Aim
The aim of this guideline is to aid nursing staff in the setting up of the PD-Paed system for peritoneal dialysis specifically for Neonatal Intensive Care. For more information see RCH Nephrology website http://www.rch.org.au/nephrology/protocols/index.cfm?doc_id=9967

Notes
- Peritoneal dialysis (PD) is indicated for anuria/acute renal failure. It allows for the slow removal of fluid and solutes while avoiding haemodynamic instability. This document is written specifically for neonates having PD on Butterfly Ward (NICU), additional general information can be obtained from the RCH Nephrology website.
- PD catheter (57cm coiled Tenckhoff) is inserted by the Urologists under general anaesthetic.
- A temporary PD catheter can be inserted on the unit in an emergency situation.
- A catheter extension is attached to the Tenckhoff catheter with a betadine cap in place until the patient is ready for connection to the PD Paed system. (This cap is single use only).
- When PD is no longer required, cap the end of the catheter extension with a new betadine cap until the Tenckhoff catheter is removed. All peritoneal dialysis should be ordered on the MR 61A. The order should be updated daily by medical staff, and checked and signed by nursing staff every 24 hours.
- Ensure accurate PD ultrafiltration (UF) inflow volume and outflow volume are recorded on MR 61B. Record only the hourly and progressive UF totals on the fluid balance chart MR 732A.
- Available solutions used for PD are balance 1.5%, 2.3% or 4.25% glucose. The “balance” solutions are delivered in a double chamber bag. Mixing both solutions by opening the seam between the two chambers results in the ready-to-use solution.

Indications for Peritoneal Dialysis:
- Hyperkalaemia
- Fluid overload
- Refractory acidosis
- Uraemic symptoms

Contraindications for Peritoneal Dialysis:
- Congenital Diaphragmatic Hernia
- Abdominal wall defects – omphalocele or gastrochisis
- Bladder extrophy
- Recent abdominal surgery – e.g. necrotising enterocolitis, babies with vesicostomies, colostomies, malignancies

Complications:
- Bacterial/fungal exit site infection, which can lead to tunnel infection and peritonitis if not treated promptly
- Bacterial/fungal peritonitis
- Umbilical/inguinal hernia
- Bowel perforation
- Ineffective dialysis due to poor in-out flows secondary to migration of Tenckhoff catheter, or due to problems with the PD lines

Equipment for setting up the PD-Paed system:
- PD-Paed System
- PD fluid
- Warming appliance – blood warmer
- Dressing trolley
- Sterile field
- Sterile gloves

Procedure:
- Setting up for and connecting system to PD catheter is performed using a sterile technique
- Bag changes can be done with a procedural hand wash and non-touch technique
- Check medical orders for dialysis, i.e. dialysate fluid, volume, frequency
- Check expiry date of PD System and package for possible damage
- Check correct PD fluid and expiry date
- Clean work surface with chlorhexidine
Contents of the PD system package:

The PD-Feed System consists of the following parts identified within the packaging by respective colouring and paper tapes:

1. Inflow system (red clamps/connectors)
2. Warming line
3. Drainage bag (yellow clamps/connectors)
4. Drainage system (yellow clamps/connectors)

Preparing the system:

- The following can be done with a clean procedural handwash.
- Prepare the PD fluid – the fluid comes in a double chamber bag. To mix the solution: Check that the lambda seam (λ) is intact before opening it.
- Apply pressure by rolling up the bag from the upper ends until the middle seam opens

- Roll up the bag from the upper edge, until the Lambda seam of the lower triangle is completely opened.

- Hang up the PD fluid and do not unroll the coiled tubings

NB: A drainage bag comes attached with the PD fluid. This drainage bag becomes irrelevant when using the PD burette system. Therefore, hang this drainage bag behind the PD fluid and do not use.
- Unscrew the yellow protection cap of the DISC and discard just prior to attaching to the sterile PD lines (get someone to do this if scrubbed)

- Open PD packaging system onto the sterile field

- **Don sterile gloves**
- Close all 7 clamps of the PD-Paed System

- Locate warming line (labelled), attach red connector of the warming line to the “inflow system” (labelled).
- Attach other end of warming line to the blue connector of the “drainage system” (labelled).
- Attach the drainage bag to the yellow connector of the drainage system
- NB. The cap on the vent of the burette is not supposed to be loosened or removed. This cap allows air passage even if it is completely screwed.
- Take the “inflow system” and unscrew the clear cap on the very top of this line and attach to the PD fluid by screwing onto the DISC with the yellow protection cap removed.
- Place warming line in temperature controlled blood warmer.

