

Drains: Percutaneous – Management, Irrigation and Aspiration

This DST addresses the following drains which:

- end in the duodenum
- end in the gall bladder
- end in the abscess cavity
- end in the bile duct in the liver

Site Applicability

All VCH and PHC sites

Practice Level

Profession	Basic Skill	Advanced Skill
NP, RN, RPN	<ul style="list-style-type: none"> • Care and Management 	Additional education required*: <ul style="list-style-type: none"> • modification of a drain without an existing luer-lock to allow for irrigation • irrigation of the drain • aspiration of the drain
LPN		Additional education required*: <ul style="list-style-type: none"> • managing percutaneous drain dressings/drainage

**Additional education consists of observation of the skill being done and then a return demonstration of the skill.*

Policy Statements

- For the management of a percutaneous drain, a Physician/NP Order is required and must include:
 - confirmation of the drain's distal location
 - the purpose of the drain
 - who is responsible for issues/concerns regarding the management of the drain
- For the irrigation of a percutaneous drain, a Physician/NP Order is required and must include:
 - confirmation of the drain's distal location
 - the volume of sterile Normal Saline (NS) (or alternate solution) to be used
 - the frequency of irrigation
- For the aspiration (withdrawal of fluid) of a percutaneous drain, a Physician/NP Order is required.

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- Sterile Normal Saline for injection without preservative is the solution of choice for irrigation unless otherwise directed (follow specific Physician's/NP's orders for alternate solution recommendations).
- An extension tube, three-way stopcock and a positive pressure cap are required for irrigation/instillation or aspiration of percutaneous drains.
- Do not irrigate if drain has migrated out of its original position.
- A Percutaneous Transhepatic Biliary Drain (PTBD), also known as Percutaneous Transhepatic Catheter (PTC), is a catheter which ends in the bile duct within the liver and should not be aspirated or attached to any type of suction device due to risk of trauma to the liver. Historically the PTBDs were not irrigated but now may be; a physician's order for the amount of irrigation to be used and the frequency of irrigation is required.
- **Removal/replacement of percutaneous drains which end in the duodenum, gall bladder, abscess cavity or bile duct in the liver, is a Physician's/NP's responsibility.**

Quick Links:

Need to Know

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- [Precautions](#)

Procedures for the Management of Percutaneous Drains

- [Cover Dressing Change](#)
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Procedures for the Irrigation of Percutaneous Drains

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 - [Modifying a Hemovac/400cc drainage system for the addition of 3-way stop-cock](#)
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- [Appendix A: Examples of Percutaneous Tubes/Drains inserted in Radiology](#)
- [Appendix B: Example of a Stat-Lock Securement Device](#)

Need to Know

Percutaneous Drains are used in the treatment of various disease processes; common examples include:

- Benign or malignant biliary duct obstruction
- Post-operative strictures
- Abscess cavities

Percutaneous drains commonly used are identified in [Appendix A](#)

Percutaneous drains are inserted and changed by interventional radiologists. The client may require a drain for days to months and sometimes years. Usually, they need to be changed every 6 to 8 weeks to prevent occlusion.

In general, the drain is not sutured in place and therefore is a risk of dislodgment. In order to decrease this risk, the drain is secured internally by a loop at the end of the catheter which resembles a pigtail and are also secured by an external skin fixation device and dressing. The drain is marked at the skin exit site to assist with the assessment of placement. Drainage is collected into a bag/container (straight drainage or suction; Hemovac or Jackson Pratt). Drains may require gentle irrigation of fluid to maintain patency as per Physician/NP order.

Any questions/concerns should be directed back to the radiology department or the Most Responsible Provider (MRP) at the hospital where the drain was inserted.

Types of Percutaneous Drains

- **Percutaneous Drains – Ending in the Duodenum**

This drain is approximately 40 cm (16 inches) in length with multiple small drainage holes along the sides of the tube at the upper and lower end. It extends about 5 to 15 cm (2 to 6 inches) outside of the body. This drain is usually capped but may also have a drainage bag attached.

Bile drains into multiple side holes in the upper part of the tube, passes across the narrowing/stricture through the tube and then exits via the side holes in the bottom of the tube. This allows for bile to pass “physiologically” across strictures. During the placement of these tubes, occasionally some minor bleeding occurs or the bile may be naturally “thick” which may require gentle irrigation with sterile normal saline as per physician’s/NP’s order to maintain patency.

