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|  <p><b>BC Renal Agency</b><br/>An agency of the Provincial Health Services Authority</p> | <p><b>Assisting with the Bedside (Percutaneous) Insertion of Chronic Peritoneal Dialysis Catheters</b></p> |
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| <p><b>Clinical Practice Standards and Procedures</b></p> | <p><b>Section:</b>                      <b>Origin Date:</b>    <b>May, 2009</b></p> <p><b>Number:</b>                      <b>Revised Date:</b></p> |
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This procedure is posted on the BC Provincial Renal Agency website – Health Professionals Channel – Standards and Guidelines – <http://www.bcrenalagency.ca/professionals/standguide.htm>

Related procedure: Assisting with the Bedside<sup>1</sup> (Percutaneous) Removal of Chronic Peritoneal Dialysis Catheters (also on the BCPRA website).

## 1.0 PRACTICE STANDARD

### Skill Level (Nursing):

Nurses<sup>2</sup> who have received orientation to the procedure, potential complications and relevant peritoneal dialysis (PD) equipment and supplies may assist the physician with bedside PD catheter insertions.

A two-hour orientation to PD catheter insertions and removals is anticipated to be sufficient for nurses who have experience in peritoneal dialysis or assisting with procedures. A longer time may be required for those who do not have peritoneal dialysis experience or experience in assisting with procedures. Orientation to include observation of one procedure and assistance (gloved) with second.

<sup>1</sup> Throughout this document “bedside” procedure refers to a procedure performed in a setting outside the operating room.

<sup>2</sup> Nothing in current legislation or the standards of the Licensed Practical Nurses (LPN) College of BC precludes an LPN in assisting with PD catheter insertions/removals. Employer policies may limit LPN practice in a particular hospital or unit after consideration of factors such as the availability of support, education, experts for consultation, staffing levels, etc. If conscious sedation is utilized, a formalized Operating Room LPN program may be required (information based on telephone communication with the CLPNBC, May 2009).

**Need to Know:**

In BC, chronic PD catheters are inserted in two ways:

- a. As a surgical procedure in the operating room performed by a vascular or general surgeon. May be done using an open incision and surgical dissection (laparotomy) or a laparoscopic technique. Both are done as same day or short stay (1 – 2 day post-operative stay) procedures and under a general anaesthetic.
- b. As a “bedside” (non-surgical) procedure in a non-surgical setting performed by a physician who has had special training. May be done using a (i) trocar, rigid catheter and guide wire (Seldinger technique); or (ii) preassembled cannula with trocar and a spiral sheath (Quill) and peritoneoscope (Y-Tec technique). Both are done as outpatient procedures and may involve an overnight stay. Procedures are done using a local anaesthetic +/- an anti-anxiety medication, narcotics or conscious sedation.

*Pre-PD bedside catheter insertion:*

- Written consent must be obtained prior to initiating the procedure.
- Anticoagulants (including acetylsalicylic acid or Aspirin®) and antiplatelet drugs are discontinued 5 days prior to the procedure to prevent bleeding (if they have not been, please inform the physician performing the procedure).
- An international normalized ratio (INR) may be ordered 3 days prior or just prior to the procedure to measure coagulation status (if ordered, ensure results are available on the chart prior to the procedure).
- Calcium and iron supplements may be discontinued up to one week prior to the procedure to prevent constipation.
- Patients are asked to complete a bowel preparation prior to the procedure to reduce the risk of bowel perforation during catheter insertion.
- Patients are asked to have a light breakfast or no breakfast on the day of the procedure (to keep the bowel clear and enable a general anaesthetic if complications arise during or after the procedure).
- Patients are asked to take their regular medications on the day of the procedure with sips of water. Patients with diabetes are provided specific instructions re diabetes medications (insulin dose is usually reduced).
- Patients are asked to void prior to the procedure to reduce the risk of perforation during the procedure.
- Procedure is done using local anaesthetic (anaesthetize the area of the primary incision) +/- an oral anti-anxiety agent, narcotic or conscious sedation.
- The Tenckhoff catheter is used for PD bedside catheter insertions. Variations include:
  - Number of cuffs (one vs two; two cuffs are most common with one pre-peritoneal and one below the skin)
  - Design of the subcutaneous pathway (permanently bent vs straight; straight catheters are the most common).

