

Percutaneous radiofrequency ablation for primary or secondary lung cancers

Interventional procedures guidance

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www.nice.org.uk/guidance/ipg372

1 Guidance

This document replaces previous guidance on percutaneous radiofrequency ablation for primary and secondary lung cancers (interventional procedure guidance 185).

- 1.1 Current evidence on the efficacy of percutaneous radiofrequency ablation (RFA) for primary or secondary lung cancers is adequate in terms of tumour control. There is a small incidence of complications, specifically pneumothorax, which may have serious implications for these patients with already compromised respiratory reserve. This procedure may be used provided that normal arrangements are in place for clinical governance, consent and audit.
- 1.2 Patient selection for percutaneous RFA for primary or secondary lung cancers should be carried out by a multidisciplinary team, which will

usually include a thoracic surgeon, an oncologist and a radiologist.

- 1.3 This procedure should only be carried out by radiologists who regularly undertake image-guided interventional procedures.
- 1.4 NICE encourages further research into this procedure. Research studies should include a clear description of case mix and lesion size, and report long-term survival.

2 The procedure

2.1 Indications and current treatments

- 2.1.1 Both primary and metastatic lung cancer are common, and the prognosis for most patients is poor.
- 2.1.2 Treatment depends mainly on tumour histology and stage, and may include surgical resection (open or thoracoscopic), external beam radiotherapy, chemotherapy or a combination of these treatments. If the tumour protrudes into major airways, bronchoscopic treatments including diathermy, laser therapy, cryotherapy, brachytherapy and photodynamic therapy may be used.

2.2 Outline of the procedure

- 2.2.1 Percutaneous RFA may be used in patients with small, early-stage lung cancers or small numbers of lung metastases who are unsuitable for, or prefer not to undergo, surgery. It may also have a place in multi-modality treatment of more advanced primary lung cancers.
- 2.2.2 The procedure is usually carried out with the patient under local anaesthesia with conscious sedation, but general anaesthesia may be required. The procedure involves inserting a small needle electrode percutaneously directly into the tumour, normally under computed tomography (CT) guidance. Radiofrequency energy is passed through the electrode causing heating of the tissues around the tip of the needle.

The tumour tissue in the target area is coagulated. A small margin of normal tissue around the tumour is also destroyed to reduce local recurrence risk.

- 2.2.3 The procedure can be applied to more than one tumour during one or more treatment sessions, and can be used alone or in combination with surgery, radiotherapy or chemotherapy.

Sections 2.3 and 2.4 describe efficacy and safety outcomes from the published literature that the Committee considered as part of the evidence about this procedure. For more detailed information on the evidence, see the [overview](#).

2.3 Efficacy

- 2.3.1 A case series of 100 patients with inoperable colorectal lung metastases reported median overall survival and overall 5-year survival after RFA treatment of 36 months and 30% respectively. A systematic review of 46 studies including a total of 1584 patients reported a mean overall survival rate of 59% over a mean follow-up period of 18 months.
- 2.3.2 Another case series of 100 patients reported median overall survival of 27 months for patients with primary lung cancer, 33 months for patients with recurrent lung cancer and 18 months for patients with metastatic disease.
- 2.3.3 A case series of 153 patients reported that the median time to progression (assessed by follow-up CT scans and also positron-emission tomography scans in selected patients) for tumours of 3 cm or smaller was 45 months, with 1-, 3- and 5-year local tumour progression-free rates of 83%, 57% and 47% respectively. Median time to progression for larger tumours was 12 months, with 1-, 3- and 5-year progression-free rates of 45%, 25% and 25% respectively. A case series of 78 patients with colorectal lung metastases reported 1-, 3- and 5-year overall progression rates (assessed by CT) of 10%, 21% and 21% respectively.
- 2.3.4 In a case series of 106 patients, there was no significant difference

between quality of life at baseline and at 12 months after RFA, using the Functional Assessment of Cancer Therapy – Lung and Short-Form 12 questionnaires.

- 2.3.5 The Specialist Advisers listed key efficacy outcomes as symptomatic improvement, quality of life, local tumour control, progression-free survival, overall survival, respiratory morbidity and the need for repeat interventions.

2.4 Safety

- 2.4.1 Four procedure-related deaths within 30 days were reported in the case series of 153 patients, 2 of which were in single-lung patients. The causes of death were haemorrhage into the pleural space; exacerbation of underlying pulmonary fibrosis; congestive heart failure; and respiratory arrest while undergoing conscious sedation. Two deaths were reported in a case series of 137 patients: 1 from intractable pneumothorax and pneumonia at 53 days, the other from massive haemoptysis 28 days after RFA. Two deaths resulting from interstitial pneumonia were reported in a case series of 130 patients (timing of events not stated). One case series of 100 patients reported no treatment-related mortality.
- 2.4.2 Pneumothorax requiring chest tube insertion was reported in less than 10% of patients in 4 centres and in 10–30% of patients in 3 centres in a case series of 493 RFA procedures performed. In 5 further case series, rates of pneumothorax requiring chest tube drainage ranged from 10% (18/183) to 20% (27/137).
- 2.4.3 Pleural effusion requiring drainage was reported in less than 10% of patients in 6 centres and more than 30% in 1 centre in the case series of 493 RFA procedures. In 3 further case series, rates of pleural effusion requiring drainage were 2% (4/211), 3% (4/137) and 3% (3/100).
- 2.4.4 The Specialist Advisers considered theoretical adverse events to include abscess, infection, pulmonary embolism, pain, damage to other intrathoracic structures, postprocedure mortality and death from interstitial pneumonitis.

3 Further information

3.1 For related NICE guidance see our [website](#).

Information for patients

NICE has produced [information on this procedure for patients and carers](#) ('Understanding NICE guidance'). It explains the nature of the procedure and the guidance issued by NICE, and has been written with patient consent in mind.

4 About this guidance

NICE interventional procedure guidance makes recommendations on the safety and efficacy of the procedure. It does not cover whether or not the NHS should fund a procedure. Funding decisions are taken by local NHS bodies after considering the clinical effectiveness of the procedure and whether it represents value for money for the NHS. It is for healthcare professionals and people using the NHS in England, Wales, Scotland and Northern Ireland, and is endorsed by Healthcare Improvement Scotland for implementation by NHSScotland.

This guidance was developed using the NICE [interventional procedure guidance](#) process.

It updates and replaces NICE interventional procedure guidance 185.

It has been incorporated into the [NICE pathway on colorectal cancer](#), along with other related guidance and products.

We have produced a [summary of this guidance for patients and carers](#). Information about the evidence it is based on is also [available](#).

Changes since publication

2 January 2012: minor maintenance.

Your responsibility

This guidance represents the views of NICE and was arrived at after careful consideration

of the available evidence. Healthcare professionals are expected to take it fully into account when exercising their clinical judgement. This guidance does not, however, override the individual responsibility of healthcare professionals to make appropriate decisions in the circumstances of the individual patient, in consultation with the patient and/or guardian or carer.

Implementation of this guidance is the responsibility of local commissioners and/or providers. Commissioners and providers are reminded that it is their responsibility to implement the guidance, in their local context, in light of their duties to avoid unlawful discrimination and to have regard to promoting equality of opportunity. Nothing in this guidance should be interpreted in a way which would be inconsistent with compliance with those duties.

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Endorsing organisation

This guidance has been endorsed by [Healthcare Improvement Scotland](#).

Accreditation

