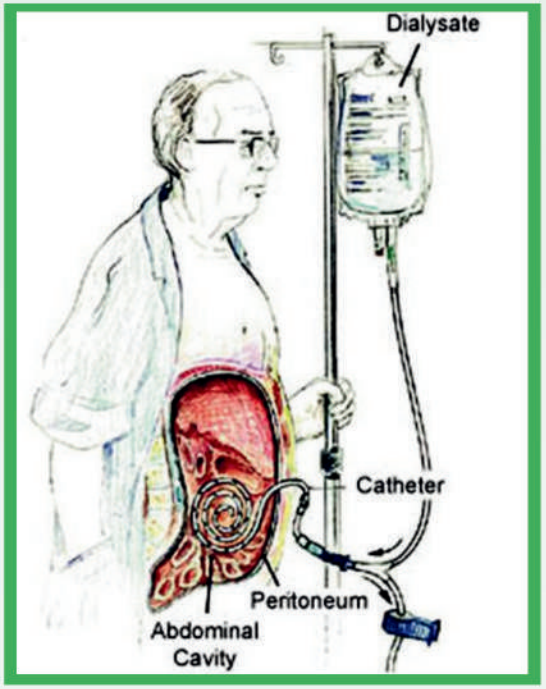
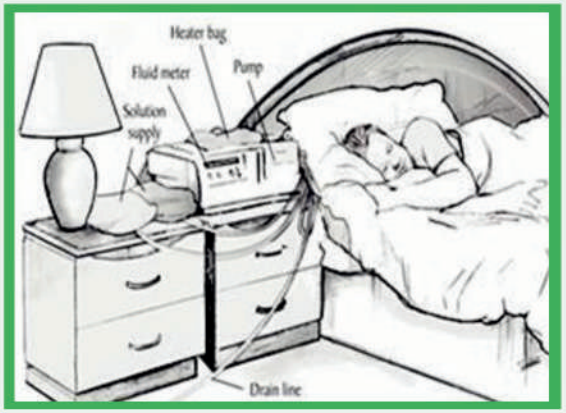
Continuous Ambulatory Peritoneal Dialysis (CAPD)



Peritoneal dialysis uses the peritoneum in a person's abdomen as the membrane through which fluid and dissolved substances are exchanged with the blood. Benefits over haemodialysis include greater flexibility and better tolerability in those with significant heart disease. The dialysate fluid that is instilled into the abdominal cavity typically contains sodium chloride, lactate or bicarbonate and a high percentage of glucose to ensure hyperosmolarity. The amount of dialysis that occurs depends on the volume of the fluid instilled (the dwell), the regularity of the exchange and the concentration of the fluid. CAPD typically involves 4 manual exchanges a day, each of 2 litres of PD fluid.

Automated Peritoneal Dialysis (APD)

For APD the patient dialyses overnight for 5-7 days each week, with APD cycles of between 3 and 10 dwells per night, using 15-20 litres of dialysis fluid.



APD may have psychosocial advantages for younger patients and those who are employed or pursuing an education.

Complications of peritoneal dialysis may include peritonitis, hernias, high blood sugar levels, constipation, bleeding in the abdomen, and blockage of the catheter. PD is not possible in those with significant prior abdominal surgery or inflammatory bowel disease.

Medicines often given on haemodialysis

Erythropoiesis stimulating agents & intravenous iron

Used to treat anaemia. Can be injected directly into the dialyser.

Vitamin D analogues and Calcimimetics

Used to treat hyperparathyroidism and ultimately renal bone disease. Medicines such as Alfacalcidol is given orally 3 times per week at dialysis to support adherence. Cinacalcet is given orally either daily or 3 times per week at dialysis to support adherence. Etelcalcetide is given 3 times per week, injected directly into the dialyser.

Anticoagulants

Dialysis requires the use of blood thinners to prevent clotting in the dialysis machine. Low molecular weight heparins are used.

Difelikefalin

For pruritus in dialysis patients. Given 3 times per week injected directly into the dialyser.

A Handy Guide to Dialysis

UKRPG

Dialysis is an imperfect treatment to replace kidney function because it does not correct the compromised endocrine functions of the kidney. Dialysis treatments replace some of the functions through diffusion (waste removal) and ultrafiltration (fluid removal).

