

Machine perfusion of donor livers: Normothermic perfusion and hypothermic oxygenated perfusion

Information for
patients



This leaflet will tell you about a different way of storing livers ready for liver transplant.

We will explain how the machine will preserve the liver, and the risks and benefits with these methods. If you have any questions after you have read this leaflet, please get in contact with the liver transplant co-ordinators.

How to contact us

Please see page 10 for contact details.

Introduction

Liver transplantation is a highly successful form of treatment for end-stage liver disease. Usually, the donor liver would be stored in ice, also known as cold storage, from the moment the liver is removed from the donor until the time it is put into the recipient. In recent years two alternatives to cold storage have been developed.

Hypothermic Oxygenated Perfusion (HOPE)

The liver is placed onto a machine, prior to being transplanted into the recipient, that keeps it cold (around 12°C). A special fluid and oxygen is circulated through the liver whilst the transplant operation is started.

Normothermic Machine Perfusion (NMP)

The liver is placed onto a machine and stored at body temperature (around 37°C). While it is on the machine, blood, oxygen and some medication is pumped around the liver. While the liver is on the machine, some tests can be done to see how well it will work once it has been put into the recipient.

Liver Assist™ machine



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In Leeds, both NMP and HOPE can be done by the same machine. This machine is called the Liver Assist™ machine. It is made by a company called XVIVO.

Why have I received this information leaflet

You may be offered a liver that requires machine perfusion. This will be decided by the surgeon when the liver is retrieved.

We will let you know, when we call you for the potential transplant if we are planning to use either NMP or HOPE for your donor liver.

What does the Liver Assist™ machine do?

This machine has two jobs. The first job is to 'recharge' the liver cells and help to improve how well a liver will work after it has been transplanted.

It may also reduce the risk of some complications that can occur after the transplant, such as damage to the tubes coming from the liver (called *bile ducts*).

The second job is to help the surgeon decide if the liver will work once it has been transplanted into a recipient.

Sometimes we cannot carry out the transplant immediately. This machine can help keep the liver in a good condition for longer periods of time. The liver can be used up to 24 hours after it has been removed from the donor. This would mean we could transplant more livers in Leeds.

What are the benefits of putting a liver on the machine?

There are different benefits of HOPE and NMP.

HOPE

Helps the liver cells to 'recharge' (like a battery!).

A lot of research studies have been carried out and they show that there is a lower risk of some complications that can affect the bile ducts, especially for patients who receive a liver from a donor who died from circulatory death (DCD).

NMP

Some livers come from donors that may have some medical issues that could affect how well the liver may work when it is put into a recipient. NMP can help the surgeon decide if the liver will work when it is transplanted. Using NMP can also improve how well the liver may work when it is transplanted.

Sometimes a liver may be too high risk to use if it was to be kept in cold storage alone, but it may be safe to use if it is preserved on NMP before it is transplanted.

What are the risks involved?

Liver transplant is a major operation and comes with several serious and less serious complications, which will be discussed with you by the liver transplant co-ordinators and doctors looking after you.

Many of the risks are the same for livers that are preserved on the machine and in cold storage.

The Liver Assist™ has been well tested and shown to be safe to use for liver transplant.

The tubing is either filled with a special preservation fluid or blood. This fluid and blood is treated so it is free of bugs and viruses. There is no increased risk of picking up HIV or Hepatitis.

There is a small risk that the machine could stop working because of a technical problem, such as a power or battery issue, or because there is a problem with the tubes connected to the liver.

If the problem was serious enough that we are worried the liver is not suitable for transplant, we would cancel the operation and tell you straight away.

Even if the liver looks good on the machine, it is still possible that it may not work when it is put into a recipient. If this is the case, we would consider putting you on the emergency transplant list (called the **Super Urgent list**) in the same way as we would do for a liver in cold storage.

Do I have to accept a liver preserved on machine perfusion and what will happen if I choose not to?

No. You do not have to agree to have a liver that is placed on the machine. This may be discussed with you when you are first called in. If you decide not to accept a liver on the machine, the surgeon will decide if it is safe to go ahead with the transplant without the machine.

If it is, we will go ahead. If the surgeon doesn't think it is safe to go ahead, we would choose a different patient, and we will explain this to you, and we wouldn't bring you in to hospital.

You would remain active on the liver transplant list, and you wouldn't lose your place at all. We may arrange to talk to you about the machine in case we can answer your questions and worries about using the machine in the future.

What happens now?

If you have any questions or worries about machine perfusion, you can discuss them with the liver transplant co-ordinators or the liver doctors looking after you.

If you decide to go ahead with a liver on the machine, you will be asked to sign a consent form to confirm that you understand this information sheet, and you agree to the use of the machine. You will be given a copy of the signed consent form to keep. You may be asked to sign the form at the time you go on to the liver transplant waiting list, or when you are called in for a liver transplant.

You can decide to change your mind at any time before you are put to sleep for the operation, and you do not need to give a reason for changing your mind. This will not affect your medical care in any other way, or your relationship with the medical and nursing staff looking after you.

Deciding not to accept a liver on the machine will not affect your position on the waiting list and your chances of receiving a liver in the future.

You will **not** need any extra scans or blood tests if you receive a liver on the machine, and you will have the same clinic appointments as a patient who doesn't have a machine perfused liver.

How will information about me be stored?

Your clinical data will be kept confidential, in line with the Trust guidelines, and shared only with staff directly involved in your care. Clinical data and blood samples taken from the donor liver, while on machine perfusion may be stored for research purposes. This data is stored using a number allocated to the donor by NHS Blood & Transplant, and it is stored separately to your medical records.

We will share information regarding your transplant with your general practitioner (GP), including information regarding the machine perfusion that we may have used for your donor liver.

Glossary

Bile ducts

Tubes connecting your liver to your bowel. These tubes carry bile from the liver to the bowel to break down fatty foods that you have eaten.

Donor after Circulatory Death (DCD)

A donor where life support is stopped and the donor dies before being transferred to the operating theatre to have their organs removed.

Hypothermic

Below body temperature.

Normothermic

At body temperature.

Oxygenated

Containing Oxygen.

Perfusion

Pumping either a special fluid or blood around a liver that will be used for a liver transplant.

Super Urgent list

A special liver transplant list reserved for patients needing a liver transplant as an emergency. One reason to be added to the Super Urgent list would be if a liver didn't work after transplant. Patients on this list would be offered any suitable liver in the entire country first.

Contact us

If you have any questions or need more information, you should contact the liver transplant co-ordinators on:

Telephone number: **0113 206 6585**, or
email: **leedsth-tr.livertransplant@nhs.net**

If you have a problem, concern or complaint, please ring Leeds Patient Advice and Liaison Service (PALS) on
Telephone number: **0113 206 7168** (during working hours) or
Telephone number: **0113 206 6261** (out of hours), or
email: **patientexperience.leedsth@nhs.net**



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