

Blood transfusion

Introduction

A blood transfusion is a process that involves taking blood from one person (the donor) and giving it to someone else.

You may need a blood transfusion for a number of reasons, including:

to replace blood lost during major surgery, childbirth or a severe accident

to treat anaemia that has failed to respond to other treatments; anaemia is a condition where a person has low levels of red blood cells

to treat inherited blood disorders, such as thalassaemia or sickle cell anaemia

You have the right to refuse a blood transfusion, but you need to fully understand the consequences of this before doing so. Some medical treatments or operations can't be safely carried out without a blood transfusion being given.

The procedure

Blood is usually given through a plastic tube inserted into a vein in your arm. It can take between 30 minutes and four hours, depending on how much blood is needed.

Read more about how blood transfusion works.

Safety

There are rigorous regulations regarding blood donations and blood transfusions. The aim of the regulations is to minimise the risk of a

person being given blood contaminated with a virus, such as hepatitis C, or receiving blood from a blood group that's unsuitable for them.

Compared to other everyday risks, the likelihood of getting an infection from a blood transfusion is very low. All blood donors are unpaid volunteers. They're carefully selected and tested to make sure the blood they donate is as safe as possible.

You must be correctly identified to make sure you get the right blood transfusion. Wearing an identification band with your correct details is essential. You will be asked to state your full name and date of birth, and the details on your identification band will be checked before each bag of blood is given.

Read more about getting ready for a blood transfusion and the risks associated with blood transfusion.

What does blood do?

When a donor gives blood, special equipment is used to separate the donation into different blood components, including:

red blood cells, which transport oxygen around the body and are used to treat anaemia

platelets – these help to stop the bleeding when a person is cut or injured; platelet transfusions can be used to prevent excessive bleeding in certain groups of people, such as those who are having chemotherapy treatment (powerful medication to treat cancers)

plasma – a liquid that makes up most of the volume of blood; plasma contains many nutrients needed by the body's cells, as well as proteins that help the blood to clot if a patient is bleeding

white blood cells, which are used to fight infection

Why a blood transfusion is necessary

Importance of iron

Make sure you eat enough food containing iron, because a shortage of iron in the blood can cause anaemia. Correcting anaemia in good time before your operation or during pregnancy may reduce the need for a blood transfusion.

There are several different types of blood transfusion. Whether or not you need one depends on a number of factors.

These include:

your health

your medical history

the type of operation you're having

the seriousness of your condition

An average-sized adult has about five litres of blood in total. Small amounts of blood loss (up to 1.5 litres) can be replaced with a salt solution, which your body replaces with new red blood cells over the following weeks.

The different types of blood transfusions are described below.

Red blood cell transfusions

The main reason for a red blood cell transfusion is to treat anaemia. Anaemia occurs when the body doesn't have enough red, oxygen-carrying blood cells, which means the body's tissues and cells aren't getting enough oxygen.

Anaemia can develop as a result of severe blood loss, for example, as a complication during childbirth or as a result of injury or surgery. Anaemia can also be caused by:

health conditions in which red blood cells are produced at a reduced rate – for example, in anaemia due to lack of iron, vitamin B12 or folate,

and some types of cancers, such as acute myeloid leukaemia and lymphoma

health conditions that disrupt the normal production of red blood cells – such as sickle cell anaemia and thalassaemia

conditions or factors that lead to red blood cells being destroyed – for example, in some types of infections such as malaria, the use of certain medications, toxins such as alcohol or lead poisoning, or as a result of the immune system mistakenly attacking healthy red blood cells

If you're told that you might need a blood transfusion, you should ask why it's necessary and whether there are alternative treatments. You have the right to refuse a blood transfusion, but you need to fully understand the consequences of this before doing so. Some medical treatments or operations can't be safely carried out without the need for a blood transfusion.

Platelets

A platelet transfusion is used to treat people who have abnormally low levels of platelet cells in their blood. This is known as thrombocytopenia.

If you have thrombocytopenia, you're at risk of excessive bleeding, either through a minor accident, cut or graze, or as a result of surgery or dental work.

Causes of thrombocytopenia that may require treatment with a platelet transfusion include:

types of cancers, such as leukaemia or lymphoma

chemotherapy or bone marrow transplantation, which reduces the production of platelets

chronic liver disease or cirrhosis (scarring of the liver, which has many causes, including alcohol abuse)

sepsis or severe infection – this can cause abnormal clotting and low platelets

Plasma

Plasma is the fluid in the blood containing proteins that help the blood to clot. A transfusion of plasma may be needed if there's severe bleeding, such as after surgery, trauma or childbirth. A transfusion may also be needed in conditions (such as liver disease) that affect the production of clotting proteins.

