

Peritoneal Dialysis

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GANTER first performed peritoneal dialysis on rabbits and guinea pigs with experimental anuria and showed improvement in the uraemic symptoms. In the same year he extended the trial in a human using physiological saline. Subsequently many workers have shown the usefulness of peritoneal dialysis in the treatment of renal failure.

In peritoneal dialysis body metabolites such as urea are removed by the principle of ultra filtration. When two solutions with different solute compositions are separated by a porous membrane the solutes move depending on their concentration gradient and the relative pore size. During peritoneal dialysis a fluid of known electrolyte composition which has been introduced is separated by the peritoneal membrane from the rich blood supply to the peritonium. During this time urea and other metabolites diffuse into the fluid through the pores of the peritonium into the dialysate fluid which is then drained out.

Peritoneal dialysis is a simple procedure and requires only simple equipment such as a rigid plastic catheter with holes perforated along the sides at one end, a drip infusion set and a trocar and cannula.

The plastic catheter is introduced into the peritoneal cavity in the mid-line, infraumbilically through a trocar and cannula, under local anaesthesia. The catheter is manipulated so that its tip rests in the rectovesical pouch or in one of the paracolic gutters. This catheter is then connected to the infusion set and the drainage bottle through a plastic Y connector.

See Figure 1.

The peritoneal dialysis solution is introduced into the peritoneal cavity through the catheter by gravitational force. After a time interval of usually half an hour the fluid is drained out by syphoning. This system is a completely closed one to avoid any infection entering the peritoneal cavity. The duration of dialysis can be extended for any length of time, even up to twenty one days. Usually dialysis is done for a period of 24 to 48 hours.

The catheter can be introduced into the peritoneal cavity anywhere along the anterior abdominal wall. Care is always taken that the urinary bladder is empty lest the bladder may be ruptured by the trocar. When the catheter is put afresh every time for repeated peritoneal dialysis, this is known as multiple puncture

technique. Alternatively special types of catheters can be used and permanently left in the peritoneal cavity as "indwelling catheters." The greatest danger of indwelling catheters is peritonitis.

When the dialysis is done through a single catheter as described above, it is known as intermittent dialysis. Alternatively two catheters can be placed in the peritoneal cavity, one for input and one for drain, when the technique is known as continuous dialysis.

The peritoneal dialysis fluid is a sterile solution of known electrolyte composition containing sodium, potassium, calcium, magnesium, chloride, bicarbonate, and glucose at normal blood PH. The concentrations of these electrolytes can be altered depending on the requirement of the patient. For example when fluid has to be removed from the patient, extra glucose can be added to the solution to make it hypertonic.

Peritoneal dialysis can be employed in all cases of reversible renal failure either of acute or chronic in presentation. The accepted indications initiating dialysis in cases of acute renal failure are :

1. Clinical deterioration in the patient's condition.
2. Anuria more than 6 days duration.
3. Blood urea more than 200 mgs.
4. Hyperkalaemia.

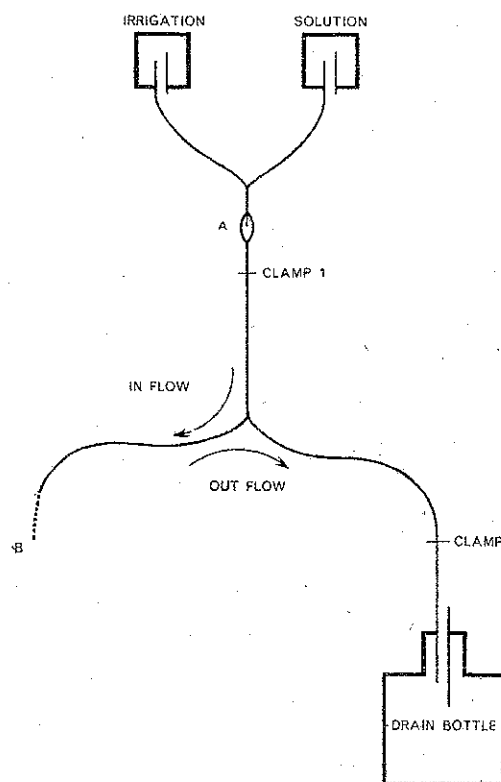


Fig. 1
Schematic Drawing of the Intermittent Method of Peritoneal Dialysis

A—Drip Chamber, Clamp 1 (Open during inflow, Closed during outflow) : B—Catheter in Peritoneal Cavity : Clamp 2 (Open during outflow, Closed during inflow)

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