

Treating pectus excavatum using a curved metal bar inserted behind the breast bone (MIRPE or Nuss procedure)

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

This leaflet is about when and how minimally invasive repair of pectus excavatum (MIRPE; also known as the Nuss procedure) can be used in the NHS to treat people with pectus excavatum. 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 leaflet is written to help people who have been offered this procedure, and/or their carers, to decide whether to agree (consent) to it or not. It does not describe pectus excavatum or the procedure in detail – a member of your healthcare team should also give you full information and advice about these. The leaflet includes some questions you may want to ask your doctor to help you reach a decision.

What has NICE said?

This procedure can be offered routinely as a treatment option for people with pectus excavatum provided that doctors are sure that:

- the patient understands what is involved and agrees to the treatment, and
- the results of the procedure are monitored.

NICE has also said this procedure should only be carried out by surgeons with special training and experience in operating on the heart and chest, and in the Nuss procedure, and they should initially carry it out with another experienced doctor. The procedure should be carried out in a centre able to deal with heart and lung injuries.

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This procedure may not be the only possible treatment for pectus excavatum.

Your healthcare team should talk to you about whether it is suitable for you and about any other treatment options available.

The medical name for this procedure is 'placement of pectus bar for pectus excavatum (also known as MIRPE or the Nuss procedure)'.

Pectus bar is the medical name for the curved steel bar used in the procedure.

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

People with pectus excavatum have an abnormally shaped chest, so the breastbone (sternum) and several ribs sink inwards. Appearance is the main problem but it may sometimes affect how the heart or lungs work.

Pectus excavatum can be corrected surgically using an operation called the Ravitch procedure, in which the chest is cut open to fix the breastbone into the correct position.

The Nuss procedure is intended to be less invasive. A curved steel bar is inserted between cuts in either side of the chest so that it lies behind the breastbone, with the curve facing backwards. The bar is then turned so the curve faces forwards, pushing out the breastbone so it looks more normal. Sometimes two bars are used. The procedure is usually carried out in children and young adults.

What does this mean for me?

NICE has said that this procedure is safe enough and works well enough for use in the NHS. If your doctor thinks the Nuss procedure is a suitable treatment option for you, he or she should still make sure you understand the benefits and risks before asking you to agree to it.

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 operation?
- What happens if something goes wrong?
- What may happen if I don't have the procedure?

You might decide to have this procedure, to have a different procedure, or not to have a procedure at all.

Summary of possible benefits and risks

Some of the benefits and risks seen in the studies considered by NICE are briefly described here. NICE looked at 10 studies on this procedure.

How well does the procedure work?

A study of 260 patients scored how patients felt about their appearance before and after the procedure on a scale of 1 to 10 (the highest number was 10, denoting a 'perfect' appearance). The average score before the procedure was 3.1 in 109 patients. After the procedure, the average score was 8.4 in 119 patients. On average, 45 patients in a survey said they were satisfied with their appearance 4.5 years after the procedure and that they had better self-esteem.

In a study of 947 patients, 83% of 521 patients who had the bar removed and whose progress was checked after 2 years had an 'excellent' result in terms of how they looked; 12% had a 'good' result and 2% had a 'fair' result. In 2% the pectus excavatum came back.

Quality of life after an average of 16 months was no different between patients in a study of 43 who had either the Nuss procedure or the Ravitch procedure.

As well as looking at these studies, NICE also asked expert advisers for their views. These advisers are clinical specialists in this field of medicine. They said that the main success factors are how the patients look and how satisfied they are with the result.

Risks and possible problems

In two studies involving 339 patients, both reported that 1 patient had a tear in the liver during surgery. In two studies involving 489 patients, both reported that 1 patient had a tear in the heart during surgery. In one study, all 4 patients had an injury to the heart during the procedure and 1 died as a result. In a study of 167 patients, the muscles between

the ribs tore in 15 older patients; 10 patients had blood or blood and air in the chest cavity; and 7 had small tears in the sac around the heart. In five studies involving a total of 1589 patients, 419 had a collapsed lung. In three studies involving 1162 patients, 13 developed pneumonia and in 16 fluid collected in the chest cavity. In the study of 260 patients, 1 had a persistent air leak and 1 had a collapsed lung.

Heart problems included fluid collecting in the sac around the heart. In three studies involving a total of 754 patients, this happened in 10. In another study, 6 out of 668 patients had inflamed heart tissues. In three studies involving 1157 patients, 64 needed another operation because the bar had moved out of place. In a study of 863 patients, 19 were allergic to the metal.

As well as looking at these studies, NICE also asked expert advisers for their views. These advisers are clinical specialists in this field of medicine. They said that the main things that can go wrong are injury to the lungs, heart, liver or an artery in the chest; inflammation of the heart tissues; fluid collecting in the sac around the heart or in the chest cavity; the bar moving; air or blood in the chest cavity; infection; bone disorders; pain; metal allergy; and complications with the anaesthetic.

More information about pectus excavatum

Your local patient advice and liaison service (usually known as PALS) may also be able to give you further information and support.

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. This 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 leaflet is about 'placement of pectus bar for pectus excavatum (also known as MIRPE or the Nuss procedure)'. This leaflet and the full guidance aimed at healthcare professionals are available at www.nice.org.uk/HTG199

You can order printed copies of this leaflet from NICE publications (phone 0845 003 7783 or email publications@nice.org.uk and quote reference N1970). The NICE website has a screen reader service called Browsealoud, which allows you to listen to our guidance. Click on the Browsealoud logo on the NICE website to use this service.

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

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