

# *Kidneys & Kidney Failure*

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## *Choosing Your Treatment*

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This booklet will help kidney failure patients take a decision on which type of treatment they must take for kidney failure.

Once permanent kidney failure has occurred, the patient has to take some kind of treatment to sustain life. If the patient is not treated, he/she will be in a bad physical condition in a few days.

When the kidneys fail, they are unable to clean the impurities from blood that are produced in the body. The blood becomes full of impurities and the toxins in the blood become dangerous to life. These toxins have to be removed from the body through natural or artificial means.

Your doctor will be of much help to decide when the treatment should start. The start of treatment will depend on:

- Signs and symptoms of kidney failure
- Urea, Creatinine and other bio-chemical parameters

Two treatments are possible for permanent kidney failure. They are:

- Dialysis
- Transplantation

Dialysis can be of two types - Haemodialysis (HD) and Peritoneal Dialysis (PD). Each type of dialysis has its own advantages and disadvantages which may suit different types of patients.

## **Haemodialysis**

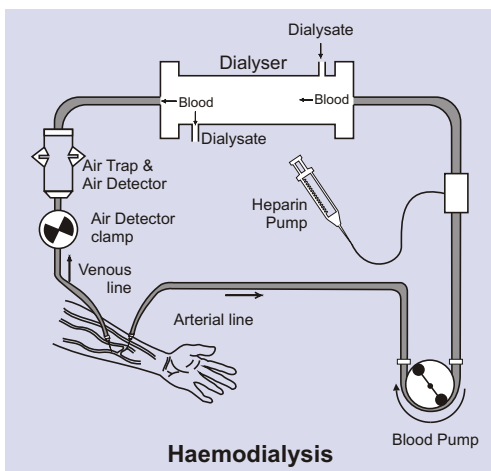
Haemodialysis is a process by which blood is purified by taking it out of the body with the help of a machine and passing it through a 'dialyser' (artificial kidney). An artificial kidney is needed because the patients kidneys have failed and cannot perform their duties.

## **Principles of Dialysis**

The main objectives of dialysis are

- Cleaning of toxic waste, mainly urea and creatinine
- Removal of excess water
- Neutralising acidity

These objectives are fulfilled by the processes of DIFFUSION and ULTRAFILTRATION.



Diffusion means removal of solutes, e.g., urea, creatinine, etc. Diffusion happens because there is a concentration difference of solutes. For example, there is high concentration of urea in blood but urea is totally absent in the dialysis solution. So urea diffuses from the blood to the dialysis solution.

Due to diffusion acetate/bicarbonate from the dialysis solution diffuse to the blood and neutralise the acidity in blood.

Ultrafiltration means the removal of excess water. It happens because the blood flows at a positive pressure and dialysis solution flows at negative pressure. The excess water flows from the blood to the dialysis solution and is removed.

## Process of Dialysis

The blood from the vein is taken into the needle and through the bloodline is passed through the dialyser. Blood and the dialysis solution do not mix in the dialyser because the dialyser membrane is a semi-permeable membrane. The toxic wastes and excess water from blood goes to the dialysis solution and finally to the drain (going out of body). Acetate / Bicarbonate from the dialysis solution goes to the blood. This way the blood is purified.

After the blood has been cleaned, it is returned to the bloodline and the second needle, which returns the blood into the body through a vein. This process continues for 4-5 hours and has to be repeated 3 times a week or more depending upon your body weight and medical condition.

## **Peritoneal Dialysis**

Peritoneal Dialysis is another method of removing excess of water and impurities from the blood. It is done with the help of PERITONEUM, a cavity which surrounds the intestine and other organs in the stomach area. In Peritoneal Dialysis (PD), the peritoneal cavity acts as a semi-permeable membrane. PD can be done by the patient himself or by his attendant at home.

