Fluid Assessment and Management

BCRenal
Provincial Health Services Authority

Peritoneal dialysis (PD) is a form of renal replacement therapy that enhances or replaces some of the kidney's functions in individuals with renal failure. This includes:

- salt and water balance
- blood pressure control both directly and indirectly.

As a person's residual renal function declines (which often correlates with the length of time they have been on PD) the role of dialysis in salt and water regulation increases. This can lead to clinical hypo or hypervolemia. Careful prescription management of the PD therapy is required as the patients clinical setting changes. Close assessment of the patients target or dry weight, BP and evidence of edema ensures that the patient maintains euvolemia.

TARGET or Dry Weight

Dry weight is weight without the excess fluid that accumulates between dialysis treatments. This weight is similar to what a person with normal kidney function would weigh after urinating. It is the lowest weight that can safely be reached after dialysis without developing symptoms of low blood pressure such as cramping and dizziness. These types of symptoms can occur when too much fluid is removed. Dry or target weight is determined by the nephrologist and can change depending on the patient's symptoms.

The PD prescription is composed of:

- A number of exchanges (regardless of CAPD or CCPD)
- Volume of PD solution. PD solutions are available in volumes from 1000cc to 3000cc. Most patients use 2000cc or 2500cc volumes
- Concentration or strength of PD solutions. Relates to the amount of dextrose in the PD solution which will result in the creation of a concentration gradient where water will move via osmosis into the peritoneum. Typically, higher concentrations of dextrose in the solution bags will allow more water to be removed from the body. This process is called ultrafiltration.

The standard PD solution concentrations are:

- 0.5% - (white pull ring) - 10g dextrose/2L - this is an uncommon concentration that is unlikely to be found outside of the peritoneal dialysis unit
- 1.5% - (yellow pull ring) - 30g dextrose/2L – commonly prescribed
- 2.5% - (green pull ring) - 50g dextrose/2L – commonly prescribed
- 4.5% - (red pull ring) - 70g dextrose/2L - less common but patients who have issues with fluid overload may use regularly
- 7.5% - (purple pull ring) bag - starch-based product which contains no sugar. Many patients use over a long dwell period of 12 hours. Icodextrin 7.5%/Extraneal will not move across the peritoneum because it is not a dextrose based solution. Most patients on PD in British Columbia will use 1 Icodextrin /day over a long dwell period of up to 12 hours. The remainder of the exchanges will be dextrose based regardless of whether they are on CAPD or CCPD.

A fluid assessment should be performed prior to performing a PD exchange. Patients are taught to assess their weight, BP, and fluid status to determine the correct solution to use. In an emergency, the PD patient may require assistance in selecting the appropriate solution from the community facility care team.

Clinical Care Path:
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Patient presents with fluid related complications:

- Hypovolemia:
  - Dry mucous membranes, increased tissue turgor, thirsty, underweight, hypotensive with orthostatic drop
- Hypervolemia:
  - Increased weight, decreased ultrafiltration, SOB, respiratory distress, hypertension, evidence of edema, raised JVP

Assess volume status:

Establish current prescription and goal weight from patient or primary PD unit

- General appearance: check mucous membranes, tissue turgor, thirst, weight
- Respiratory status: dyspnea, rate, O2 requirements, air entry
- Cardiovascular status: heart rate/rhythm, BP (lying and standing), edema (peripheral, sacral, facial)

Hypovolemia

- Investigate underlying causes
- Hold diuretics and antihypertensives
- Consider IV fluids/ boluses

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- d/c use of any hypertonic PD solutions. Use 1.5% solutions

Hypervolemia

- Investigate for underlying cause
- Consider large dose of IV diuretics if pt produces urine (e.g. 120 mg furosemide trial)

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- Use hypertonic PD solutions (2.5% or 4.25%)
- Ensure dwell times are at least 2 hours to ensure maximum ultrafiltration
- Consider addition of icodextrin 7.5%

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Consult primary PD unit for prescription direction

Euvolemia- No obvious signs of hypo or hypervolemia

- Investigate alternative causes of systemic symptoms

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- Continue with current PD prescription