

Ultrasound-enhanced, catheter-directed thrombolysis for pulmonary embolism

Information for the public

Published: 26 June 2015

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What has NICE said?

The procedure raises no major safety concerns but there is not much good evidence about how well it works compared with catheter-directed thrombolysis without ultrasound. It should only be used if extra steps are put in place to record and review what happens.

More research on this procedure is needed and NICE may look at it again if more evidence is published.

What does this mean for me?

Your health professional should fully explain what is involved in having this procedure and discuss the possible benefits and risks with you. In particular, they should explain the uncertainty about the evidence on how likely it is to improve your symptoms. You should also be told how to find more information about the procedure. You should only be asked if

you want this procedure after having this discussion. Your health professional should ask you if details of your procedure can be collected.

NICE also noted that this procedure could reduce the dose of thrombolytic drug and the treatment time, compared with catheter-directed thrombolysis alone.

The condition

A pulmonary embolism is a blockage in the pulmonary artery, which is the blood vessel that carries blood from the heart to the lungs. The blockage is usually caused by a blood clot that has come loose and travelled from one of the deep veins in the leg, thigh, pelvis or arm.

Symptoms of pulmonary embolism can include chest pain, shortness of breath, and coughing up blood. Severe pulmonary embolism can be life-threatening. Some people are at risk of developing pulmonary embolism, for example after surgery or if they can't move.

The usual treatments for pulmonary embolism are anticoagulant drugs (usually warfarin or heparin), which thin the blood to stop it clotting further. There are also methods that physically break up the clot (mechanical thrombectomy) or dissolve the clot with drugs (catheter-directed thrombolysis) using a tube inserted into the blocked artery. Thrombolysis carries a risk of serious complications. If pulmonary embolism is life-threatening, the clot may be removed surgically.

NICE has looked at using [ultrasound-enhanced, catheter-directed thrombolysis](#) as another treatment option.

NHS Choices (www.nhs.uk) and NICE's information for the public about [venous thromboembolic diseases](#) may be a good place to find out more.

The procedure

Ultrasound-enhanced, catheter-directed thrombolysis is done using local anaesthesia. Ultrasound waves and a drug are used to break up the clot. The purpose of the ultrasound waves is to help the drug penetrate into the clot. Before and during the procedure heparin (an anticoagulant drug) is given.

A small tube (catheter) inserted through one of the blood vessels (usually at the top of the leg) into the blood clot delivers the drug. A small wire inside the tube delivers ultrasound waves to the clot. Imaging techniques such as X-rays are used to make sure that the treatment is delivered to the correct place. Treatment usually lasts for about 12–24 hours. During this time the patient is continually monitored. More imaging is done at regular intervals to check progress before treatment is stopped and standard anticoagulation therapy is started.

Benefits and risks

When NICE looked at the evidence, it decided that there was not enough evidence to know how well this procedure works. The 9 studies that NICE looked at involved a total of 272 patients.

Generally, the studies showed the following benefits after the procedure compared with catheter-directed thrombolysis without ultrasound:

- complete or partial clearance of blood clots in most patients
- reduced treatment time
- improvements in heart function
- improvements in blood pressure in the pulmonary artery
- most people (19 out of 22) with the most serious types of pulmonary embolism were still alive 180 days after treatment.

The studies showed that the risks of the procedure were:

- One person had acute kidney failure and their heart stopped beating; this person later recovered.
- In 7 people there was a lot of bleeding; 5 of these needed a blood transfusion. There was a small amount of bleeding in 21 people.
- Within 3 months of the procedure 7 people died; these deaths were mainly in people with severe pulmonary embolism who also had other serious illnesses.

If you want to know more about the studies, see the [guidance](#). Ask your health

professional to explain anything you don't understand.

Questions to ask your health professional

- 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?

About this information

NICE [interventional procedures guidance](#) advises the NHS on the safety of a procedure and how well it works.

ISBN: 978-1-4731-1243-8

Accreditation