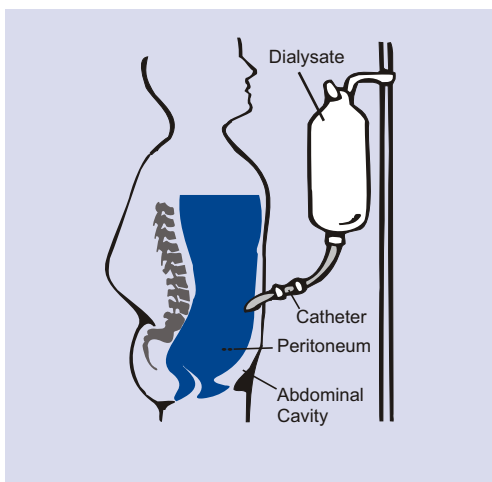
## **The process of Peritoneal Dialysis**

In PD, as in Haemodialysis, a dialysis solution is used to clean the blood. The dialysis solution is introduced and drained from the Peritoneal Cavity through a soft elastic tube called Catheter. Time between the filling and draining of the dialysis solution, in and from the peritoneal cavity, is called the dwell time. During this time excess water and toxic wastes diffuse from blood across the peritoneal membrane into the dialysate because of the processes of Diffusion and Osmosis.

In PD, removal of solutes happens through diffusion, e.g., urea, creatinine, etc. Diffusion happens because there is a concentration difference of solutes between the blood and dialysis solution. For example, there is high concentration of urea and creatinine in blood but they are totally absent in the dialysis solution. So urea and creatinine diffuse from the blood to the dialysis solution.

Ultrafiltration means the removal of excess water. It happens because the dialysis solution contains a sugar called 'Dextrose' which has the ability to attract water from the blood. The excess water flows from the blood to the dialysis solution and is removed while draining.

Generally, 2 liters of dialysis fluid is filled in the peritoneal cavity each time. In a day 8-10 liters of fluid is filled and drained from the peritoneum. The normal dwell time is 3-4 hours.



## Transplantation

Kidney transplantation means placing a kidney from another person (donor) into the patient's (recipient's) body, through a major surgery. After the transplant, no dialysis treatment is needed. The patient feels better and has more energy to enjoy life. Many restrictions, which were imposed during dialysis, are lifted.

The transplanted kidneys can come from a donor, living or dead (cadaveric donor). Amongst the living donors, the donor can be related to the patient or can be unrelated.

In most of the cases the old diseased kidneys are not removed from the body of the recipient. The new kidney is attached to the vein and artery and the ureter is attached to the urinary bladder of the recipient.

The transplant patients have to take immunosuppressants, medicines to suppress the immune system. These medicines have to be taken continuously throughout life. If not taken continuously in the right proportion, rejection of the transplanted kidney may occur and the patient will have to go back to dialysis or a second transplant.

## What are the factors for deciding the right treatment?

The following section describes the advantages and disadvantages of each option available. It also describes which type of patient would be more suitable for which therapy.

Patients having any of the following problems usually do better on HD.

1. Severe inflammatory intestinal disease
2. Acute psychotic disorder
3. Dementia or mental retardation
4. Chronic poor hygiene (cleanliness)
5. Multiple abdominal operations
6. Hernia (unrepaired)
7. Severe diabetic gastroparesis

But if the patient has any of the following problems he/she may **NOT** opt for Haemodialysis (HD)

1. Cardio-vascular problems
2. Vascular (veins) access problems
3. Less mobility due to age, etc.
4. Blood coagulation problems

### **The advantages of HD are**

1. It is a treatment provided under the supervision of qualified medical staff.
2. Treatment is usually only 2-3 times/week.
3. Chances of infection are low.
4. Comparably low cost treatment at present.

### **The disadvantages of HD are**

1. Patient has to go to the HD center.
2. Patient is dependent on the machine for dialysis.
3. Severe salt and water restriction.
4. Risk of hepatitis.

Patients having any of the following problems usually do better on PD.

1. Cardiovascular disease
2. Higher kidney residual function
3. Transmissible disease
4. Variable schedule
5. Travel
6. Unstable vascular disease
7. Children under five
8. Younger diabetics
9. Distant from HD center
10. Independent life style

But if the patient has any of the following problems he/she may **NOT** opt for Peritoneal Dialysis (PD)

1. Healing problems
2. Hernia
3. Major abdominal surgery
4. Infection problems

#### **The advantages of PD are**

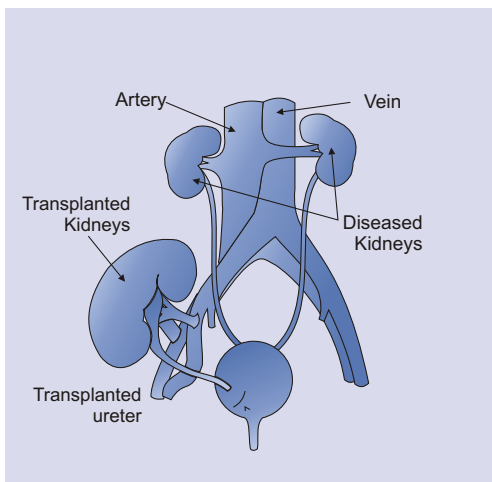
1. Allows patient to be independent.
2. Can be done at many locations.
3. Does not require any machine.
4. Improves appetite.
5. Less food, salt and water restrictions.
6. Good control of blood pressure, weight, sodium and uremic toxins.

