Flow-related Complications

BCRenal
Provincial Health Services Authority

Flow-related Complications

- In flow/out flow problems
  - Mechanical issues (often catheter related)
  - Constipation (bowel management)
  - Hernias
  - Leaks
- Patient technique failure
- Fluid management

Mechanical Complications

Catheter mechanical complications fall into 2 primary categories:

- inflow and outflow problems
- catheter malfunction

The PD catheter is positioned to sit low in the pelvic brim to allow minimal discomfort and maximal function. In this position, gravity will assist draining of the PD fluid with less likelihood of omental wrapping. The most common problems of catheter malfunction are issues with inflow and outflow. The diagnosis can often be found with history, examination and watching the patient perform a PD exchange.

The inability to either drain or infuse dialysis solutions can be caused by:

  - Constipation
  - Blood or fibrin clots
  - Air lock
  - Catheter tip migration
  - Omental wrap
  - Kinked or clamped catheter
  - Intraperitoneal adhesions
- Outflow failure – the drainage volume is substantially less than the inflow volume and there is no evidence of pericatheter leakage. Usually occurs soon after catheter placement. Often preceded by irregular drainage, increased fibrin in the dialysate or constipation
- Inflow failure – solution will not flow from the dialysate bag into the peritoneal cavity.

Most of the complications of catheter dysfunction are related to outflow issues and often result from inadequate bowel activity. (see bowel management care path) However, there are other causes that should be considered, especially if no improvement is seen with good bowel activity. Commonly these include hernias and leaks.

Hernia

- Hernia formation is a mechanical complication of PD that occurs as a result of intra abdominal pressure (IIP) from instillation of dialysis fluid into the peritoneal cavity. The increased pressure leads to increased tension of the abdominal wall and the potential for hernia formation in areas of weakness. Inguinal (direct and indirect), pericatheter, ventral, umbilical and epigastric are common locations for hernia formation.

Risk factors for hernia formation may be related to:

- Large dialysis solution volumes
- Sitting position
- Isometric exercise
- Valsalva maneuver
- Recent abdominal surgery
- Previous hernia repair
- Obesity
- Congenital anatomical defects

Dialysate leak

A dialysate leak is the loss of dialysate outside the peritoneal cavity through a route other than the lumen of the peritoneal catheter. The loss of dialysate from the peritoneal cavity occurs as the result of a loss of integrity of the peritoneal membrane.

Dialysate leaks may occur:

- From catheter exit site
- Extravasation into the subcutaneous tissues resulting in abdominal wall or genital edema.

Risk factors for leakage may be related to:

- Catheter insertion technique
- Catheter design
- Time between catheter insertion and initiation of PD
- Condition/weakness of the abdominal wall

Increased intra-abdominal pressure (IIP)may exacerbate the potential for both hernias and leaks. IIP may result from the instillation of dialysate into the peritoneal cavity.

The magnitude of the increase in intra-abdominal pressure depends upon:

- Volume of dialysate instilled
- Position of the patient (sitting>standing>supine)
- Age, body mass index
- Coughing, lifting, straining

Clinical Care Path:
Flow-related Complications

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Patient presents with difficulty draining, difficulty filling, difficulty filling and draining

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Assess patient exchange technique: are all clamps open? Is there fluid in the abdomen to drain? Consider a trial of filling patient with 500 ml of 1.5% PD dialysate and try to drain

Difficulty draining (technique OK)

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Assess bowel function. Initiate bowel care path if required

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Book x-ray to determine catheter position and consult primary PD unit

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Assess for hernias and other signs of dialysate leaks (swelling, bulging, pitting edema, weight gain, moisture at ES

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Consult primary PD unit if leaks/hernia is suspected or present.organize imaging if there are signs of leak or hernia

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If bowels are moving and no signs of leak, consult primary PD unit for treatment direction

Difficulty filling (technique OK)

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Consider that catheter may be blocked, most commonly with fibrin

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Consult primary PD unit for treatment direction

Difficulty filling and draining (technique OK)

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Consider that catheter is occluded or wrapped in omentum

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Book x-ray to confirm catheter placement

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Consult primary PD unit for treatment direction