Granulocytes

Granulocytes are a type of white blood cell that help fight infection. Granulocyte transfusions aren't commonly used but may be needed if there's a severe infection that's not responding to antibiotics after chemotherapy or bone marrow transplantation.

Surgical operations

Surgeons always try to carry out surgery in such a way that it minimises the amount of blood lost. In recent years, this has become easier due to the increasing use of keyhole surgery (laparoscopic surgery), where only small cuts are made in the body.

However, some types of surgical operations and procedures have a higher risk of blood loss, therefore a blood transfusion is more likely to be needed.

It may be possible to use a procedure called intra-operative cell salvage. It collects your blood that's lost during the surgery, and it can be returned back to you. Ask your doctor or nurse if intra-operative cell salvage is appropriate for the type of surgery you may be having.

It's no longer possible to routinely collect your own blood in advance of your surgery.

Preparing for a blood transfusion

If you're going to receive a blood transfusion as part of a planned course of treatment, the doctor in charge of your care will usually obtain your informed consent for the procedure.

Obtaining consent for a blood transfusion isn't legally required, although most healthcare professionals consider it to be best practice in terms of patient care.

In obtaining consent, your doctor will:

explain the reasons why a blood transfusion is required and if there are any alternatives

explain potential risks or complications associated with the transfusion

Once you've understood both these points, you'll be asked to give your permission for the transfusion to go ahead.

There may be circumstances when it's not possible to obtain consent before a transfusion. For example, if someone is unconscious after a major accident.

If you have religious objections to receiving a blood transfusion, you should carry a signed card explaining that you refuse to accept the use of all blood components under any circumstances.

Planned surgery

If you're going to have a surgical operation where a blood transfusion may be needed, you can take steps to reduce the chances of this happening. These include:

eating a healthy, well-balanced diet in the weeks leading up to the operation

increasing your iron level, which is particularly important if you have anaemia; your DOCTOR, consultant or nurse will be able to advise you further

If you're taking blood-thinning medication, such as aspirin or warfarin, you may be told to stop taking it for several days before having surgery.

You must only stop taking medication under the direction of your DOCTOR or consultant.

How a blood transfusion is performed

How quickly is blood given?

A unit (bag) of red blood cells usually takes two to three hours to give. If needed, a unit can be given more rapidly, for example to treat severe bleeding.

A unit of platelets or plasma is given in 30 to 60 minutes.

Before making a blood donation, the potential donor is asked about their health, lifestyle and history. This is to make sure the donor is fit and well, and because certain groups of people shouldn't donate blood as they have an increased risk of having a blood-borne infection, such as men who have had sex with other men or injecting drug users.

Read more information about who can donate blood.

After blood has been donated, it's always tested for the following infections:

hepatitis B

hepatitis C

HIV and AIDS

syphilis

human T-cell lymphotropic virus (HTLV) – a rare but potentially serious virus, which in some people can cause a type of leukaemia that's usually fatal

The blood may also be tested for malaria and West Nile virus if the donor has recently spent time in countries where these two conditions are known to be prevalent.

How blood is given

A small sample of your blood is usually needed before a blood transfusion to make sure your blood is compatible with the donor blood. Read more about blood groups.

Blood is usually given through a tiny plastic tube called a cannula, this is inserted into a vein in your arm. The cannula is connected to a drip and the blood runs through the drip into your arm.

Depending on the underlying condition and the type of other treatment needed, some patients may have a larger tube, which is known as a central line, inserted into a vein in their chest. Alternatively, a peripherally inserted central catheter (PICC line) may be inserted in the crook of the arm. These lines can also be used for blood transfusions.

During the transfusion

Most people don't feel anything when receiving a blood transfusion. You'll be observed at regular intervals, but if you start to feel unwell during or shortly after your transfusion, you should tell a member of staff immediately.

Some people may develop a temperature, chills or a rash. These reactions are usually mild and easily treated with paracetamol or by slowing down the blood transfusion.

Severe reactions to blood are rare. If they occur, staff carrying out the transfusion are trained to recognise and treat them. If you have any concerns, discuss them with your doctor, nurse or midwife.

Risks of a blood transfusion

Blood transfusions are a fairly common procedure. The risk of serious side effects is low as your blood is tested against the donor blood to make sure it is compatible.