#### **The disadvantages of PD are**

1. Must be performed 3-4 times everyday.
2. Dialysis solution has to be carried around.
3. Risk of peritonitis.
4. High cost compared to HD at present.
5. Causes hernia.

Patients having any of the following problems may **NOT** opt for Transplantation

1. Recurrent kidney failure disease
2. Severe heart disease
3. Cirrhosis of liver
4. Mental illness



5. Very old age
6. Vascular (veins) problems
7. Chronic Active Hepatitis
8. AIDS
9. Malignancy, etc.

### **The advantages of transplantation are**

1. The patient does not need dialysis.
2. Many dietary restrictions are withdrawn.
3. The patient is free from the dialysis center and his house for dialysis.
4. The patient can travel anywhere, of course, after taking due care.
5. The patient feels more energetic, and sexual life may improve.

### **The disadvantages of transplantation are**

1. Harmful side effects of immunosuppressive drugs.
2. Body becomes more prone to other infections.
3. Skin lesions.

### **Finances**

The amount of money needed for each therapy is different. Keeping in mind the above conditions and with the help of your doctor, you can decide on the type of treatment suitable for you.



HD needs a continuous expenditure of money with each dialysis session. The initial cost is comparatively less. The patient has to undergo a small operation for making the Arterio Venous Fistula (AVF). The cost of this operation may differ from institute to institute. The recurring cost for HD is the cost of every dialysis session you will undergo.

In PD, the initial cost may vary from institute to institute, depending on, from where you do your catheter implantation operation. You will have to buy dialysis bags stock of at least one and half months. More over you will also have to buy the caps, povidone iodine, gauze, and tapes, and so on, as and when needed.

For Transplantation, you will have to spend a large sum while doing the transplant operation. The initial cost will be that of the operation itself. Transplant patients have to buy their immunosuppressive medications every month to ensure that their body does not reject their transplanted kidney.

Over and above these basic costs for each therapy, each patient has to take medicines. The prescription of medicines will mainly depend on your medical condition and the type of therapy you are taking. Some of the main medicines are Erythropoietin, Phosphate binders, Vitamin D, Anti-hypertensives, and so on.

## **Lifestyle**

Your lifestyle is also one of the important parameters for selecting a therapy of your choice. If you are motivated enough and want to sustain life with your own efforts, and do not want to be dependent on machine, CAPD is the treatment of choice. People who are busy all day, can opt for CCPD, which can be done at night while the patient sleeps. If patient or relative cannot manage or do not want to take therapy at home, Haemodialysis, twice or thrice every week, would be preferable. People, who like to be totally free of dialysis and for whom a kidney donor is available, will always prefer transplantation. Most of the restrictions imposed by HD and PD are removed when a patient takes transplantation.

## Change of mode of treatment

Yes, one can change his/her mode of treatment if he/she finds the existing treatment is not suitable. But this cannot be done frequently as it entails a lot of changes on the part of the patient and the doctor. The less the changes, less would be the problems to the patient and to the doctor.

## At the end

It does not matter which treatment a patient chooses as long as he/she keeps healthy and happy. Treatment must be taken as prescribed by the doctor. It must be accompanied by the type of food and the medications that have been prescribed. Let the decision about the treatment of kidney failure be an informed decision.

## Keywords

Haemodialysis, Dialyser, Peritoneal dialysis, Peritoneum, Transplantation.

Please also refer the following information booklets from India Renal Foundation for more information.

1. Haemodialysis
2. Peritoneal Dialysis
3. Kidney Transplantation
4. Diabetes and Kidney Failure
5. Hypertension and Kidney Failure
6. Kidney failure and Anemia
7. Kidney stones and Kidney Failure

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