Pleural Effusion Drainage Using a Tunnelled PleurX™ Catheter

Corporate Policy & Procedures Manual
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Approved by:
Chief Medical Officer; and
Chief Operating Officer

CAUTION: Sound Alike / Look Alike Warning
 The title of this policy and procedure is similar to another policy/procedure entitled “Peritoneal Fluid Drainage using a Tunnelled PleurX™ Catheter”.

Purpose
To describe the standards of care and procedure for draining a pleural effusion when the patient has an indwelling pleural (PleurX™) catheter in the pleural space.

Applicability
This procedure applies to all Covenant Health facilities, staff, members of the medical staff, volunteers, students and any other persons acting on behalf of Covenant Health.

General
1. Confirm patient care orders to drain fluid using the PleurX™ catheter. Order must indicate:
   a. frequency of drainage;
   b. maximum amount of fluid to be removed per drainage;
   c. type of drainage: intermittent or continuous;
   d. suture removal order, if sutures in-situ; and
   e. frequency of vital signs, if required

2. Standard Infection Prevention and Control practices shall be followed for all procedures associated with an indwelling pleural catheter. This includes hand hygiene with an antiseptic agent (either an alcohol-based hand rub or washing with an antimicrobial soap), appropriate use of personal protective equipment (PPE) and adherence to aseptic technique.

3. The patient’s indwelling PleurX™ catheter must not be accessed with any object or device other than the specialized connector provided in the PleurX™ drainage line.

4. The pleural catheter dressing will be changed each time the catheter is accessed using strict aseptic technique. If the catheter is not accessed, the dressing will still be changed at least twice a week in acute care and continuing care settings, or at a

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1 Frequency of vital signs depends on patient’s prognosis and symptom management that aligns with their values and wishes for care
2 For patients who are mobile, falls’ risk, or at risk of hypotension, consider obtaining pre and post procedure vital signs
minimum of every seven days in the community setting, or PRN if soiled, wet, or loose.

5. When the regulated health care professional is accessing the catheter to drain the chest, they must remain with the patient until the procedure is complete.

6. In the community, the client or caregiver may perform the procedure if the in-home training has been completed with successful demonstration of the procedure observed. In acute care and continuing care settings the client or caregiver may perform the procedure if training has been completed, provided this is allowed per institutional or unit specific policy.

7. If complications occur during the drainage, contact the physician/nurse practitioner (NP). Refer to Section 8, Potential Complications.

Equipment

If the patient from the community presents to the Emergency Department, requires pleural drainage and has the drainage kit with them, staff may use this equipment. While in hospital, the equipment utilized will be a PleurX™ drainage line, an evacuated/wound drainage bottle, or if the physician/NP has ordered the drainage to straight drainage you would use the PleurX™ drainage line and a drainage system container/bag...

Required Equipment:

- PleurX™ drainage kit
  Note: If you are using the PleurX™ kit for drainage, all supplies you require will be located in that kit.

  OR

- If using PRE-VAC wound drainage bottle you will also need to gather:
  - 1 PleurX™ lockable drainage line
  - 1 PleurX™ valve cap
  - 1 sterile 4 x 4 foam dressing
  - 2 sterile 4 x 4 gauze dressings
  - 1 pair of sterile gloves
  - 5 chlorhexidine swabs or swab sticks
  - 1 sterile procedure pack or dressing tray
  - 1 large sized occlusive dressing
  - 1 sterile scissors

Procedure

See Appendix 1 for step by step procedure

Resources

Pleural Effusion Drainage Using a Tunnelled PleurX™ Catheter

(e.g. PleurX™)

Related Policies
- Covenant Health PleurX Catheter Insertion Policy V-197
- Covenant Health Biomedical Waste Sorting, Handling and Disposal Covenant Health Policy (Policy # 3.1.3.7)

References

Revisions
- August 7, 2015
- January 3, 2012
APPENDIX 1: PROCEDURE

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1. Pre-Drainage Assessment

1.1 Presenting symptoms such as shortness of breath or abdominal discomfort often indicate drainage is required.

1.2 Baseline vital signs may be required depending on the patient’s condition, disease trajectory, and patient care orders.