- **Percutaneous Drain – Ending in the Gallbladder**

Depending on the actual procedure, several different types of tubes are used, ranging from the pigtail catheter (as described above) to a Foley type catheter. These drains are also inserted percutaneously directly into the gallbladder and are usually attached to a bag. The percutaneous access allows the interventional radiologist to break up and remove gallstones in clients deemed medically unfit for surgery. This procedure is repeated over several weeks by the radiologist. The tube may require gentle irrigation with sterile normal saline as per Physician’s/NP’s order to encourage the removal of small particles. These tubes may also be inserted preoperatively to decompress and/or decrease gallbladder inflammation.

- **Percutaneous Drain – Ending in an Abscess Cavity**

As an alternative to surgery, a drain is inserted by the Radiologist directly into an abscess and may be attached straight drainage or to a suction device (e.g. Hemovac, Jackson-Pratt (JP)). Occasionally a drain is inserted at the time of surgery when the abscess cavity is not accessible by interventional radiology. Generally, the drain will require gentle irrigation with sterile normal saline as per Physician’s/NP’s order to evacuate the abscess, keep the drain patent and

promote healing. This intervention usually takes place over a 1 to 2 week period; however, it may also be maintained for several weeks.

NOTE: Hemovac or JP tubing does not include a luer-lock connector to accept a 3-way stopcock. In order to perform irrigation, the tubing must be modified to include luer-lock connector so that a 3-way stopcock can be added.

- **Percutaneous Transhepatic Biliary Drain (PTBD)**, also known as Percutaneous Transhepatic Catheter (PTC) - **Ending in the Bile Duct in the Liver**

This catheter used is inserted into the biliary system to allow bile to drain by straight drainage into the external bag or drain may be capped. The catheter is about 30 cm (12 inches) in length with several small drainage holes along the side of the catheter at the internal end. It extends about 10 cm (4 inches) outside of the body. The tubes may be secured internally by a loop at the end of the catheter which resembles a pigtail and are also secured by an external skin fixation device and dressing.

A PTBD is not to be attached to any type of suction device due to risk of trauma to the liver.

Precautions:

Alert the most responsible Physician/NP if any of the following occur for any drain:

- Leakage, redness, swelling and/or pain at the insertion site
- Hemorrhage/bleeding/clots
- Elevated temperature greater than 38.5°C
- Drain position has migrated out of its original position or the drain has come out

Equipment and Supplies

See specific procedure for equipment and supply.

Procedures for the Management of Percutaneous Drains

Cover Dressing Change:

A transparent film dressing is the more commonly used cover dressing for percutaneous drains where there is no drainage and skin is intact. It should be changed every 7 days or more frequently as clinically indicated (i.e. dressing not intact, soiled, denuded/irritated skin noted).

A sterile 4x4 gauze cover dressing should be used when there is drainage from around the drain site or there is a concern regarding the skin (denuded/ irritated) or S&S of local infection are noted. The dressing should be changed at least 2 times a week or more frequently if clinically indicated. Dressing should remain dry between dressing changes.

Equipment and Supplies:

- Clean gloves
- Sterile gloves
- Sterile dressing tray
- Sterile Normal Saline

- Alcohol wipe
- Skin barrier film wipe as required
- Small Steri-strip
- Dressing: either a sterile Transparent Film dressing or a sterile 4x4 gauze dressing
- Tape
- Paper ruler

Procedure:

1. Gather supplies as above.
2. Perform hand hygiene and prepare/position patient.
3. Perform hand hygiene and prepare sterile dressing tray.
4. Put on clean gloves.
5. Carefully remove cover dressing. If the insertion site is sitting outside of the cover dressing, then anchor tube at insertion site with a sterile 2x2 gauze in order to prevent dislodgement.
6. Remove clean gloves and perform hand hygiene. Put on sterile gloves
7. On first dressing change, use a paper ruler to measure from the insertion site to the end of the drain and record this measurement. On subsequent dressing changes, measure the distance and note any slippage of the drain; consult with Physician/NP if drain is seen to be slipping out.
8. Cleanse the skin around the insertion site of the percutaneous drain with sterile normal saline, move from center of drain exit site outwards, discarding each piece of gauze once it is lifted from skin.
9. Note condition of insertion site and surrounding skin. Redness, swelling and drainage at the insertion site may indicate infection; report to Physician/NP if concerns noted. Consult with NSWOC (Nurse Specialized in Wound Ostomy Continence) or Wound Clinician for skin issues related to drainage/moisture.
10. Carefully cleanse percutaneous drain from insertion site down its length with an alcohol wipe; the wipe will also remove any light adhesive residue.
11. Apply skin barrier film to peri-drain area if needed. Allow the peri-drain to dry completely before applying cover dressing (greater than 30 seconds).
12. If required, change the securement device – see [Securement Device Change](#) section below.
13. Apply the cover dressing ensuring that the insertion site is visible:
 - If using a sterile transparent film dressing (e.g. Opsite or Tegaderm) and the securement device is close enough to the insertion site that the transparent film dressing will cover it, along with the insertion site, then cover the securement device with 2x2 or 4x4, allowing for visibility of insertion site before applying the transparent film dressing. This will ensure that when transparent film is removed that it does not adhere to the securement device or pull the device off.



