1] **Non-randomised controlled study** UK Study period: not stated **n = 13** Population: patients with suspected symptomatic simple renal cysts referred for trial aspiration: • 46% (6/13) = percutaneous re-aspiration with sclerotherapy • 54% (7/13) = laparoscopic deroofing Mean age (years): • Sclerotherapy = 50.8 (range 33–62) • Laparoscopic deroofing = 50.9 (range 25–84) Indications: symptomatic simple renal cysts with temporary response to aspiration. Cysts communicating with pelvic calyceal collecting system on a contrast-medium study were excluded. Technique: 95% ethanol was used as the sclerosant; transperitoneal approach was used for laparoscopic deroofing. **Mean follow-up (months):** • **Sclerotherapy = 17 (range 12–23)** • **Laparoscopic deroofing =** 1**7.7 (range 2–56)** Disclosure of interest: none stated	**<u>Operative outcomes</u>** **Technical success:** Cyst was accessed successfully in all patients. **Mean operative time for laparoscopic deroofing** = 106 minutes (range 49–142) **Mean hospital stay for laparoscopic deroofing** = 3.4 days (range 2–8) **<u>Symptom control</u>** **Recurrence of pain at follow-up:** • Sclerotherapy = 100% (5/5) • Laparoscopic deroofing = 0% (0/7) (One patient in sclerotherapy group presented with flank mass rather than pain)	Cyst fluid cytology was negative for malignant cells in all cases. **Complications** Laparoscopic deroofing group: Haemorrhage = 1 out of 7 patients Sclerotherapy group: One sclerotherapy patient, who presented with a flank mass, developed severe pain of radicular distribution immediately after ethanol instillation. The pain persisted and patient was referred to pain clinic.	An additional four patients were referred; aspiration was ineffective in one; three had sustained pain relief from simple aspiration alone. The authors emphasise the importance of diagnostic evaluation, including trial cyst aspiration.

Abbreviations used: ADPKD, autosomal dominant polycystic kidney disease; CT, computerised tomography			
Study details	**Key efficacy findings**	**Key safety findings**	**Comments**
Lucan M (2001)[2] **Case series** Romania Study period = 1998–1999 **n = 30** Population: patients with big and/or symptomatic renal cysts undergoing retroperitoneal laparoscopic resection Mean age = 34 years (range 18–50) Male = 50% (15/30) 10 = peripheral single simple cysts in upper half of kidney; 5 = peripheral single simple cysts in lower half of kidney; 10 = multiple simple cysts; 5 = peripelvic cysts Right kidney = 60% (18/30) 20 patients had previous treatments (non-opiate analgesics, needle aspiration, with or without a sclerosant, percutaneous marsupialisation). Indications: big and/or symptomatic renal cyst. Exclusion criteria not stated. Technique: retroperitoneal approach used; urethra-vesical catheter placed preoperatively. **Mean follow-up = 5.5 months (range 1–10)** Conflict of interest: none stated	**<u>Operative outcomes</u>** **Mean operative time** = 35 minutes (range 10–60) **Mean blood loss** = 75 ml (range 0–250) **Mean hospital stay** = 42 hours (range 12–72) **<u>Symptom control</u>** **Symptom free at follow-up** = 97% (29/30) **Cyst recurrence:** No sign of cyst recurrence at operation side, visualised on ultrasound at follow-up = 67% (20/30)	**Complications** • Severe bleeding = 3% (1/30) (managed with intracorporeal cyst marginal suture and blood transfusion) • Transperitoneal puncture = 3% (1/30) ('solved conservatively') There were no conversions to open surgery.	Retrospective review. Before deroofing, cysts were aspirated for cytological examination but these results were not presented in the paper. The paper does not specify that all 30 patients were assessed by ultrasound at follow-up.

Abbreviations used: ADPKD, autosomal dominant polycystic kidney disease; CT, computerised tomography

<table>
<tr><th>Study details</th><th>Key efficacy findings</th><th>Key safety findings</th><th>Comments</th></tr>
<tr>
<td>Lee DI (2003)[3]

Case series

USA

Study period = 1994–2001

n = 29 patients (35 procedures)

Population: patients with confirmed ADPKD and chronic pain

Mean age = 45.5 years (range 20–75)

Male = 24% (7/29)

6 bilateral and 23 unilateral procedures; mean 220 cysts treated per patient.