2. Initial Steps and Dressing Removal

2.1 Perform hand hygiene as per Infection Control Guidelines. Don clean protective gloves.

2.2 Clean your working surface using a hospital approved disinfectant and allow the surface to air dry.

2.3 Remove the old catheter dressing, note the skin condition, sutures (if in situ) and puncture site. **Note**: Do not use scissors or sharp objects around the pleural catheter to avoid the risk of damaging the line.

2.4 Open the procedure pack/dressing tray and place it on your clean working surface, ensuring you maintain a sterile field.

2.5 Open the appropriate drainage bottle and/or catheter drainage bag in addition to the drainage line package. Place the bag/bottle onto, or next to, the sterile field with the drainage line on the sterile field.

2.6 Prepare the sterile dressing items onto your sterile field (i.e. open your swabs, dressings, new valve cap, scissors).

2.7 Remove and discard protective gloves.

2.8 Perform hand hygiene and don sterile gloves.

DRAINAGE (depends on drainage device being used, see below)

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3 Frequency of vital signs depends on patient’s prognosis and symptom management that aligns with their values and wishes for care.
### 3. Intermittent Drainage: Draining fluid from the pleural cavity using the PRE-VAC wound drainage bottle

**Note:** With PRE-VAC® brand wound drainage bottles, the drainage line that comes pre-attached to the PRE-VAC® bottle IS NOT ACCESIBLE to the indwelling patient pleural catheter, so you must change out the PRE-VAC® attached drainage line with a PleurX™ lockable drainage line.

3.1 Change out the drainage line attached to the PRE-VAC® bottle to a PleurX™ lockable drainage line by utilizing a luer-lock connection and sterile technique. Rest this line and bottle onto your sterile dressing field.

3.2 Ensure the clamps on the drainage bottle and drainage line are completely closed.

3.3 Using one swab, cleanse around the indwelling catheter insertion site. Using another swab, clean from the proximal to distal end of the catheter, both front and back side. Using another swab, clean the valve cap.

**Note:** During cleaning, prevent the indwelling catheter from touching non-sterile surroundings by holding the catheter upright with your sterile gloved hand.

3.4 Position a sterile drape next to the patient and rest your cleaned catheter and cap on the drape.

3.5 Remove and discard the old catheter cap. While still holding the valve, pick up one of the chlorhexidine swabs and wipe the valve opening. Do not push the swab into the valve.

3.6 Continuing to hold the catheter valve in your hand, pick up the drainage line and insert the tip into the patient’s catheter valve. Push the tip completely into the valve. You will likely feel and hear a ‘click’ when the tip and valve are locked together. **DO NOT ATTEMPT TO ACCESS THE CATHETER VALVE WITH ANYTHING OTHER THAN THE PLEURX™ DRAINAGE LINE.**

3.7 Open the slide clamp on the vacuum drainage bottle.

3.8 Release the squeeze clamp on the drainage line. Fluid will now flow into the vacuum bottle. Regulate the flow rate by partially closing and opening the squeeze clamp.

**Note:** Remove fluid as tolerated. Coughing and chest tightness during the procedure are normal and is related to lung expansion, however, if the patient experiences severe coughing and chest tightness the drainage should be slowed. The amount drained MUST NOT exceed one (1) litre per drainage episode unless otherwise prescribed.

3.9 When the bottle is full (indicated by the complete expansion of the green-colored vacuum regulator on the bottle) or if flow stops, close the squeeze clamp on the drainage line completely.

3.10 If you need to drain additional fluid using additional bottle(s), verify the patient care order to ensure you are within drainage volume parameters. Set up additional drainage bottle(s) as per points 2.5 through 2.8 and repeat steps 3.2 to 3.9 above. It is not necessary to replace the drainage line with a new one if you are accessing additional drainage bottles.