Allergic reaction

Having an allergic reaction to the donated blood is an uncommon complication of a blood transfusion. In 2011, there were 180 reported cases of allergic reactions after a blood transfusion in the UK.

An allergic reaction is caused by the body's immune system reacting to proteins or other substances in the donated blood. The symptoms of the reaction are usually mild and occur during or shortly after the transfusion.

Common symptoms include:

raised, red, itchy skin rash (urticaria)

swelling of hands, arms, feet, ankles and legs (oedema)

dizziness

headaches

Less common symptoms include:

high temperature (fever) of or above 38°C (100.4°F)

chills

shivering

These types of reactions can usually be successfully managed by slowing down or stopping the transfusion and treating the symptoms with antihistamines (medication for allergies) and, in some cases, paracetamol.

Anaphylaxis

Anaphylaxis is a more serious and potentially life-threatening allergic reaction to antibodies or other substances in the blood.

The symptoms of anaphylaxis may occur as soon as the blood transfusion begins. They include:

chills

abdominal cramps

shortness of breath

vomiting

diarrhoea

Anaphylaxis is usually treated with an injection of a type of medication called adrenaline.

Fluid overload

Occasionally, too much blood is transfused into the body in too short a time for the body to properly cope with it. This is known as fluid overload.

The excess fluid can result in the heart being unable to pump enough blood around the body (heart failure). The lungs also become filled with fluid, which can result in shortness of breath. Older patients and those with serious health conditions, such as heart disease, are at greater risk of fluid overload.

Lung injury

An uncommon but very serious risk associated with blood transfusions is transfusion-related acute lung injury (TRALI).

TRALI is a poorly understood condition in which a person's lungs suddenly become very inflamed within six hours of the transfusion. The high levels of inflammation cause the lungs to become starved of oxygen. In some cases, this can be fatal.

Most experts believe that some type of abnormal immune response causes the inflammation associated with TRALI.

Treatment for TRALI requires using a ventilator to provide the body with oxygen until the inflammation of the lungs subsides.

Acute haemolytic transfusion reaction

An acute haemolytic transfusion reaction (AHTR) is when the immune system reacts to the donated blood and begins attacking the blood cells.

One cause of AHTR is when a person is mistakenly given the wrong blood type. However, AHTR can occasionally occur when all the procedures associated with a blood transfusion have been correctly followed.

During AHTR, the immune system attacks the donated blood cells, triggering a range of symptoms that usually develop very quickly after the transfusion and rapidly get worse.

Symptoms of AHTR include:

anxiety

shortness of breath

high temperature (fever) of 38°C (100.4°F) or above

chills

facial flushing

People with AHTR may go into shock (a seriously reduced blood flow), which can cause the following symptoms:

cold, clammy skin

low blood pressure

nausea

vomiting

A person with AHTR may develop acute (sudden) kidney failure. AHTR is a medical emergency that usually requires admission to an intensive care unit (ICU) where medication and fluids are administered to improve blood flow.

Bacterially contaminated blood

Despite every effort being made to keep donated blood sterile (germ-free), bacteria can occasionally develop in donated blood. Donations of platelets are particularly vulnerable to contamination because they need to be stored at room temperature.

If a person receives a donation of contaminated blood, they may develop symptoms of blood poisoning (sepsis), including:

high temperature

chills

a fast heartbeat

fast breathing

cold, clammy skin

changes in mental states, such as confusion

Cases of sepsis usually need to be treated with injections of antibiotics. See treating sepsis for more information.

Viral contaminated blood

It is extremely rare for someone to develop a viral infection from a blood transfusion as the blood services use strict testing processes. For example, it is estimated that:

the risk of getting hepatitis B is about 1 in 1.3 million

the risk of getting hepatitis C is about 1 in 28 million

the risk of getting HIV is about 1 in 6.5 million

There hasn't been a recorded case of someone developing a viral infection from a blood transfusion since 2005.

Variant Creutzfeldt-Jakob disease (vCJD)

Creutzfeldt-Jakob disease (CJD) is a rare and fatal condition that causes worsening brain damage over time.

A form of this condition called variant Creutzfeldt-Jakob disease (vCJD), which is usually caused by eating meat infected with bovine spongiform encephalopathy (BSE, or 'mad cow disease'), can be passed on through a blood transfusion. However, this is extremely rare.

As a precautionary measure to reduce the risk of transmitting vCJD, people who have received a blood transfusion since 1980 are not currently able to give blood.