Indications: primary indication was chronic flank and abdominal pain thought to be attributable to the renal cysts; no inclusion or exclusion criteria were stated.

Technique: Transperitoneal approach in 94%, retroperitoneal in 6% of procedures. In the initial two patients, only a few large cysts were drained; from December 1995 onwards, all detectable peripheral and perihilar cysts were treated (large cysts were decorticated; medium cysts were broadly incised; small cysts were punctured and drained). On completion of cyst drainage, the kidney was sutured to the retroperitoneal musculature to prevent renal torsion.

Mean follow-up = 32.3 months (range 6–72)
Conflict of interest: none stated</td>
<td><u>Symptom control</u>

Pain: Relative pain relief (defined as [preoperative pain score] – [postoperative pain score]/[preoperative pain score]):
• 12 months = 58%
• 24 months = 47%
• 36 months = 63%
Percentage of patients with at least 50% pain relief:
• 12 months = 73%
• 24 months = 52%
• 36 months = 81%
Hypertension: Among 21 patients with hypertension preoperatively, 5 became normotensive; hypertension decreased in 9; 6 patients had worsening hypertension (1 patient was not accounted for in the paper). Among the 8 patients who were normotensive preoperatively, one patient had become hypertensive at 4 years' follow-up.

Quality of life
<table>
<tr><th>Mean QoL scores</th><th>Preop</th><th>12 months</th><th>24 months</th></tr>
<tr><td>Physical functioning</td><td>52.9</td><td>66.8</td><td>70</td></tr>
<tr><td>Role physical</td><td>42.9</td><td>40</td><td>50</td></tr>
<tr><td>Pain index</td><td>28.9</td><td>67</td><td>52</td></tr>
<tr><td>General health</td><td>34</td><td>54.6</td><td>46</td></tr>
<tr><td>Vitality</td><td>37.9</td><td>39</td><td>47.5</td></tr>
<tr><td>Social functioning</td><td>50</td><td>65</td><td>81.3</td></tr>
<tr><td>Role emotional</td><td>47.6</td><td>86.7</td><td>50</td></tr>
<tr><td>Mental health index</td><td>59.4</td><td>78</td><td>70</td></tr>
</table>
All scores range from 0 (worst) to 100 (best).</td>
<td>No tumours were noted in any cyst cavity; all cyst walls sent for pathology examination were benign.

Complications:
• Urinoma = 10% (3/29) (managed with placement of indwelling ureteral stent for 4 weeks)
• Atelectasis = 7% (2/29)
• Ileus (7 day) = 3% (1/29)
• Urinary retention = 3% (1/29) (treated with intermittent catheterisation for 1 day)
• Severe flank and groin pain on contralateral side = 3% (1/29) (resolved within 48 hours)
• Severe headache after epidural for postoperative pain = 3% (1/29)
• Small bilateral effusions noted on routine postoperative chest radiograph = 3% (1/29) (these did not require drainage and patient remained asymptomatic)</td>
<td>24 patients had at least 6 months' follow-up.

Two patients were withdrawn from the study; one had recurrent pain 1 year after the procedure and was counted as a treatment failure; the other developed a renal abscess on the treated side 6 months after the procedure and subsequently underwent nephrectomy.

Another patient died because of a myocardial infarction after a subsequent nephrectomy; the patient's data were included until the last follow-up (period not stated).</td>
</tr>
</table>

Abbreviations used: ADPKD, autosomal dominant polycystic kidney disease; CT, computerised tomography			
Study details	**Key efficacy findings**	**Key safety findings**	**Comments**
Lee DI (2003) *continued.*	**Operative outcomes** **Mean operative time** = 4.9 hours (range 2.6–6.6) **Mean estimated blood loss** = 124 ml (range 50–450) **Mean hospital stay** = 3.2 days (range 1–7) **Mean morphine sulphate equivalents required** = 61.1 mg (range 5–313) **Return to full activity** = 7.7 weeks (range 2–16) **Renal function** 21 (out of 29) patients had normal renal function preoperatively, of whom 1 had >20% increase in creatinine clearance (from 54.0 to 80.2 ml/min at 48 months) and 1 had a significant decrease in creatinine clearance (from 80.3 to 62.9 ml/min at 24 months). 8 patients presented with renal impairment (creatinine > 1.4 mg/dl); 3 patients with creatinine between 1.4 and 2.0 mg/dl had stable renal function at last follow-up. 5 patients had pre-procedural serum creatinine > 2.1 mg/dl and creatinine clearance below 30 ml/min, all of whom had a significant decrease of creatinine clearance (mean decrease 34%, range 20% - 51%).		

