What is hemodialysis?

It is a form of renal replacement therapy or dialysis where blood is circulated through a machine. In the machine, blood runs through a special membrane called dialyzer against very pure form of water mixed with electrolytes called dialysate. During this process, as toxins move from blood in to dialysate, blood is cleared of harmful toxins. Blood is circulated through dialysis machine several times over the prescribed time.

It is important to know that dialysis doesn't help your kidneys to get better or cured of underlying disease. It doesn't perform all the functions of a kidney such as formation of hormones (erythropoietin), vitamins (vitamin D) etc. Dialysis rather replaces only a part of kidney function such as clearing blood of toxins, excess fluid and electrolytes. When kidney fails and dialysis is needed, it is a lifesaving treatment. For hemodialysis, presence of a functioning vascular access is necessary (Read section on vascular access to obtain more information).
Image 1: Hemodialysis procedure. Source of image: Wikipedia.org (image used under Creative Commons License)

**What are different forms of hemodialysis?**

Hemodialysis can be performed either at dialysis units (in-center hemodialysis) or at home (home hemodialysis).

**In-Center Hemodialysis:** Patients usually come to dialysis units 3 times a week (Monday/Wednesday/Friday or Tuesday/Thursday/Saturday schedule) for 3.0-4.5 hours each session. Once patient come, they are weighed and sat in chair. Vital signs are checked. A dialysis nurse will clean your vascular access and connect you to the machine using the access and tubes. Thereafter, you will be monitored but you may read, sleep, listen to music or watch television as you like. Dialysis in itself is a painless procedure but may be complicated by low blood pressure, muscle cramps or fatigue.

Some dialysis center also offers daily hemodialysis during night (5-6 times per week) for several hours (nocturnal hemodialysis). It offers better control of blood pressure, phosphorus, excess fluid and daytime lifestyle schedule.
Image 2: Hemodialysis machine. source of image: Wikipedia.org (image used under Creative Commons License)

**Home Hemodialysis:** This form of dialysis is performed at home by patient with a family member assistance. It can be done as short daily hemodialysis or nocturnal (night) hemodialysis. In case of any problem, patients may contact dialysis nurse or doctor and seek help. Patients are trained in a dialysis unit before home dialysis is started.

Benefit of home hemodialysis include dialysis at own home environment, better and more adaptable lifestyle schedule. Frequent hemodialysis also helps to better control of blood pressure, electrolytes such as phosphorus and potassium and excess fluid. It also offers patients more liberty of food intake and reduced need of medications for high blood pressure and phosphorus.

**Concerns of home hemodialysis:** It needs ample space for dialysis at home and often require some assistance at home by a family member. Frequent use of vascular access also may lead to increased risk of dysfunction and need of surgical intervention.

**What are potential complications related to hemodialysis?**

Use of vascular access may lead to its infection.
Low blood pressure and muscle cramps may occur during hemodialysis procedure.

Patients may also feel dizzy, tired and fatigued after the treatment.

**What are the other adjuvants to hemodialysis?**

Patient will need to follow a dietary regimen often requiring limiting potassium, phosphorus and fluid intake.

Patients also frequently require medications to control blood pressure, phosphorus, PTH and low hemoglobin.

You will get advice from dietician and social worker.

You will get information on kidney transplantation and referral for transplant evaluation if agreed by you.

You will get information on advance directives on resuscitation measures in future.

**How is hemodialysis treatment monitored?**

You will undergo regular blood tests assessing electrolytes, phosphorus, anemia and iron status and PTH (parathyroid hormone) level.

Kt/V (Target ≥1.2) and urea reduction ratio (URR) [Target ≥ 65%] are commonly used tests to measure adequacy of hemodialysis.

*Know your Kt/V* and be aware that you are receiving adequate hemodialysis.

**What are alternative options to hemodialysis?**

Patients may choose peritoneal dialysis.

If suitable donor is available, kidney transplantation is the best form of renal replacement therapy.
You also may decide not to choose any form of renal replacement therapy.

**How is hemodialysis as compared to peritoneal dialysis?**

Patient education and information is vital in deciding between hemodialysis and peritoneal dialysis (PD). Based upon current evidence and research, both hemodialysis and PD are known to be equivalent forms of therapy with individual benefits and risks.

**Benefits of PD:** It is performed by patients at home hence provide better lifestyle schedules. Patients don’t need to travel to dialysis unit and be dependent upon dialysis nurses for dialysis treatment. Since PD is slow but steady and continuous form of dialysis treatment, treatment schedule is somewhat similar to function of a normal kidney. It also offers freedom for more liberal intake of food and diet intake in contrast to hemodialysis patients who often need to limit potassium and phosphorus intake. Patients also can travel without much restriction. Hence PD offers personal independence, lifestyle flexibility and dietary freedom.

**Concerns of PD:** Since, patients perform PD at home by themselves; they may feel overwhelmed by the dialysis procedure. If not done cleanly, it may lead to infection of peritoneal membrane (peritonitis). Often peritoneal dialysate solutions use dextrose which is a form of sugar and can lead to elevated blood sugar level. Long term inflammation of peritoneal membrane may occasionally cause a disease condition called encapsulated peritoneal sclerosis (EPS).

**Benefit of hemodialysis:** Majority of patients in the United States choose hemodialysis as the mode of renal replacement therapy. Patients don’t have to worry about technical difficulties during a dialysis treatment. Patients with limited functional status or disabilities may feel more comfortable while receiving dialysis in more monitored setting. Patients may also see medical assistance during dialysis as promptly available. In the dialysis unit, patients may develop social relationship and bonding with other patients and healthcare providers.
Concerns of hemodialysis: If you receive in-center hemodialysis then you will need to travel to dialysis unit 3 times a week and spend approximately 4-5 hours for dialysis treatment. Dialysis schedule and timings are usually fixed hence doesn’t offer flexibility to daily lifestyle schedules. Patients may report feeling dizzy, fatigued and tired after a hemodialysis treatment. You also will need to follow a stricter dietary regimen restricting potassium, phosphorus and fluid intake. Using catheter as a dialysis access also increases risk of variety of serious complications.

FURTHER SUGGESTED READING AND INFORMATION RESOURCES:

1) Know all about kidney failure and hemodialysis at National Institute of Diabetes, Digestive and Kidney Disease:


2) Know more about hemodialysis options at American Association of Kidney Patients:

https://www.aakp.org/education/brochures/item/understanding-your-hemodialysis-options.html

3) Know about Home Hemodialysis at National Institute of Diabetes, Digestive and Kidney Disease:


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