### Priming the System:

- Ask a helper to turn the dial on the DISC to the last 3 dots
- There are 2 different baselines to choose from. Select the left measurement for the inflow burette and the right measurement for outflow burette. Cover the measurement that is not required to avoid confusion.
Open the red clamp between the disc and the inflow burette; fill the burette to ~150mls. Then close the clamp. Do not drain the inflow burette completely to prevent air from getting into the line.

Open the red clamp below the inflow burette and allow fluid to run through until fluid squirts out of blue PIN (this blue pin like connector attaches to the PD catheter to the patient. **Do not push in the pin** as this will make the line unable to be used). Re-clamp red clamp, attach set to patient, unclamp patient catheter, unclamp blue clamps and commence draining patient. This way allows commencement of PD, starting the drain also primes the drain line. (Remove sterile gloves)

Fill the inflow burette to prescribed inflow volume.

The system is now ready for dialysis.

**Dialysis procedure:**

**Inflow**
- Fill the inflow burette by opening the red clamp and fill to the prescribed volume, close the clamp (aim to grade up to fill volumes of 40ml/kg).
- Open the 2 red clamps, one before and one after the warming line to infuse the PD fluid to patient.
- Observe the burette level during the inflow, close the clamps when the Fluid level reaches ‘0’ and the prescribed volume is infused.

**Dwelling**
- Dwell time according to medical orders (the fluid remains in the peritoneum providing an exchange)

**Outflow**
- Open blue clamp between PIN connector and outflow burette
- Observe the fluid for clarity and fibrin (document abnormal fluid and alert the Renal team immediately)
- Close clamp when drain is completed
- Measure and record the amount of dialysate drained
- Empty burette by opening the yellow clamp between the burette and drainage bag, close clamp when drain completed.

Repeat above procedure for the next cycle. Always ensure that each cycle is recorded on the PD ultrafiltration record sheet (MR 61B) and that only the hourly and progressive UF is also documented on the fluid balance chart.

**Care of PD catheter and lines:**
- If there are problems with inflow or outflow check the following:
  - Patient catheter and PD lines for kinks and/or closed clamps;
  - The ports on top of the burettes, if they become wet then it interferes with the internal pressures of the line and affects the flow;
  - The blue PIN, if it is partially or fully pushed in then fluid will no longer flow properly;
• Attempt to reposition the patient to encourage better flow. Manual PD relies on gravity to help with flows;
• Good inflow but poor outflow can mean migration of PD catheter, notify Renal team/surgeons especially if abdomen becomes distended.
• Patient fluid balance chart, if urine output has increased then there will be less PD drainage, if the child is dehydrated there will be less drainage;
• Overall patient condition, does child look overloaded – oedematous, distended abdomen, high BP, increased WOB or dehydrated – sunken eyes, poor skin turgor, low BP, tachycardic.

  o If the child has peritonitis then they will have IP (intra-peritoneal) antibiotics, and it is recommended that the PD extension line be changed under sterile conditions (page the PD co-ordinator 5721 to assist with this task)

  o Check lines regularly for leakage of fluid due to cracks in the line or poor connection. The PD system is supposed to be a closed circuit, if there are leaks then this constitutes possible contamination. Replace the set and take a PD fluid sample for culture and inform Renal team, they will decide whether prophylactic IP antibiotics are required.

  o PD line changes – every 3rd day – sterile technique

  o PD fluid bags are changed daily (unless additives require more frequent changes) – procedural hand wash, non-touch technique

  o PD exit site dressing changes are done as directed by Nephrology team. Usually the post-op dressing is changed on day 7-14 and if a stitch is in-situ, it is to be removed on day 10 and should only be done by the PD co-ordinator. After this time dressing changes are done every 3-7 days or as directed by PD co-ordinator (refer to PD co-ordinator regarding type of dressing used)

For all equipment related to PD, contact PD co-ordinator on extension 55721
PD fluids can be ordered from Pharmacy

Contact the Koala Ward for assistance out of hours, if required

Links