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- A sterile 4x4 gauze cover dressing may be used on its own if there are any of the following concerns noted on inspection of the surrounding skin: redness, rash, pustules or blisters which may indicate infection or contact allergy. Consult Wound Clinician or Physician/NP – MRP for direction on how to manage skin concerns.
14. Clean up work surface, remove gloves and perform hand hygiene.

Securement Device Change for Non-Sutured & Sutured Drain:

At the time of insertion, the drain may be sutured in place or a securement device may be applied.

The purpose of the securement device e.g. StatLock, steristrips or tape is to provide security for the non-sutured drain and to prevent traction on the drain (sutured/non-sutured) from the drainage tubing/bag. The securement device must be the correct size for the drain; the device should not pinch the drain nor should the drain be 'loose' once it is clamped into the device. Follow manufacturer directions for use of specific devices (e.g. StatLock® - see [Appendix B](#)); Steri-strips or tape may be used as an alternate to a commercially available securement device.

The principle of placement of the securement device is that it should be placed distal to the insertion site so as not to obscure visibility of the insertion site. It may be either under, or outside the border of, the transparent or gauze cover dressing.

If the securement device is under a transparent film dressing, ensure that the securement device is covered with a gauze dressing before the transparent film dressing is applied. This will ensure that when the transparent film is removed, it does not pull on the securement device.

Leave the securement device in place when the device and the surrounding skin are intact; note condition and document as "intact".

Change the securement device when the device has lost its adhesion and/or surrounding skin becomes denuded/irritated.

Equipment and Supplies:

- Sterile dressing tray
- Sterile Normal Saline
- Cover dressing supplies as needed
- Clean gloves
- Sterile gloves
- Adhesive remover wipe
- Skin barrier film wipe, if needed
- Securement device (must be the appropriate size for percutaneous drain) or steri-strips

Procedure:

1. Gather supplies as above.
2. Perform hand hygiene.

3. Prepare/position patient.
4. Perform hand hygiene.
5. Prepare sterile dressing tray and add all dressing change supplies.
6. Put on clean gloves. Open clamp on the securement device and gently lift percutaneous drain from securement device.
7. Gently remove the securement device from the skin.
8. Use the adhesive remover wipe to remove any adhesive from the skin previously covered by the securement device as well as from drain itself.
9. Cleanse the skin previously covered by the securement device, soak a 2x2 in sterile Normal Saline and wring out; cleanse in an outwards direction from the insertion site. Discard each gauze once it has been lifted from skin.
10. Note condition of the skin at the previously used securement site:
 - a. If the skin is intact:
 - i. apply skin barrier film to previously used securement site (slightly alter placement if possible to new area of skin) and allow to dry completely (greater than 30 seconds).
 - ii. Remove paper backing from the new securement device and apply device to skin. Gently press drain into securement device and close the clamp.
 - b. If the skin is not intact:
 - i. Provide treatment to non-intact skin e.g. silicone cream
 - ii. Place the securement device on an area of intact skin
11. Apply appropriate cover dressing based upon the condition of the skin – see [Cover Dressing Change](#) section above.
12. Clean up work surface, remove gloves and perform hand hygiene.

Procedures for Irrigation of Percutaneous Drains

A 3-way stopcock and an extension tube, if needed, are to be attached and left in place any time instillation/irrigation is ordered. A needleless connector is then added to the side port of the 3-way stopcock for greater ease of irrigation. Replace the stopcock or the needleless connector if soiled, broken, or blocked.

Adding or Changing a 3-way stopcock to the drainage system with an existing luer-lock:

Equipment and Supplies:

- Personal Protective Equipment as needed
- Sterile dressing tray
- Alcohol wipe
- Sterile 3-way stopcock
- Sterile needleless Connector
- Sterile gloves

Procedure:

1. Gather supplies as above.
2. Perform hand hygiene and prepare/position patient.
3. Perform hand hygiene; set up sterile dressing tray and supplies.

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4. Perform hand hygiene and put on Personal Protective Equipment.
5. Put on sterile gloves.
6. Use the alcohol wipe to cleanse, with friction, the connection between the percutaneous drain and drainage bag for 15 seconds and allow to dry completely for greater than 30 seconds.
7. Carefully disconnect the percutaneous drain from the drainage bag tubing, taking care not to contaminate the percutaneous tube end and the drainage bag connection end.
8. Connect the percutaneous drain to the 3-way stopcock and then to the drainage bag tubing.
9. Ensure the stopcock is open to the percutaneous drain/drainage bag and turned off to the side port. Add the needleless connector to the side port.
10. Clean up work surface, remove gloves and perform hand hygiene.