- Design of the intra-abdominal portion (straight vs curled/coiled; curled catheters are the most common; curled catheter is less likely to migrate).

*During PD bedside catheter insertion:* Wash hands and use maximal sterile barrier precautions.

- Staff: surgical mask covering mouth and nose, surgical cap or hood, sterile or clean gown and sterile gloves.
- Patient: gown or pajamas and sterile drapes from head to toe with the abdomen exposed. A mask covering the patient's mouth and nose is recommended, especially if patient is methicillin-resistant staphylococcus aureus (MRSA) positive or has an airborne infectious disease.

*Post-PD catheter insertion:*

- The dialysis fluid should fill and drain rapidly and the patient should not have an unusual urgency to void or defecate. Dialysate returns should show no evidence of faecal material or persistent bleeding.
- Initial dressings remain in place for one week post-procedure (unless dressing is not intact or wound requires assessment secondary to pain, wet dressing or suspected infection). Catheter should be immobilized and secured to the abdomen to enable healing of the exit site.
- Patients return to the PD clinic or another designated area once per week to have their dressing changed and PD catheter flushed once per week until they start on dialysis. Alternative arrangements may be made for dressing changes and flushing of catheters if more convenient for patients.
- If possible, the PD catheter should not be used for at least two weeks post-insertion to allow proper healing.

*Potential complications of PD catheter insertions include:*

1. Organ perforation:
  - a) Bowel perforation: sudden abdominal pain, hissing sound and/or foul smell from gas release, watery stool, inadequate drainage of dialysate, dialysate effluent may be cloudy, odorous or clearly faecal, dipstick of feces shows high glucose (indicating presence of dialysate)... may require surgical intervention.
  - b) Bladder perforation: sudden pain, extreme urgency to urinate, massive voiding of dialysate, unable to instill and/or drain dialysate, dipstick of urine shows high glucose (indicating presence of dialysate)...may require surgical intervention.
2. Catheter placed preperitoneally: pain on inflow, minimal or no drainage, initially clear drainage becomes blood-tinged... may need to remove catheter.
3. Bleeding: dialysate dark red and does not clear with rinses, may be bleeding at catheter exit site... may require surgical intervention.

## 2.0 EQUIPMENT

- PD catheter insertion tray (see Appendix 1 for contents)
- Sterile gloves x 2
- Sterile or clean gowns x 2
- Surgical cap or hood x 2
- Sterile towel x 1 (to dry hands)
- Masks x 3 (MD, RN, patient)
- Soaker (blue) pads x 2
- Antiseptic solution and scrub brush
- Syringe 10 mL x 2
- Disposable needles (#18g, #21g, #25)
- Lidocaine with epinephrine
- Lidocaine without epinephrine
- 1 set of curved Kelly forceps (for blunt dissection)
- 1 set of retractors/spreader
- Blade stab (for exit)
- Temporary PD catheter with connecting tube and catheter holder
- Permanent PD catheter
- IV pole with Y-tube PD administration set
- 2 litre PD drainage bag
- 2 litre bags of dialysate with heparin 1:1000 IU instilled x 2
- 500 cc 0.9% sodium chloride irrigation solution
- Sutures
- Dressing over exit site (e.g., Mepore)
- Abdominal pads (2)
- If using conscious sedation, Midazolam, fentanyl, and metoclopramide (Maxeran®) & oxygen saturation monitor
- If using pre-operative antibiotic, antibiotic (e.g., ceFAZolin, vancomycin or cloxacillin)

If Seldinger Technique, also include:

- Trocar
- Guidewire
- Dilator/introducer
- Split-sheath

If Peritoneoscopic/Y-Tec Technique, also include:

- Quill catheter guide
- Peritoneoscope

## 3.0 ASSESSMENT AND INTERVENTIONS

### *Preparation for PD bedside catheter insertion:*

1. Ensure timely arrival of patient (1 hour prior to procedure).
2. Ensure consent for procedure has been signed.
3. Record patient's current condition including vital signs (BP, pulse, and temperature), blood glucose using portable meter (if patient has diabetes), height, weight, and allergies.
4. Ensure patient has voided.
5. If ordered and not already performed, arrange to have blood drawn for stat INR (need results prior to starting the procedure).
6. Check patient for constipation (if laxative(s) taken prior to the procedure day was not effective, check with physician re the use of an enema).