Abbreviations used: ADPKD, autosomal dominant polycystic kidney disease; CT, computerised tomography			
Study details	**Key efficacy findings**	**Key safety findings**	**Comments**
Gupta NP (2005)[4] **Case series** India Study period = 1997–2002 **n = 24** Population: patients with symptomatic simple renal cysts Mean age = 42 years Male = 54% (13/24) Mean cyst size = 10.9 cm (range 6–14) Solitary cysts = 75% (18/24), multiple cysts = 25% (6/24) Peripheral cysts = 71% (17/24), peripelvic = 29% (7/24) Right kidney = 54% (13/24) Indications: renal cysts causing pain; other inclusion and exclusion criteria not stated. Technique: retroperitoneal approach **Mean follow-up = 2.8 years (range 1.5–5)** Conflict of interest: none stated	**Operative outcomes** **Mean operative time** = 95 minutes (range 50–210) **Estimated blood loss** = 90ml (range 30–200) **Mean analgesic requirement (pethidine equivalents**) = 47 mg (range 25–75) **Mean hospital stay** = 2.9 days (range 2–7) **Mean time to complete recovery** = 19 days **Symptom control** **Pain / cyst recurrence:** One patient had worsening of pain at 6 weeks postoperatively with recurrence of cyst seen on ultrasound scan. **Pain scores:** decreased from a mean of 7.2 preoperatively to 1.4 at 3 months follow-up in the 22 patients with improvement. **Symptom status:** Asymptomatic at 12 months = 96% (22/23) **Asymptomatic recurrence of cyst** = 9% (2/23) (both see on ultrasound scan at 3 month follow-up; both were peripelvic cysts)	**Complications (all described as minor):** • Wound infections = 8% (2/24) • Urine leak = 4% (1/24) (due to inadvertent entry into the collecting system; a stent was inserted postoperatively and the leak stopped without any consequences)	Patient selection not described. 96% (23/24) of patients were available for postoperative evaluation. There are no details on the one patient lost to follow-up.

Abbreviations used: ADPKD, autosomal dominant polycystic kidney disease; CT, computerised tomography			
Study details	**Key efficacy findings**	**Key safety findings**	**Comments**
Guazzoni G (1994)[5] **Case series** Italy Study period = 1992–1994 **n = 20** Population: patients with symptomatic simple renal cysts Mean age = 45 years (range 35–55) Male = 55% (11/20) Mean maximum diameter of cyst = 8.5 cm (range 6–15) Solitary cysts = 75% (15/20); two cysts in same kidney = 25% (5/20) Anterior cyst = 70% (14/20), posterior cyst = 30% (6/20) Right kidney = 55% (11/20) Indications: all patients had already had at least one percutaneous aspiration of the cyst; inclusion and exclusion criteria not stated. Technique: 4 patients underwent concomitant laparoscopic cholecystectomy because of symptomatic gallbladder stones; transperitoneal approach was used for all patients. **Follow-up = 6 months** Conflict of interest: none stated	**<u>Operative outcomes</u>** **Mean operative time** = 75 minutes (range 45–100) **Mean hospital stay** = 2.2 days (range 1–3) **Mean return to regular activity** = 7 days (range 4–10) **<u>Symptom control</u>** **Symptom recurrence / control:** All patients were symptom-free postoperatively. **Cyst recurrence.** No recurrence at 6 months (assessed by ultrasound) = 100% (13/13)	The paper reported that there were no complications. None of the cases was found to have carcinoma on cytological analysis.	85% (17/20) patients were followed up for 3 months, 65% (13/20) were followed up for 6 months. There is no discussion of the patients apparently lost to follow-up.

