

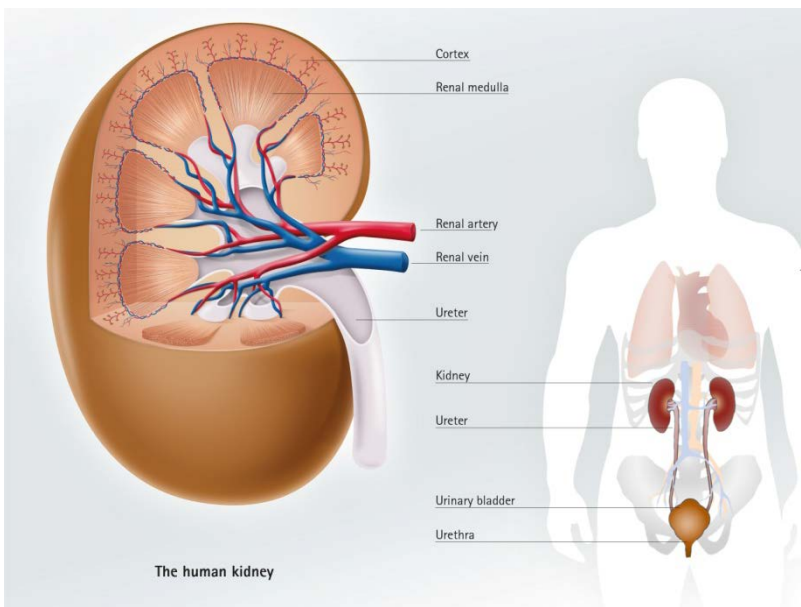
## HOW DOES HEMODIALYSIS WORK?



## WHY DO I NEED HEMODIALYSIS?

You need dialysis because you have suffered kidney (renal) failure. Your kidneys have stopped – or almost stopped working. The kidneys are the body's filter system, getting rid of toxins and chemicals you do not need, and keeping the fluid and chemicals you do need.

Hemodialysis is a treatment that removes toxins such as urea and creatinine from your body.



## HOW IS HEMODIALYSIS DONE?

During hemodialysis blood is removed from your body and filtered through the dialyzer before being returned to your body. The dialyzer has hundreds of small tubes through which the blood travels. These tubes are made of a special membrane that has thousands of very small holes which allows certain chemicals and toxins to pass through and away from your blood. These chemicals and toxins are then disposed of by the dialysis machine.

On the other side of the tubes is a specially treated water called dialysate. This is a very clean water that has gone through a special process in the dialysis centre to remove any chemicals that may cause you harm during treatment. This water is then mixed with the dialysate concentrate by the dialysis machine to a specific prescription before being passed through the dialyzer.

## WHAT SORTS OF THINGS ARE REMOVED DURING DIALYSIS?

There are a wide variety of things removed during dialysis so we will only explore some of the most common chemicals. As you kidneys are normally responsible for removing and regulating these chemicals, dialysis now has to do this job for you. Urea is the result of protein metabolism by your body. Because your kidneys are no longer working very well this builds up in your body and can make you feel unwell.

So dialysis is very important for removing this toxin. Creatinine is also a chemical that is a result of normal body metabolism, and is also removed and controlled by dialysis. As you eat you take in electrolytes such as sodium and potassium. Too much sodium can make you feel thirsty, which will result in you drinking too much fluid. This will also affect your blood pressure.

You will already be aware that you are on a low potassium diet, and too much potassium in your body can make you feel weak, and will also affect how your heart works. It is therefore important for dialysis to remove the excess potassium. Fluid will build up between dialysis sessions as you drink, and this fluid will collect in your body. Dialysis will remove this excess fluid.

## HOW DOES THE DIALYZERS CLEAN MY BLOOD?

- As we have already seen the dialyzer has two main parts – one part for your blood and the other for the dialysate. Both of these parts are separated from each other by the dialyzer membrane. The blood and dialysate are never mixed and kept separate at all times. Blood cells, proteins and other important things remain in your blood because they are too big to pass through the membrane.
- Smaller waste products such as urea, sodium and potassium as well as excess fluid pass through the membrane and are removed. Changes in the dialysate fluid can be made to suit your specific needs and are determined by your dialysis prescription.

## HOW DOES MY BLOOD GET INTO AND OUT OF MY BODY?

The efficiency of dialysis is dependent upon the ability to get blood from you and to pass it through the dialyzer. This is achieved by using the vascular access that you currently have.

Blood tubing is attached to your access and a pump on the dialysis machine pumps the blood from your body through the dialyzer and back to you.

You will notice that the blood runs in a continuous circuit: from you to the dialyzer and then back to you. This means that only a small amount of your blood is outside of you at any one time.

## WHAT TYPES OF VASCULAR ACCESS ARE THERE?

The options for vascular access are:

- an arterio-venous fistula or graft
- or a central venous catheter

We will explore these types of vascular access and their care in a later presentation.

## HOW LONG WILL EACH DIALYSIS TREATMENT LAST?

Most people dialyze three times a week, and each treatment last about four hours. However, as you continue on dialysis the length of treatment may need to change to ensure you get an adequate dialysis dose. The more time you have on dialysis the more waste and fluid is removed.

The amount of dialysis you need depends on:

- how much your own kidneys are working
- how much fluid weight you gain between dialysis treatments
- how much you weigh
- how much waste you have in your blood

Your doctor will give you a dialysis prescription that details how much dialysis you need, the size of dialyzer and the type of dialysate concentrate. Studies have shown that getting the right amount of dialysis improves your health, makes you feel better, keeps you out of hospital and helps you to live longer.