7. If IV antibiotic ordered, start saline lock (give antibiotic pre-procedure).
8. Place soaker pads under the patient's trunk area.
9. Position patient supine and close to the edge of the bed in the flat position. Drape the patient and fold patient's arms on chest (i.e. out of the way). Expose the abdomen.
10. Administer pre-medication as ordered.
11. Clip the abdominal insertion area and scrub with antibacterial soap.
12. Assemble equipment, including the IV pole with the dialysis equipment and solution. Prime lines.
13. Wash hands with conventional antiseptic-containing soap and water or with waterless alcohol-based gels or foams.

***During PD bedside catheter insertion:***

1. Don surgical mask and cap or hood, sterile or clean gown and sterile gloves.
2. Place mask on patient, especially if patient is methicillin-resistant staphylococcus aureus (MRSA) positive or has an airborne infectious disease.
3. Open the outer wrapper of the PD insertion tray. Open inner wrapper with lifting forceps.
4. Add to the tray: needles (#18g, #21g, #25g), syringes (2x10mL), and abdominal pads (2).
5. Add antiseptic to one bowl. To the other bowl, add 250 mL of normal saline and 2,000 units of heparin.
6. Ensure physician gown and towel are accessible.
7. Close inner wrapper of tray.
8. Position the prepared PD system, garbage can, sharps container.
9. When physician arrives, open the inner wrapper of tray with the lifting forceps.
10. Provide assistance to physician as required:
  - Assistance to gown
  - Local anaesthetic
  - Temporary PD catheter with connecting tube and catheter holder
  - Permanent PD catheter with connecting tube and catheter holder
11. When instructed, securely connect the Y-Type PD administration set to the:
  - L-connector of the connection tube of the temporary catheter.
  - Connector of the permanent catheter.
12. Open roller clamp on the patient end of the peritoneal dialysis system immediately and tape the patient end of the system to the bed.
13. Check ease of inflow and outflow and clarity of drainage, when instructed by physician.
14. Apply dressing to midline suture area and catheter exit site as per protocol.
15. Monitor vital signs.
16. Remove gloves and wash hands with conventional antiseptic-containing soap and water or with waterless alcohol-based gels or foams.

**Post PD bedside catheter insertion:**

1. Monitor vital signs until stable (if conscious sedation was used, monitor blood pressure, pulse and oxygen saturation every 15 minutes until stable).
2. Start PD as ordered.
3. During infusion of the dialysis fluid, observe for indications of bowel or bladder perforation:
  - Bowel: sudden abdominal pain, hissing sound and/or foul smell from gas release, watery stool, inadequate drainage of dialysate, dialysate effluent may be cloudy, odorous or clearly faecal, dipstick of feces shows high glucose (indicating presence of dialysate).
  - Bladder: sudden pain, extreme urgency to urinate, massive voiding of dialysate, unable to instill and/or drain dialysate, dipstick of urine shows high glucose (indicating presence of dialysate).
  - **If either bowel or bladder perforation is suspected, drain the fluid and immediately notify the physician.** Obtain dialysis fluid specimen for investigation. Monitor vital signs q 5 minutes. Start IV and prepare patient for the operating room.
4. Observe the dialysis drainage and the dressing over the suture line for frank bleeding.
  - Some blood-tinged dialysis drainage is normal but usually it clears after several flushes.
  - A small amount of oozing at the catheter exit site is also normal.
  - **If dark red dialysate persists after several flushes and/or there is red bleeding at the catheter exit site, immediately notify the physician.** Monitor vital signs q 5 minutes. Start IV and prepare patient for the operating room. (Patients may go into shock, have decreased blood pressure, increased pulse, and clammy cool skin).
5. After the pre-medication has worn off and the fluid has drained from the abdomen, allow the patient to ambulate.
6. Obtain order to restart anticoagulants or antiplatelets as necessary.
7. Discharge according to unit specific criteria (usually within 2-4 hours of procedure):
  - Vital signs within normal range for patients
  - No evidence of bleeding
  - Able to ambulate
  - Tolerated light snack
  - Voided at least one
  - Somebody available to drive the patient home
  - Patient teaching completed (see next section)