**NOTE:** It should not be necessary to reposition the patient to increase flow. Repositioning will only yield small amounts of fluid.
4. Intermittent Drainage: Draining fluid from the pleural cavity using the Pleurx™ kit

**NOTE:** If you are using either the 500ml or the 1000ml vacuum bottle kit, ensure you remove the plastic support clip from the neck of the bottle. Then push the white T plunger firmly into the neck of the bottle to puncture the foil seal within the bottle.

4.1 Ensure the clamp on the drainage line is completely closed.

4.2 Remove the drainage tip cover. Carefully place the tip of the drainage line back onto the sterile field.

4.3 Grasp the catheter valve, remove and discard the old cap. While still holding the valve, pick up one of the chlorhexidine swabs and wipe the valve opening. **Do not push the swab into the valve.**

4.4 Continuing to hold the catheter valve in your hand, pick up the drainage line and insert the tip into the catheter valve. Push the tip completely into the valve. You will feel and hear a ‘click’ when the tip and valve are locked together. **DO NOT ATTEMPT TO ACCESS THE CATHETER VALVE WITH ANYTHING OTHER THAN THE PLEURX™ DRAINAGE LINE.**

4.5 Open the slide clamp on the vacuum bottle.

4.6 Release the squeeze clamp on the drainage line. Fluid will flow into the vacuum bottle. Control the flow by partially closing the squeeze clamp.

**Note:** Remove fluid as tolerated. Coughing and chest tightness during the procedure are normal and is related to lung expansion, however, if the patient experiences severe coughing and chest tightness the drainage should be slowed. The amount drained MUST NOT exceed one (1) litre per drainage episode unless otherwise prescribed.

4.7 When the bottle is full or flow stops, close the squeeze clamp on the drainage line completely.

4.8 If the patient still feels short of breath, or if the bottle is full of fluid, all of the chest fluid may not have drained. Verify the patient care order to ensure you are within drainage volume parameters. Set up additional drainage bottle(s) as per points 2.5 through 2.8 and repeat steps 4.1 to 4.7. **It is not necessary** to replace the drainage line with a new one if you are accessing additional drainage bottles.

**Note:** It should not be necessary to reposition the patient to increase flow. Repositioning will only yield small amounts of fluid.
5. Terminating the Drainage

6.1 Hold the drainage line in one hand and the catheter valve in your other hand; pull the drainage line tip out to the valve in a firm, smooth motion.

6.2 Using a chlorhexidine swab, clean around the catheter valve.

6.3 Place the new cap over the catheter valve and twist it clockwise until it snaps into its locked position.

6.4 Dispose of the drainage and vacuum bottle set as the Biomedical Waste Sorting, Handling and Disposal Covenant Health Policy (Policy # 3.1.3.7).

6. Specimen Collection (if ordered/prescribed)

6.1 Collect specimen from the vacuum bottle immediately following drainage procedure.

6.2 Ensure to maintain sterile technique to avoid contaminating specimen.

6.3 Dispose of the drainage and vacuum bottle set as the Biomedical Waste Sorting, Handling and Disposal Covenant Health Policy (Policy # 3.1.3.7).

7. Placing a New Dressing

7.1 Ensure you have maintained sterile technique; otherwise, perform hand hygiene and don new sterile gloves.

7.2 Clean around the PleurX™ catheter site with a chlorhexidine swab/swab stick. Allow the skin to thoroughly air dry.

7.3 Starting at the exit site, clean the catheter with a chlorhexidine swab/swab stick, working from proximal to distal end.

7.4 Place a foam dressing around the catheter insertion site. If the dressing is not pre-split, you will need to create a split foam using sterile scissors to cut the dressing.

7.5 Wind the catheter into loops and place it over the foam pad. Cover the catheter with sterile gauze pads.

7.6 Apply the transparent self-adhesive dressing to ensure the catheter insertion site and dressings are completely covered.