Abbreviations used: ADPKD, autosomal dominant polycystic kidney disease; CT, computerised tomography			
Study details	**Key efficacy findings**	**Key safety findings**	**Comments**
Atug F (2006)[6] **Case series** USA Study period = 1994–2005 **n = 45** Population: patients with symptomatic simple renal cysts. Male = 58% (26/45) Mean age = 54 years (range 14–78) Right kidney = 60% (27/45) Mean cyst size = 9.7 cm (range 6–19) Parapelvic cysts = 13% (6/45) 53% (24/45) patients had undergone previous cyst aspiration with injection of sclerosant material. Indications: All patients had pain at presentation; complex renal cysts and autosomal dominant polycystic kidneys were excluded. Technique: transperitoneal route was preferred access in all patients. **Median follow-up = 52 months (range 3–132) for symptom assessment,** **39 months (range 3–96) for radiological assessment** Conflict of interest: none stated	Pain was measured using Wong-Baker faces visual pain score, 0 indicating no pain and 10 indicating the most severe pain. **Operative outcomes** **Mean operative time** = 89 minutes (range 48–170) **Mean blood loss** = 85 ml (range 20–400) **Mean hospital stay** = 1.1 days (range 1–3) **Symptom control** **Symptom recurrence:** 91% (41/45) of patients were symptom-free at follow-up. The remaining 4 patients reported some alleviation of symptoms. **Cyst recurrence:** radiographic success (no recurrence on CT scan) was achieved in 96% (43/45) of patients. Mean preoperative pain score = 7.66 (range 6–10) Mean postoperative pain score = 1.21 (range 0–5) The authors stated that they did not find any decrease in success rate with long-term follow-up.	**Complications** One patient (2.2%) underwent conversion to open surgery because of excessive bleeding.	

Abbreviations used: ADPKD, autosomal dominant polycystic kidney disease; CT, computerised tomography			
Study details	**Key efficacy findings**	**Key safety findings**	**Comments**
Shiraishi (2006)[7] **Case series** Japan Study period = 1993–2004 **n = 36** Population: patients with symptomatic simple renal cysts Male = 42% (15/36) Mean age = 60 years (range 46–77) Right kidney = 47% (17/36) Mean cyst size = 7.5 cm (range 3.2–22.0) 30 peripheral cysts, 6 peripelvic cysts 50% (18/36) of patients had previous percutaneous aspiration with sclerosant. Indications: 31 patients had pain and 5 had obstruction of upper urinary tract; patients with ADPKD and complicated cysts (Bosniak classification 2 or more) were excluded from the study. In all patients, absence of calcifications, septations or other lesions in the cysts was confirmed by preoperative ultrasonography and CT. Technique: 29 transperitoneal and 7 retroperitoneal approaches. **Mean follow-up = 67 months (range 13–128)** Conflict of interest: none stated	**Symptom control** **Pain recurrence or upper urinary obstruction:** symptomatic success rate = 92% (33/36) **Cyst recurrence**: radiological success rate (changes of cyst size assessed by CT scan) = 81% (29/36) Peripelvic cysts were significantly correlated with radiological failure. Symptomatic improvement was evident by 3 months, while radiological improvement continued for up to 3–4 years after surgery. Several cysts remained large, indicating some reduction in volume was enough to improve the symptoms.	All patients had negative pathological findings for malignancy. There were no conversions to open surgery. Paper reported that there were no complications.	Retrospective review. The authors suggested that the high rate of radiological failure may be due to the surgical technique used; part of the cyst wall was left when the margin was not obvious or the access was limited.

