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Information for the public

National Institute for Health and Clinical Excellence

Treating lung cancer using non-thermal high-energy pulses of electricity

NICE 'HealthTech guidance' advises the NHS on when and how new procedures can be used in clinical practice.

This document is about when and how non-thermal high-energy pulses of electricity can be used in the NHS to treat people with lung cancer. It explains guidance (advice) from NICE (the National Institute for Health and Clinical Excellence).

This HealthTech guidance makes recommendations on the safety of a procedure and how well it works. An interventional procedure is a test, treatment or surgery that involves a cut or puncture of the skin, or an endoscope to look inside the body, or energy sources such as X-rays, heat or ultrasound. 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 how well the procedure works and whether it represents value for money for the NHS.

NICE has produced this guidance because the procedure is quite new. This means that there is not a lot of information yet about how well it works, how safe it is and which patients will benefit most from it.

This document is written to help people who have been offered this procedure to decide whether to agree (consent) to it or not. It does not describe lung cancer or the procedure in detail – a member of your healthcare team should give you full information and advice about these. The document includes some questions you may want to ask your doctor to help you reach a decision. Some sources of further information and support are on page 7.

What has NICE said?

Currently there is not enough evidence to be certain about how well this procedure works or how safe it is. For this reason, NICE has said that this procedure should only be carried out as part of a research study. The research should look at how well the procedure works to prevent the lung tumour growing again, and patient survival after the procedure.

Other comments from NICE

NICE noted that most of the evidence included patients with different tumour types and only a few had cancer in the lungs. NICE said that more evidence is needed about whether this procedure causes less damage to tissue near to the tumour (for example major blood vessels) than other types of treatment.

Treating lung cancer using non-thermal high-energy pulses of electricity

Your healthcare team should talk to you about what treatment options are available.

The medical name for this procedure is 'irreversible electroporation for treating primary lung cancer and metastases in the lung'.

The procedure is not described in detail here – please talk to your specialist for a full description.

Cancer that starts in the lungs is called primary lung cancer. When cancer has spread from other parts of the body to the lung the tumours are called lung metastases. Treatment depends on the type of tumour and the stage of the disease.

Treatments include surgery to cut away the cancerous parts of the lung, chemotherapy, radiotherapy, photodynamic therapy (using a

light-activated drug with a laser to destroy the cancer cells), or using heat to kill the cancer cells, or a combination of these.

The aim of this procedure (irreversible electroporation, or IRE for short) is to destroy cancer cells using short, repetitive, non-thermal high-energy pulses of electricity. It is claimed that this allows cancer cells to be destroyed with less damage to nearby healthy tissue, such as major blood vessels, than other types of treatment.

Before starting the procedure the patient is given a general anaesthetic and a drug to prevent muscle contractions. Special needles are then inserted through the skin in and around the tumour. Sometimes open or keyhole surgery is used instead. Short pulses of electricity fire between the needles for several minutes. The needles may then be moved and the process repeated until the whole tumour and a small area of surrounding tissue is treated. To avoid the electrical pulses causing problems with the patient's heartbeat, a process called cardiac synchronisation should be used. This is when the heart is monitored using ECG (electrocardiography) so that the pulse of electricity is given during the heart's resting period (the period between heartbeats when it is least affected by shocks).

What does this mean for me?

Your doctor can only offer you this procedure as part of a research study.

NICE has recommended that some details should be collected about every patient who has this procedure in the UK. Your doctor may ask you if details of your procedure can be used in this way and will give you more information about this.

You may want to ask the questions below

- What does the procedure involve?
- What are the benefits I might get?
- How good are my chances of getting those benefits? Could having the procedure make me feel worse?
- Are there alternative procedures?
- What are the risks of the procedure?
- Are the risks minor or serious? How likely are they to happen?
- What care will I need after the procedure?
- What happens if something goes wrong?
- What may happen if I don't have the procedure?

Summary of possible benefits and risks

Some of the benefits and risks seen in the studies considered by NICE are briefly described below. NICE looked at 2 studies and 1 case study on this procedure.

How well does the procedure work?

A study of 38 patients with various types of tumours looked at how well the procedure worked. None of the 4 patients with lung cancer had a successful response to treatment and after 3 months the disease had progressed in all 4 patients.

A report of 2 patients with lung tumours found that the disease had got worse at 2 months after treatment in 1 patient and at 6 months after treatment in the other patient.

As well as looking at these studies, NICE also asked expert advisers for their views. They said that the main things that need to be measured to decide if the procedure is successful are patient survival, whether tumours were stopped from growing, if, or how long it is before, the tumour(s) come back, improvement in quality of life and reduction in symptoms.

Risks and possible problems

Two studies of patients with various types of tumours reported problems with patients' heartbeat during the procedure. In the first study, this happened in 6 of 38 patients (only 2 of the 6 had cardiac synchronisation). One patient needed to be treated with an electric shock to restore the heart's rhythm but the others got better on their own. In the second study, of 21 patients, patients had irregular heartbeats during 2 out of 3 procedures for lung cancer.

In a study of 45 patients, air leaked from the lung into the lung cavity causing lung collapse in 7 out of 50 treatments. In 2 other studies with a

total of 59 patients, 4 out of the 7 patients with lung cancer developed a collapsed lung. This re-inflated on its own in 1 of the patients.

In a report of 2 patients, 1 patient had bleeding in the lungs when having the procedure.

As well as looking at these studies, NICE also asked expert advisers for their views. They said that a possible problem is a severe bacterial infection. In theory, other problems could include malignant tumour cells breaking off and growing where the needles were inserted, an abnormal channel (a fistula) opening between the lung and the space surrounding the lung, dead tissue being left behind, and scarring of the lungs.

More information about lung cancer

NHS Choices (www.nhs.uk) may be a good place to find out more.

For details of all NICE guidance on lung cancer, visit our website at www.nice.org.uk

About NICE

NICE produces guidance (advice) for the NHS about preventing, diagnosing and treating different medical conditions. The guidance is written by independent experts including healthcare professionals and people representing patients and carers. They consider how well an interventional procedure works and how safe it is, and ask the opinions of expert advisers. HealthTech guidance applies to the whole of the NHS in England, Wales, Scotland and Northern Ireland. Staff working in the NHS are expected to follow this guidance.

To find out more about NICE, its work and how it reaches decisions, see www.nice.org.uk/aboutguidance

This document is about 'irreversible electroporation for treating primary lung cancer and metastases in the lung'. This document and the full guidance aimed at healthcare professionals are available at guidance.nice.org.uk/HTG302

The NICE website has a screen reader service called Browsealoud, which allows you to listen to our guidance. Click on Accessibility at the bottom of the NICE homepage to use this service.

We encourage voluntary organisations, NHS organisations and clinicians to use text from this document in their own information about this procedure.

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