## WHAT DOES THE DIALYSIS MACHINE DO?

The hemodialysis machine has a number of different functions, all designed to make your treatment as efficient and safe as possible. It is like a large computer and a pump. As well as pumping blood from you to the dialyzer it keeps track of

- the blood flow
- your blood pressure
- how much fluid is removed
- and many other vital pressures and information that help the nursing and medical staff to ensure you have the best possible treatment.

It is also responsible for mixing the dialysate concentrate and the pure water. This is responsible for helping to put out the toxins across the dialyzer membrane.

## WHAT HAPPENS WHEN I COME FORM DIALYSIS?

There is a general routine that is common for all patients when they come for dialysis. When you enter the dialysis room you will be asked to wash your hands as part of our infection control routine.

You will then be weighed, so that the nurse can calculate how much fluid will need to be removed during dialysis. Before you start dialysis the nurse will assess your general condition by checking you blood pressure and pulse, and maybe your temperature.

It is important to tell the nurse at this point if you have been unwell since your last dialysis, or if there is anything else that is worrying you before you start your treatment.



## WHAT HAPPENS DURING DIALYSIS?

Once you have been “connected” and the dialysis treatment has started you are free to do what you wish –as long as you remember that you are restricted to the dialysis chair. There are many things you can during your treatment:

- Talk to other patients
- Read a book
- Listen to music or a book on tape
- Play hand-held video games
- Do crossword puzzles
- Write letters
- Take a nap
- Exercise. Some centers have special exercise equipment for dialysis patients

The nurse will also check your blood pressure and pulse at least every hour, and will make a note of the machine settings to ensure your treatment is progressing correctly. There will also be time for you to ask questions about dialysis.

## WHAT DOES THE DIALYSIS MACHINE ALARM?

One of the functions of the dialysis machine is to monitor your treatment and ensure that you are safe during your dialysis treatment. Throughout dialysis it measures pressures inside the blood tubing and dialyzer. The dialysis machine also measures the blood flow, temperature and the correct mixing of the dialysate.

When your treatment starts your nurse will set limits to all these pressures. If the machine measures any of these pressures outside of these limits the machine alarms to let the nurse know of the problem.

With some of the alarms the machine will also stop the blood pump or dialysate flow. This is to make sure that you are safe until the problem has been resolved.

Then when it is time to go home it also alarms!

## WILL I FEEL BETTER AFTER DIALYSIS?

Unless you are sick for other reasons than kidney failure, dialysis should help you feel better. You may feel very tired after your first series of dialysis treatments, and it can take some people to adjust to dialysis.

It may take a few weeks before you start to notice a real difference in how you feel. And often when you look back after 3 months you will probably see a big difference in how you feel and what you are able to do. One of the positive changes that many people feel is that their appetite has returned.

However, if your dialysis treatments continue to make you feel tired and unwell, make sure you tell you nurse or doctor so that they can help to make you better.

## WHAT ARE SOME OF THE COMPLICATIONS...

The two most common complications during dialysis are low blood pressure (hypotension) and cramps. Low Blood Pressure during dialysis occurs when too much fluid is removed too quickly. It may-be that you have drunk too much fluid between dialysis sessions and the dialysis staff find to difficult to remove the correct amount. It is therefore important that you stick to your fluid restriction.

If you take blood pressure medication, check with the staff if you should take these before your dialysis treatment.

Always tell the staff if you start to feel light headed, dizzy or nausea during treatment, as these symptoms might mean your blood pressure is dropping.

## ... THAT CAN HAPPEN DURING DIALYSIS?

Cramps usually occur in the legs and can be un-comfortable. There are a number of reasons why cramps occur, and are different from patient to patient. The most common cause is linked to the removal of large volumes of fluid during dialysis.

Make sure you tell the staff as soon as you feel the cramp starting so that they can help you and prevent it from getting worse.

Infection remains at risk during dialysis because of the nature of the treatment. The dialysis staff are trained in methods to reduce infection risks, but you also have a role to play. When you enter and leave the dialysis treatment room, make sure that you wash your hands. Always tell the nursing staff before you start dialysis if you believe you have some form of infection.

## WHAT ARE MY JOBS DURING DIALYSIS?

### **At the dialysis center**

- Make sure you tell the nurse of any problems you have had since the last dialysis session before you start treatment
- Wash you hands before you enter and when you leave the dialysis room
- Tell the nurses if you feel unwell during treatment
- If you want to become more involved in your dialysis treatment ask the nursing staff

### **At Home**

- Follow the advice you have been given about your diet and fluid intake
- Make sure you take your phosphate binders with every meal
- Be as active as you can, exercise will help you feel stronger and more involved in life



## WHAT HAPPENS AT THE END OF DIALYSIS?

Once your dialysis treatment has finished your blood will be washed back, and then you will be disconnected from the dialysis machine. If you are using a central venous catheter this will be capped off until your next treatment. However, if you are using a fistula or graft the needles will be removed and only when the nurse is sure that the bleeding has stopped will you be able to leave the dialysis centre.

Your blood pressure will be checked to make sure it is safe for you to get off the chair. This is important as you can sometimes feel faint the first time you stand up after treatment.

Your weight will be checked again and recorded. This assessment is important and your nurse wants to make sure it is safe for you to leave the dialysis room and wait for your transport home.

If at anytime you feel unwell, make sure you tell the nurse before you leave the dialysis center.

## SO WHAT NEXT?

Now you have read through this a nurse or doctor will come back to answer any other questions you might have. Remember, you can ask questions at any time.

There will be other booklets for you to read later that will include the following topics:

- Hemodialysis – a brief introduction
- How does hemodialysis work?
- Looking after your vascular access
- Managing your fluid intake
- The dialysis diet
- Increasing your independence
- Transplantation

We hope that this will help you to adapt to dialysis, helping you to feel better.

**Remember, you can ask questions about your treatment at any time.**



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