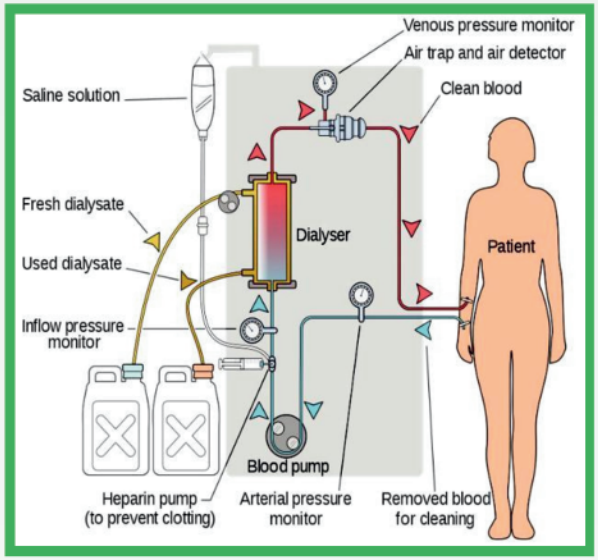
The Renal Drug Database can provide information on how to dose in dialysis patients. Considerations when deciding on dosing schedules include: molecular size of the drug, water solubility, protein binding, type of dialysis membrane being used, dialysis rate and length of dialysis session.

www.ukkidney.org/rpg

Types of Dialysis

- Intermittent Haemodialysis/ Haemodiafiltration
- Continuous Haemofiltration/ Haemodiafiltration
- Continuous Ambulatory Peritoneal Dialysis
- Automated Peritoneal Dialysis
- Slow Low Efficiency Dialysis / SLED-f

Intermittent Haemodialysis



Conventional haemodialysis is usually done three times per week, for about 3–5 hours for each treatment. Blood is passed along one side of a semi-permeable membrane. Crystalloid solution is pumped along the other side of the membrane in the opposite direction. Solutes move across the membrane by convection and diffusion. During dialysis, the patient's blood is drawn out through a dialysis catheter at a rate of 200–400 mL/min. The blood is then pumped through the dialysis filter, and after processing, is pumped back into the patient's bloodstream. During the treatment, the patient's entire blood volume (about 5 litres) circulates through the machine every 15 minutes.

The dialyser, or artificial kidney, is a cylindrical bundle of hollow fibres, whose walls are composed of semi-permeable membrane. Blood is pumped through this bundle of very thin capillary-like tubes, and the dialysate is pumped through the space surrounding the fibres. Pressure gradients are applied to move fluid from the blood to the dialysate compartment.

Injection ports on the venous return side of the dialysis circuit allow for the administration of intravenous drugs during dialysis. Many units will perform haemodiafiltration (HDF) for many patients. High flux dialysers are used in the majority of units; ensure medication dosing reflects this.

SLED / SLED-f

This is essentially haemodialysis, but with low blood and dialysate pump speeds and a longer duration, usually 6-8 hours each day. Using predilution SLED-f may reduce the risk of the filter clotting. Drug removal can be as good as via CVVHDF during the procedure.

Continuous Kidney Replacement Therapy

Continuous Haemofiltration (CVVH)

Blood passed under pressure down one side of a highly permeable membrane. Water and solutes are removed by convection, driven by the pressure gradient.

Continuous Haemodiafiltration (CVVHD)

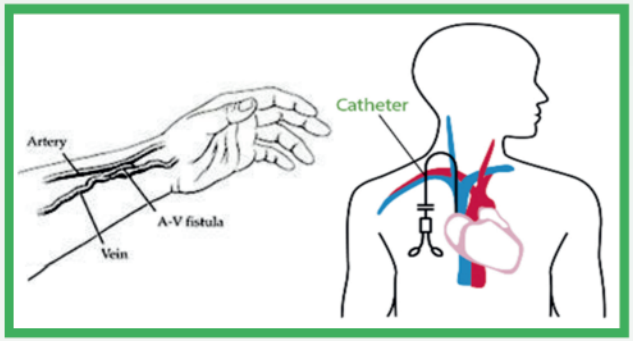
Blood is passed along one side of a semi-permeable membrane. Crystalloid solution is pumped along other side of membrane in opposite direction. Solutes move across membrane by *convection and diffusion* at rate depending on concentration gradient and molecular size.

- Can be done anywhere as no specialist plumbing required.
- Much less aggressive than haemodialysis. Better for haemodynamically unstable patients.
- Usually employed in the acute situation, e.g. in the management of AKI on ICU.

Anticoagulation is required, this can be heparin or citrate based.

Dialysis Access

Two primary methods are used to gain access to the blood for haemodialysis: an intravenous catheter, and an arteriovenous fistula.



AV Fistula

A vein in the arm is surgically attached to an artery. Both the artery and the vein dilate and elongate in response to the greater blood flow, but the vein dilates more and becomes "arterialised". When the vein is large enough to allow cannulation, the fistula is defined as "mature".

Central Venous Catheters

- Usually inserted into jugular vein or femoral vein
- Temporary lines limited duration (< 2 weeks)
- Permanent lines are usually cuffed and tunnelled
- Complications include infection/clotting – a ‘line lock’ is used between sessions.