

THERAPEUTIC APHERESIS (THERAPEUTIC PLASMA EXCHANGE) PATIENT INFORMATION SHEET

WHAT IS THERAPEUTIC APHERESIS?

Blood is made up of a number of different components:

- *Red blood cells*, which carry oxygen around the body.
- *White blood cells*, which help to prevent and fight infections.
- *Platelets*, small particles which help the blood to clot.
- *Plasma*, the liquid part of the blood in which many proteins and other substances are dissolved.

Some diseases are caused by excessive numbers of these cells and by abnormalities of the proteins and other substances dissolved in the plasma. One way of treating these diseases is to temporarily remove blood from the body and to separate the blood into its components. The unwanted component can then be discarded, before returning the other components to the body. Although only a small volume of blood is removed from the body at any one time, large quantities of blood can be processed in this way, leading to a significant reduction in the level of cells or substances responsible for the disease. This process is called *apheresis* and is accomplished by means of a special machine called an *apheresis machine*. Because apheresis can also be used to collect blood cells and plasma from normal blood donors, the term *therapeutic apheresis* is used when this process is used to treat a disease.

WHAT IS PLASMAPHERESIS OR PLASMA EXCHANGE?

Most diseases that can benefit from therapeutic apheresis are due to abnormalities of the plasma. Although some diseases are caused by abnormal proteins in the plasma, in others the problem appears to be due to low levels of particular proteins in the blood. In these cases, removal of plasma by apheresis allows large quantities of plasma from normal blood donors to be given to replace what is removed by apheresis. Other terms that are sometimes used for this process include *plasma exchange* and *plasmapheresis*.

WHAT DOES APHERESIS INVOLVE?

Blood is removed from a vein and mixed with a substance called an anticoagulant to stop the blood clotting while outside the body. In most cases the anticoagulant used is *citrate*. This binds calcium, which is essential for clotting of blood. The blood is then processed by the apheresis machine to separate the various components, allowing the unwanted component to be discarded and the remaining components to be returned to the patient.

In some cases, plasma exchange can be performed using needles that are placed in each arm. In some patients with small arm veins or where several procedures are needed for the condition being treated, it may be necessary to insert a special catheter into the large veins under the collarbone or in other parts of the body to allow adequate blood flow for the procedure. If insertion of a special catheter is required, separate information about this procedure will be given and separate consent will be obtained.

Each procedure takes several hours, the actual time depending on a number of factors including the disease being treated, the size of the patient and the type of machine being used. The number of treatments required also depends on a number of factors, but treatments are usually provided every 1-2 days, initially.

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ARE BLOOD OR BLOOD PRODUCTS USED DURING THE PROCEDURE?

The fluid removed during therapeutic apheresis has to be replaced and, when large amounts of plasma are removed, some protein has to be replaced. A variety of replacement fluids are used, including:

- Saline, a solution of salt and water.
- Albumin solution, a purified blood product containing albumin, the major protein in plasma. Albumin solutions are derived from the pooled blood donations of New Zealanders.
- Fresh Frozen Plasma derived from New Zealand blood donations, from which the plasma is separated and frozen shortly after collection.

Patients who require albumin or fresh frozen plasma may obtain further information about these products by reading the NZBS pamphlets entitled *Fresh blood components* and *Albumex 4 and Albumex 20*.

WHAT ARE THE POSSIBLE RISKS OF THERAPEUTIC APHERESIS?

Plasma exchange is a safe procedure but side effects can occur.

- Some minor problems are occasionally caused by the insertion of the needles in the arms, including pain, bruising, infection and minor damage to the nerves of the skin.
- Tiredness, dizziness and fainting can occur sometimes.
- Nausea, cramps, and tingling in the fingers or around the mouth may occasionally be experienced. These symptoms are usually caused by the citrate that prevents the blood from clotting while outside the body. It is infused into the patient with the components that are not discarded, but the body rapidly removes citrate from the blood stream, usually making this a very brief phenomenon. It can generally be overcome by slowing the rate of return of the components or by giving calcium, either by mouth or (rarely) by infusion into the blood stream.
- All the tubing, needles and bowls used in this process are sterile and disposable. A new apheresis set is used for each procedure, avoiding any problems of contamination.
- Reactions to the replacement fluids occur occasionally. These are more common when fresh frozen plasma is used, but serious reactions are rare. The risks associated with receiving albumin or fresh frozen plasma are described in the NZBS pamphlets entitled *Fresh blood components* and *Albumex 4 and Albumex 20*. Rare theoretical risks include the possibility that air might be introduced into the patient's blood stream but modern apheresis machines include alarms to prevent this and patients are monitored very closely during the procedure.
- It is very important to notify the apheresis nurse if any of the above symptoms occur.

If you have any concerns or questions about this procedure you may discuss them at any time with the nurse who will be carrying out the apheresis procedures or with a transfusion medicine specialist.