Abbreviations used: ADPKD, autosomal dominant polycystic kidney disease; CT, computerised tomography			
Study details	**Key efficacy findings**	**Key safety findings**	**Comments**
Lifson BJ (1998)[8] **Case series** USA Study period = 1991–1996 **n = 17 patients (20 procedures)** Population: patients undergoing laparoscopic cyst decortication for polycystic kidney disease or other renal cystic disease (multiple, complex and solitary symptomatic cysts) Polycystic kidney disease = 55% (11/20), simple solitary cyst = 20% (4/20), complex cyst = 15% (3/20), multiple cysts = 10% (2/20) Indications: no inclusion or exclusion criteria were stated. In patients with polycystic disease, pain was the indication in all cases except one, in which the procedure was attempted to identify and control bleeding after cyst haemorrhage. Technique: Transperitoneal approach was used for all patients except one. **Mean follow-up = 26 months (range 3–63)** Conflict of interest: none stated	*Patients with polycystic disease* **<u>Symptom control</u>** Pain relief: 90% (9/10) primary or secondary procedures successfully produced immediate pain relief. Of 7 patients who could be evaluated at 6 months, 5 were pain-free and 4 were pain-free after 2 years. 3 patients with recurrent pain had a secondary procedure, which was successful in 2. **Control of within the cyst bleeding** In one patient, the procedure was attempted with the intention to control bleeding after cyst haemorrhage; it was unsuccessful and patient subsequently underwent open exploration and nephrectomy. *Patients with other renal cystic disease* **<u>Symptom control</u>** Pain relief: all 5 patients who underwent procedure for pain relief were pain-free during follow-up. The remaining 3 patients underwent the procedure for evaluation of a complex renal cyst (2 cases proved to be haemorrhagic cysts and 1 was a septated cyst).	*Operation on malignant cyst (not previously diagnosed) / open conversion* In one patient, cyst wall carcinoma was visually noted during the procedure; immediate open radical nephrectomy was performed (needle aspiration of radiologically simple cyst had shown benign cytology prior to surgery). *Polycystic disease* Retroperitoneal bleeding requiring blood transfusion occurred in the single procedure done with a retroperitoneal approach. *Other renal cystic disease* Prolonged ileus = 1 case (resolved after 4 days without specific therapy) Postoperative bleeding = 1 case (unrecognised coagulopathy was diagnosed) No patient had deteriorating renal function in the immediate postoperative period, as demonstrated by stable serum creatinine values.	Retrospective review of all patients undergoing laparoscopic renal cyst decortication during study period. Complex cysts were limited to those in Bosniak type II category (minimally complicated benign cysts with some radiological findings that cause concern). These may include septated, minimally calcified, infected and high-density cysts.

Validity and generalisability of the studies

- The single comparative study is small and patients were not randomised to treatment groups.[1]
- Only two of the eight studies included patients with polycystic kidney disease.[3,8]
- The laparoscopic technique varied between studies; two studies used a retroperitoneal approach for all patients and four studies used a transperitoneal approach for the majority of patients.
- In two studies, all patients had previously undergone percutaneous cyst aspiration.[1,5]

Specialist Advisers' opinions

Specialist advice was sought from consultants who have been nominated or ratified by their Specialist Society or Royal College.

Mr C Eden, Mr P Grange, Mr F Keeley, Professor M Nicholson, Mr S Sriprasad, Mr M Wright

- Three advisers considered the procedure to be established practice, one considered it to be a minor variation of an established procedure and one considered it to be novel and of uncertain safety and efficacy.
- There is uncertainty about which patients would benefit from the procedure.
- Outcome measures of benefit include pain relief, length of hospital stay, time to return to normal activities and incidence of haematuria and urinary tract infections.
- Adverse outcomes include operating time, conversion to open surgery or nephrectomy, intraoperative blood loss, re-intervention rate, recurrence of cyst, port site infection, and urine leakage (from parapelvic cyst).
- The potential impact of the procedure on the NHS in terms of numbers of patients and use of resources is minor.

Issues for consideration by IPAC

- Evidence on both polycystic kidney disease and simple renal cysts has been included in this overview; it may be appropriate to consider the two indications separately.

References

1. Okeke AA, Mitchelmore AE, Keeley FX, et al. (2003) A comparison of aspiration and sclerotherapy with laparoscopic de-roofing in the management of symptomatic simple renal cysts. *BJU International* 92: 610–13.
2. Lucan M, Neculoiu M, Ghervan L. (2001) Retroperitoneal laparoscopic resection of symptomatic or recurrent renal cysts. *Magyar Urologia* 13: 43–9.
3. Lee DI, Andreoni CR, Rehman J, et al. (2003) Laparoscopic cyst decortication in autosomal dominant polycystic kidney disease: impact on pain, hypertension, and renal function. *Journal of Endourology* 17: 345–54.
4. Gupta NP, Goel R, Hemal AK, et al. (2005) Retroperitoneoscopic decortication of symptomatic renal cysts. *Journal of Endourology* 19: 831–3.
5. Guazzoni G, Bellinzoni P, Montorsi F, et al. (1994) Laparoscopic unroofing of simple renal cysts. *Urology* 43: 154–9.
6. Atug F, Burgess SV, Ruiz-Deya G, et al. (2006) Long-term durability of laparoscopic decortication of symptomatic renal cysts. *Urology* 68: 272–5.
7. Shiraishi K, Eguchi S, Mohri J, et al. (2006) Laparoscopic decortication of symptomatic simple renal cysts: 10-year experience from one institution. *BJU International* 98: 405–8.
8. Lifson BJ, Teichman JMH, Hulbert JC. (1998) Role and long-term results of laparoscopic decortication in solitary cystic and autosomal dominant polycystic kidney disease. *Journal of Urology* 159: 702–6.