7.7 Label dressing with the date and your initials.
8. Assessment During Drainage

**Note:** Monitoring vital signs depends not only on the patient care orders, but also depends on patient’s prognosis and symptom management that aligns with their values and wishes for care. For patients who are mobile, falls’ risk, or at risk of hypotension, consider obtaining pre and post procedure vital signs.

<table>
<thead>
<tr>
<th>8.1</th>
<th>Monitor patient for:</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>• worsening shortness of breath</td>
</tr>
<tr>
<td></td>
<td>• chest pain</td>
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<tr>
<td></td>
<td>• symptoms of hypotension</td>
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| 8.2 | Monitor appearance and volume of drainage fluid. |

| 8.3 | If pleural fluid drainage is less than 50 mL on each occasion for three consecutive drainages notify the physician/NP. |

9. Documentation

<table>
<thead>
<tr>
<th>9.1</th>
<th>The following should be recorded on the patient care record:</th>
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<tbody>
<tr>
<td></td>
<td>• system function (type and amount of drainage);</td>
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<td></td>
<td>• time drainage was initiated or system changed;</td>
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<td></td>
<td>• patient status, which may include respiratory rate, lung sounds, pulse oximetry, blood pressure, skin color, temperature, mental status;</td>
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<td></td>
<td>• chest dressing status and care done;</td>
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<td></td>
<td>• drainage characteristics and amount;</td>
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<td>• patient’s toleration of procedure.</td>
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### 10. Potential Complications

<table>
<thead>
<tr>
<th>Complication</th>
<th>Action</th>
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<tbody>
<tr>
<td><strong>INFECTION</strong></td>
<td>• Routinely monitor catheter site for signs of infection, which may include redness, swelling, and discomfort.</td>
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<td></td>
<td>• Monitor patient for signs of infection (fever, chills, rigidity of muscles).</td>
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<td></td>
<td>• Monitor the drainage fluid for changes in colour, clarity, viscosity and volume. Colour of the fluid can change depending on the volume status of the patient, e.g., if the patient is dehydrated the fluid can look more concentrated.</td>
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<td>• Notify the physician/NP immediately if problems arise.</td>
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<td><strong>HYPOTENSION</strong></td>
<td>• If indicated, obtain baseline vital signs prior to draining the catheter.</td>
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<td>• If indicated, monitor the vital signs after the drainage procedure.</td>
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<td></td>
<td>• Observe for signs of pallor, tachycardia, dyspnea and oliguria.</td>
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<td></td>
<td>• If patient develops dizziness or fainting slow the flow of drainage.</td>
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<td></td>
<td>• If symptoms persist, stop the drainage.</td>
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<td></td>
<td>• If the symptoms remain after the drainage, contact the physician/NP.</td>
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<tr>
<td><strong>CATHETER IS ACCIDENTALLY DISLODGED OR PUNCTURED</strong></td>
<td>• Immediately clamp or pinch the catheter closed as close to the skin as possible.</td>
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<td></td>
<td>• Place the patient on their side, catheter side down.</td>
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<td></td>
<td>• Call the Physician/Nurse Practitioner.</td>
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<td></td>
<td>• Monitor for shortness of breath and signs of shock.</td>
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<tr>
<td><strong>RE-EXPANSION PULMONARY EDEMA</strong></td>
<td>• Keep drainage volume under one (1) litre per drainage episode, except in extraordinary circumstances and as ordered by the physician/NP.</td>
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<tr>
<td>This is a rare yet critical complication; it may result from too rapid re-inflation of the lung tissues, with subsequent tissue damage that may be irreversible.</td>
<td>• If pulmonary edema is suspected, notify the attending physician/NP immediately.</td>
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<td>• Symptoms of pulmonary edema may include worsening shortness of breath, cough with frothy sputum, tachycardia, and irregular heart rate.</td>
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<td></td>
<td>• Most importantly, discontinue drainage immediately if patient develops chest tightness or excessive cough.</td>
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<td></td>
<td>• Perform a respiratory assessment after drainage.</td>
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