

Percutaneous radiofrequency ablation for primary and secondary lung cancers

1 Guidance

- 1.1 Current evidence on the safety and efficacy of percutaneous radiofrequency ablation for primary and secondary lung cancers shows that there are no major safety concerns with this procedure. There is evidence that the treatment can reduce tumour bulk; however, this evidence is limited and is based on heterogeneous indications for treatment. The procedure should therefore be used only with special arrangements for consent, audit and clinical governance.
- 1.2 Clinicians wishing to undertake percutaneous radiofrequency ablation for primary and secondary lung cancers should take the following actions.
- Inform the clinical governance leads in their Trusts.
 - Ensure that patients understand the uncertainty about the procedure's safety and efficacy and provide them with clear written information. In addition, use of the Institute's information for patients ('Understanding NICE guidance') is recommended (available from www.nice.org.uk/IPG185publicinfo).
 - Audit and review clinical outcomes of all patients undergoing percutaneous radiofrequency ablation for primary and secondary lung cancers.
- 1.3 Patient selection should be carried out in the context of a multidisciplinary team, usually including a thoracic surgeon, an oncologist and a radiologist. This procedure should be used in patients for whom surgery is inappropriate or who are unwilling to undergo surgery.
- 1.4 Further research will be useful in relation to survival and quality-of-life outcomes, and in establishing the potential role of this procedure as either curative or palliative treatment.

2 The procedure

2.1 Indications

- 2.1.1 Both primary lung cancer and metastatic lung disease are common. The stage of the disease is the most important prognostic factor; however, the overall prognosis for patients with lung cancer is poor.
- 2.1.2 Percutaneous radiofrequency ablation may be used in patients with small early stage lung cancer for whom surgery is not appropriate or who do not wish to undergo conventional surgery, and for patients with a small number of lung metastases.
- 2.1.3 The treatment of lung cancer depends mainly on the histology of the tumour and disease stage, and may involve surgery, chemotherapy, radiotherapy or their combination. Interventional bronchoscopic treatments for the management of malignant endotracheal or endobronchial obstructions include diathermy, laser therapy, cryotherapy, brachytherapy and photodynamic therapy.

2.2 Outline of the procedure

- 2.2.1 A small needle electrode is inserted through the skin directly into the tumour, usually under computed tomography (CT) guidance. Radiofrequency energy is passed through the electrode, producing heat which destroys the tumour tissue. The procedure can be performed under local, regional or general anaesthesia, and can be used alone or in combination with surgery, radiotherapy or chemotherapy. It can be repeated if required.

2.3 Efficacy

- 2.3.1 In six case series, complete tumour response rates (assessed by CT scan) varied from 38% (12/32) to 98% (44/45) of primary or metastatic lung tumours. In general, tumour response rates were higher for smaller tumours (usually defined as ≤ 3 cm in diameter) than for larger tumours.

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This guidance is written in the following context

This guidance represents the view of the Institute which 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.

Interventional procedures guidance is for healthcare professionals and people using the NHS in England, Wales, Scotland and Northern Ireland.

This guidance is endorsed by NHS QIS for implementation by NHSScotland.

2.3.2 In a case series of 31 patients with 54 tumours (13 primary, 41 metastatic), no significant difference in complete tumour response rates was found between primary (46%) and metastatic (63%) tumours. In this study, 1-year survival was 85%. Survival by tumour type was 89% for primary tumours and 84% for metastatic tumours. Survival by tumour size was 94% for tumours 3 cm or less in diameter and 74% for tumours larger than 3 cm.

2.3.3 One study assessed quality of life in 20 patients with lung metastases. Physical and mental summary scores were significantly worse 1 month after the procedure ($p < 0.001$ and $p = 0.047$, respectively). At 12 months, physical functioning, but not other domains, continued to be significantly worse when compared with baseline. Whether these findings could be attributed to the radiofrequency ablation rather than to administration of other treatments and/or the disease progression itself is uncertain. For more details, refer to the 'Sources of evidence' section.

2.3.4 The Specialist Advisers stated that the long-term efficacy of the procedure is unknown.

2.4 Safety

2.4.1 Pneumothorax, not requiring chest drain insertion, was the most frequently reported complication, reported in 9% (3/33) to 65% (13/20) of all patients. The proportion of patients requiring chest drain insertion ranged from 3% (1/30) to 16% (5/31). In one case series, subcutaneous emphysema was reported in 10% (3/30) of patients.

2.4.2 In two case series, haemothorax was reported in 2% (1/54 treatments and 1/50 patients). Painful pleural effusion was reported in 4% (2/54) of treatment sessions in one study, while asymptomatic pleural effusion ranged from 9% (3/33) of patients to 27% (12/45) of treatment sessions in four case series.

2.4.3 Other reported complications included haemoptysis, fever, chest pain, cough/haemoptysis/expectoration of necrotic lung tissue, pneumonia, lung abscess, skin burn at the site of probe insertion, hoarseness, myalgia and dyspnoea. There were no reports of procedure-related deaths in the eight case series reviewed.

2.4.4 In an international survey of seven centres reporting on 493 procedures, minor complications not requiring intervention and large pneumothorax

requiring insertion of a chest drain were each reported to occur in up to 30% of procedures. Pleural effusion requiring aspiration was reported in fewer than 10% of procedures. Two patients (0.4%) died among the 493 procedures reported, although the causes of death were not stated in the publication. For more details, refer to the 'Sources of evidence' section.

2.4.5 The Specialist Advisers stated that the procedure is relatively safe. Pneumothorax is common, but often does not require intervention. Theoretical adverse events include bronchopulmonary fistula, arteriovenous fistula and seeding of the tumour.

2.5 Other comments

2.5.1 It was noted that most studies did not report outcomes separately for primary and secondary tumours. Information about whether the procedure was employed with curative or palliative intent was also limited.

3 Further information

3.1.1 The Institute has issued guidance on photodynamic therapy for advanced bronchial carcinoma (www.nice.org.uk/IPG087) and cryosurgery for malignant endobronchial obstruction (www.nice.org.uk/IPG142).

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'Understanding NICE guidance'

NICE has produced information describing its guidance on this procedure for patients and carers ('Understanding NICE guidance'). It explains the nature of the procedure and the decision made, and has been written with patient consent in mind. This information is available from www.nice.org.uk/IPG185publicinfo

Sources of evidence

The evidence considered by the Interventional Procedures Advisory Committee is described in the following document.

'Interventional procedure overview of percutaneous radiofrequency ablation for primary and secondary lung cancers', January 2006.

Available from: www.nice.org.uk/IP316overview

Ordering information

Copies of this guidance can be obtained from the NHS Response Line by telephoning 0870 1555 455 and quoting reference number N1084. 'Understanding NICE guidance' can be obtained by quoting reference number N1085.

The distribution list for this guidance is available at www.nice.org.uk/IPG185distributionlist

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Interventional procedure guidance makes recommendations on the safety and efficacy of a procedure. The guidance does not cover whether or not the NHS should fund a procedure. Decisions about funding are taken by local NHS bodies (primary care trusts and hospital trusts) after considering the clinical effectiveness of the procedure and whether it represents value for money for the NHS.

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