Appendix A: Additional papers on laparoscopic deroofing of renal cysts not included in summary table 2

The following table outlines the studies that are considered potentially relevant to the overview but were not included in the main data extraction table (table 2). It is by no means an exhaustive list of potentially relevant studies.

Article	Number of patients/ follow-up	Direction of conclusions	Reasons for non-inclusion in table 2
Brown JA, Torres VE, King BF, et al. (1996) Laparoscopic marsupialization of symptomatic polycystic kidney disease. *Journal of Urology* 156: 22–7.	13 patients 12–28 months' follow-up	8 patients with ADPKD 62% (8/13) of patients pain-free at follow-up. 38% (5/13) of patients had persistent or recurrent cysts.	Larger case series are included.
Dunn MD, Portis AJ, Naughton C, et al. (2001) Laparoscopic cyst marsupialization in patients with autosomal dominant polycystic kidney disease. *Journal of Urology* 165: 1888–92.	15 patients Mean follow-up = 2.2 years	15 patients with ADPKD Pain decreased by an average of 62% in 73% (11/15) of patients. Hypertension worsened in 33% (5/15) of patients; renal function worsened in 1 patient (7%).	Larger case series are included.
Fahlenkamp D, Rassweiler J, Fornara P, et al. (1999) Complications of laparoscopic procedures in urology: experience with 2407 procedures at 4 German centres. *Journal of Urology* 162: 765–71.	139 patients	Complication rate = 4% (5/139) Overall complication rate for all procedures = 4.4% (107/2407)	Paper presents results of all laparoscopic procedures in urology together.
Hemal AK, Aron M, Gupta NP, et al. (1999) The role of retroperitoneoscopy in the management of renal and adrenal pathology. *BJU International* 83: 929–36.	9 patients Follow-up = 15–39 months	All procedures were successful; all patients were asymptomatic, with no cyst recurrence at follow-up.	Larger case series are included.
Iannelli A, Fabiani P, Niesar E, et al. (2003) Long-term results of transperitoneal laparoscopic fenestration in the treatment of simple renal cysts. *Journal of Laparoendoscopic & Advanced Surgical Techniques* 13: 365–9.	15 patients Mean follow-up = 60 months	80% (12/15) patients were symptom-free. No cyst recurrences.	Larger case series are included.
Kurosaka S, Iwamura M, Matsuda D, et al. (2005) Laparoscopic unroofing of peripelvic cyst. *Acta Urologica Japonica* 51: 1–4.	6 patients Follow-up = 4 weeks	All patients showed improvement of hydronephrosis at follow-up.	Larger case series with longer follow-up are included.