## 4.0 PATIENT EDUCATION AND RESOURCES

### *Pre PD bedside catheter insertion topics:*

- Type of procedure, insertion site and type of catheter.
- Medication changes for day of procedure
- Transportation to and from hospital
- Bowel care prior to procedure
- Showering the night before and/or morning of procedure
- Eating the night before and day of procedure
- What to bring to the hospital the day of the procedure (snack and medications)
- What to wear (loose clothes such as jogging suit) the day of the procedure
- What to expect during the recovery period

### *Post PD bedside catheter insertion topics:*

- Dressing care
- No showers, baths or swimming until your nurse or doctor tells you
- Management of discomfort/pain
- Avoid constipation
- No heavy exercise or lifting until your nurse or doctor tells you
- No tight clothing that could put pressure on the catheter
- Follow-up appointments
- When to call for medical help (kidney doctor, nurse or emergency department)

### *Resources (available on BCPRA website):*

- “Bedside” Insertion of a Peritoneal Dialysis Catheter: Patient Preparation Sheet (patient instruction sheet under separate cover)
- Insertion of a Bedside Peritoneal Catheter: What do I Need to Know after the Procedure? (patient teaching pamphlet under separate cover)

## 5.0 DOCUMENTATION

1. Document patient tolerance to the procedure and any complications, length of the procedure, time and mode of discharge, dialysate inflow, outflow, and blood loss in the patient record.
2. Document insertions, re-insertions, and removals in the Dialysis Access module in PROMIS.

## 6.0 REFERENCES

1. American Nephrology Nurses’ Association. 2008. *Core Curriculum for Nephrology Nursing*, 5<sup>th</sup> ed., p.p., 777-795.

2. Ash, Stephen. 2003. “Chronic Peritoneal Dialysis Catheters: Overview of Design, Placement, and Removal Procedures,” *Seminars in Dialysis*, 16 (4), July/August, p.p., 323 – 324.
3. Asif, Arif. 2004. Peritoneal Dialysis Access-Related Procedures by Nephrologists, *Seminars in Dialysis*, 17 (5), p.p., 398 – 406.
4. Flanigan, Michael and Gokal, Ram. 2005. Peritoneal Catheters and Exit-Site Practices Toward Optimum Peritoneal Access: A Review of Current Developments, *Peritoneal Dialysis International*, 25, p.p., 132 – 139.

## **7.0 DEVELOPED BY**

1. BCs PD Clinicians Group.
2. Adapted from:
  - PD Catheter Management, Royal Columbian Hospital
  - PD: Assisting the Nephrologist with the Percutaneous Insertion of a Chronic Indwelling PD Catheter, Vancouver Coastal Health

## **8.0 REVIEWED BY**

1. BC PD Clinicians Group
2. BC Provincial Renal Agency – Medical Advisory Committee

## Appendix 1: Sample PD Catheter Insertion Tray

- Equipment**
- 1 - 11½" x 17" SS tray
  - 2 - 5" SS solution bowls
  - 6 - 2" x 2" gauze sponges 8-ply
  - 10 - 4" x 4" gauze sponges 4-ply
  - 3 - green towels
  - 1 - ortho towel (for lining tray)
  - 4 - ortho towels (folded)
  - 1 - 45" x 45" wrapper
- Instruments**
- 3 - artery forceps (use 1 for placing in first fold of wrapper)
  - 1 - 6½" needle holder
  - 1 - 6" dressing forcep
  - 1 - 6" tissue forcep
  - 1 - suture scissor
  - 1 - #3 B.P. handle
- Assemble**
- Place tray with 17" side facing you  
Line tray with ortho towel allowing excess towel to overflow evenly on all sides  
Place (2) solution bowls side by side along left 11½" side of tray  
Place instruments in order given along bottom of tray next to bowls  
Place 6 - 2" x 2" gauze and 4" x 4" gauze across top of tray  
Place (3) green towels and (4) ortho towels evenly over items on tray  
Fold surplus towel from bottom over tray forming a 2" cuff. Place artery forcep in this first fold (the forcep will be sterile and can be used to add items to tray by user).  
Fold surplus towel from top over tray forming a 2" cuff  
Fold in sides of towel  
Wrap diagonally with 36" wrapper  
Use instrument packing slip and label "*PERITONEAL DIALYSIS TRAY*" with initials and date
- Sterilize:** Steam sterilize at 134° C. (273° F.) for 4 minutes