

Extracorporeal membrane oxygenation (ECMO) for acute heart failure in adults

Information for the public

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What has NICE said?

There is good evidence about how well ECMO works but it isn't clear who would most benefit from it. There is also a high risk of serious complications. So this procedure should only be used if extra care is taken to explain the risks, and extra steps are put in place to record and review what happens.

NICE is asking health professionals to send information about everyone who has ECMO and what happens to them afterwards to a database at the international Extracorporeal Life Support Organization, so that the safety of the procedure and how well it works can be checked over time.

More research on this procedure is needed.

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 and on possible side effects. You should also be told how to find more information about ECMO. You should only be asked if you want to agree to this procedure after having this discussion.

Your health professional should ask you if details of your procedure can be collected.

Other comments from NICE

NICE said that it was difficult to decide who would most benefit from this procedure because the evidence was from patients with different conditions. It also said that ECMO was only suitable for short-term support so, before starting ECMO, health professionals would need to have a plan in place for how to support the patient afterwards.

NICE was told that the procedure should only be used for patients whose condition would not get better with other treatments, and whose [acute heart failure](#) is likely to recover, or if there was a clear plan for what would happen afterwards – for example, a heart transplant. NICE was also told that ECMO may need to be withdrawn from patients whose heart failure is not likely to recover or who cannot have more treatment.

In an emergency, healthcare professionals may give treatment immediately, without obtaining your informed consent, when it is in your best interests.

Your healthcare team

This procedure should only be done by a team of health professionals with special expertise and training in carrying out [ECMO](#) for [acute heart failure](#) in adults.

The condition

Heart failure means the heart does not pump enough blood to meet all the needs of the body, usually because the heart muscle has been damaged. Symptoms include

breathlessness due to fluid building up in your lungs, swollen legs, difficulty doing exercise, tiredness and feeling generally unwell. Acute heart failure is when the symptoms develop very quickly. Treatment usually involves a combination of drugs, devices (such as a [pacemaker](#)), a [left ventricular assist device](#) or surgery to help the heart pump properly.

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

NICE has looked at using [ECMO](#) as another treatment option. Click on to the next page to find out more.

The procedure

ECMO stands for extracorporeal membrane oxygenation. The ECMO machine is very similar to a [heart–lung machine](#). An artificial lung (the membrane) oxygenates the blood outside the body (extracorporeally). A tube (cannula) is normally inserted into the right upper chamber of the heart or major vein in the neck or groin. This allows blood to divert into the ECMO machine, which removes carbon dioxide and then adds oxygen to it. The blood is then returned to the patient through another tube into the major artery going to the left side of the heart or major vein in the groin. A drug is given to stop the blood from clotting.

ECMO for [acute heart failure](#) in adults can be used after heart surgery to provide temporary support while they are moved from a heart–lung machine to a mechanical ventilator. It can also be used to support patients with severe heart failure during recovery, after a heart transplant or when having a [left ventricular assist device](#) implanted. If patients have kidney problems, the system can be adapted with a special filter so that it also removes waste products from the blood.

Benefits and risks

When NICE looked at the evidence, it decided that there was enough evidence to show that the procedure works, but that it was not clear who will get the most benefit from it. This is because the patients in the studies had a range of different conditions. There was also evidence of a high risk of serious complications. The 12 studies that NICE looked at involved a total of 9097 patients.

Generally, the results showed the procedure helped patients recover or go on to further

treatment, sometimes a heart transplant. The survival rate in hospital in seriously ill patients who had the procedure was between 24% and 59%. In 1 small study, quality of life seemed to be improved significantly around a year after the procedure.

The studies showed that the some patients having ECMO had the following complications:

- bleeding within the skull
- major bleeding elsewhere in the body, sometimes needing another operation
- stroke
- arteries or veins being damaged
- feet or legs having to be amputated
- complications because of muscle swelling in the leg caused by reduced blood flow (known as compartment syndrome), which sometimes needed an operation to relieve the swelling
- poor blood flow in the feet or legs, which sometimes needed an operation
- blood clots
- infection
- pneumonia
- the ECMO device not working properly
- nerve damage in the neck or arm.

Fifty-two patients died during the procedure in a study of 131. According to this study, in 'most cases' this was because of multiple organ failure or severe bacterial infection (sepsis). In another study of 219, 167 patients died within 30 days of having the procedure – the main cause of death was heart failure. One patient in another study, whose spinal nerves were injured when ECMO equipment was inserted, died 55 days later from a variety of complications.

NICE was also told about some other possible risks: brain or nervous system problems because of lack of oxygen flow, bleeding in the chest, blood clots in the heart, and damage to the lungs.

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?

Medical terms explained

Heart-lung machine

Also known as cardiopulmonary bypass, this device temporarily takes over from your heart and lungs during surgery, keeping oxygen and blood flowing through your body.

Left ventricular assist device

Sometimes shortened to LVAD, this is a mechanical device that helps the heart to pump blood around your body.

Pacemaker

A small device that is implanted into the chest which sends regular electrical pulses to keep your heart beating regularly.

About this information

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

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Accreditation