Article	Number of patients/ follow-up	Direction of conclusions	Reasons for non-inclusion in table 2
Lutter I, Weibl P, Daniel I, et al. (2005) Retroperitoneoscopic approach in the treatment of symptomatic renal cysts. *Bratislavske Lekarske Listy* 106: 366–70.	19 patients Mean follow-up = 42 months	No recurrence of pain or cysts.	Larger case series are included.
McNally ML, Erturk E, Oleyourryk G, et al. (2001) Laparoscopic cyst decortication using the harmonic scalpel for symptomatic autosomal dominant polycystic kidney disease. *Journal of Endourology* 15: 597–9.	7 patients Mean follow-up = 14 months	7 patients with ADPKD Major complications included postoperative bleeding in 2 patients and re-admission for ileus in 1.	Larger case series with longer follow-up are included.
Ou YC, Yang CR, Chang YY, et al. (1997) The clinical experience of gaseous retroperitoneoscopic and gasless retroperitoneoscopy-assisted unroofing of renal cyst. *Chinese Medical Journal* 59: 232–9.	14 patients	Both techniques are safe, effective and minimally invasive. A gasless retroperitoneoscopy-assisted procedure is recommended in patients who have had retroperitoneal surgery or who have multiple renal cysts.	Larger case series are included. Study compares two different laparosopic techniques (gaseous and gasless).
Rane A. (2004) Laparoscopic management of symptomatic simple renal cysts. *International Urology and Nephrology* 36: 5–9.	11 patients (plus 5 historical controls treated with open cyst aspiration)	3 of 5 historical controls were traceable and had no recurrence. Mean hospital stay for open aspiration = 7 days. One major complication (deep vein thrombosis). Small-volume cysts were satisfactorily dealt with by aspiration alone. All patients with larger-volume cysts treated with laparoscopic deroofing had improvement in symptoms and objective cure on follow-up imaging studies. One major complication (ureteral fistula).	Although this is described as a comparative study, only 3 of 5 patients treated with open aspiration could be traced. The only parameter that could be objectively evaluated from the records was mean hospital stay.
Rassweiler JJ, Seemann O, Frede T, et al. (1998) Retroperitoneoscopy: experience with 200 cases. *Journal of Urology* 160: 1265–9.	50 patients	Renal cyst marsupialisation classified as 'simple' procedure, with mean operative time of 80 minutes	Paper presents results for a range of retroperitoneoscopic techniques together.

Article	Number of patients/ follow-up	Direction of conclusions	Reasons for non-inclusion in table 2
Zanetti G, Trinchieri A, Montanari E, et al. (1996) Laparoscopic renal cyst excision. *Minimally Invasive Therapy & Allied Technologies: Mitat* 5: 567–70.	18 patients Follow-up = 6 months	No intraoperative complications were encountered. One cyst recurrence at follow-up. 'Retroperitoneoscopy seems to be safer and easier compared to the transperitoneal technique'.	Larger case series with longer follow-up are included.

Appendix B: Related NICE guidance for laparoscopic deroofing of renal cysts

Guidance	Recommendation
Interventional procedures • Laparoscopic nephrectomy (including nephroureterectomy). *NICE Interventional Procedure Guidance 136* (August 2005).	1.1Current evidence on the safety and efficacy of laparoscopic nephrectomy (including nephroureterectomy) appears adequate to support the use of this procedure provided that the normal arrangements are in place for consent, audit and clinical governance. 1.2 Patient selection is important when this procedure is being considered for the treatment of malignant disease. Long-term follow-up data are lacking, and clinicians are encouraged to collect data on rates of recurrence in patients with malignant disease.
Clinical guidelines • Chronic kidney disease: early identification and management of adults with chronic kidney disease in primary and secondary care. *NICE clinical guideline in progress*. (Publication expected September 2008.) Consultation on draft of guideline with stakeholders is expected March–May 2008.	Guideline in progress. Management of progressive kidney disease will be discussed but the scope states that the treatment of each of the specific causes of chronic kidney disease will not be covered by the guideline.

Appendix C: Literature search for laparoscopic deroofing of renal cysts

Database	Date searched	Version searched
Cochrane Library	17/11/2006	2006, Issue 4
CRD databases (DARE & HTA)	17/11/2006	2006, Issue 4
Embase	17/11/2006	1988 to 2006 Week 46
Medline	17/11/2006	1966 to November Week 2 2006
Premedline	17/11/2006	1966 to Present
CINAHL	17/11/2006	1982 to November Week 2 2006
British Library Inside Conferences	17/11/2006	2006 Issue 4
NRR	17/11/2006	2006 Issue 4
Controlled Trials Registry	03/11/2006	

The following search strategy was used to identify papers in Medline. A similar strategy was used to identify papers in other databases.

1 exp Laparoscopy/
2 exp Laparoscopes/
3 exp surgical procedures, minimally invasive/
4 laparoscop$.tw.
5 endoscop$.tw.
6 percutan$.tw.
7 deroof$.tw.
8 de-roof$.tw.
9 unroof$.tw.
10 lance$.tw.
11 pierce.tw.
12 fenestrat$.tw.
13 retroperitoneoscop$.tw.
14 Kidney Diseases, Cystic/
15 (((Renal or Kidney) adj3 cyst$) or boil$ or abscess$ or furuncle$ or vesicl$).tw.
16 Cysts/su [Surgery]
17 or/1-6
18 or/7-13
19 or/14-16
20 17 and 18 and 19