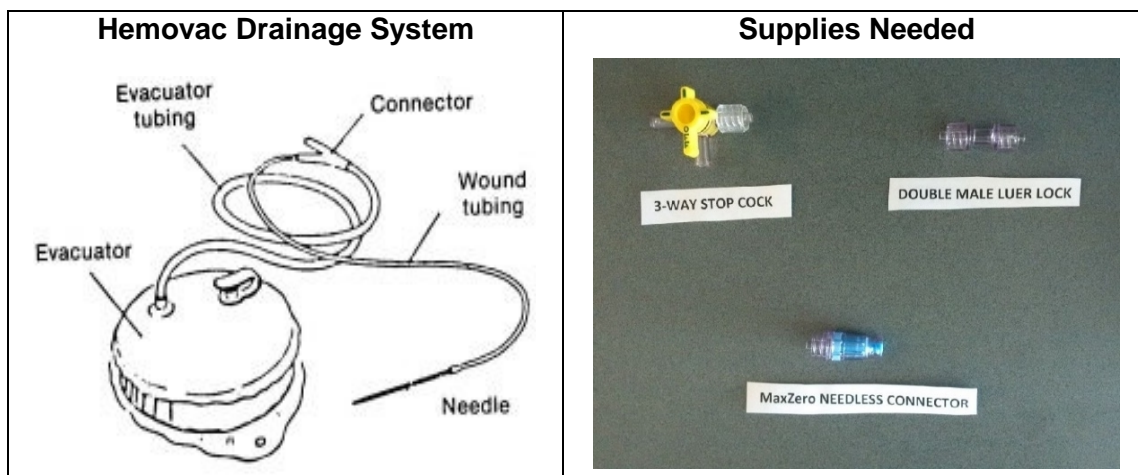
Adding or Changing a 3-way stopcock to the drainage system without an existing luer-lock:

If not already done in the OR, the drainage tubing of a Hemovac or Jackson Pratt can be modified to allow the addition of a 3-way stopcock and a needleless connector.

Modifying a Hemovac/400cc drainage system

Equipment and Supplies:

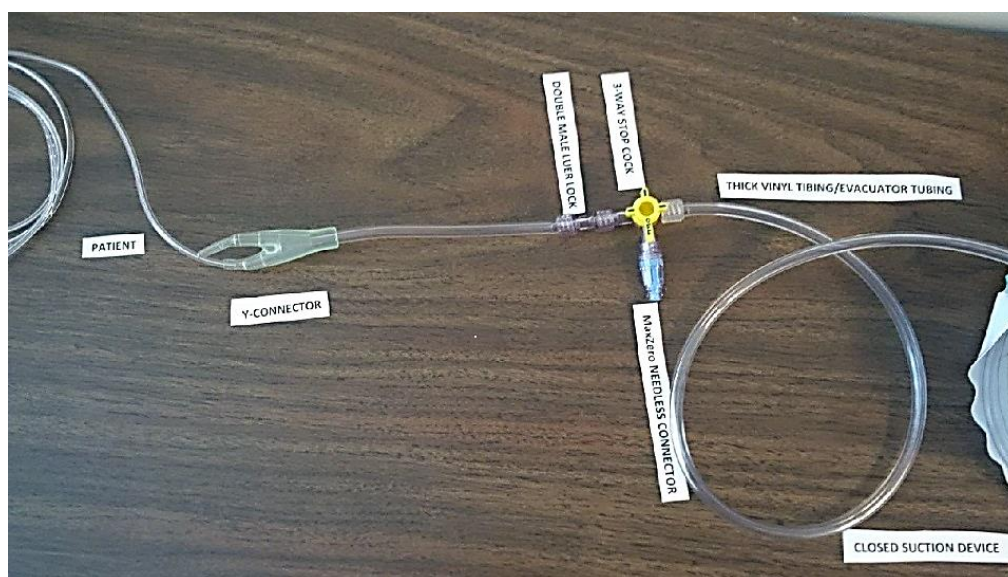
- Personal Protective Equipment as needed
- Sterile dressing tray
- Sterile gloves
- Sterile scissors
- Alcohol wipe
- Sterile 3-way stopcock
- Sterile double male luer-lock
- Sterile needleless connector



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Procedure:

1. Gather supplies as above.
2. Perform hand hygiene and prepare/position patient.
3. Perform hand hygiene; prepare sterile dressing tray and supplies.
4. Perform hand hygiene and put on Personal Protective Equipment.
5. Put on sterile gloves.
6. Pick up hard vinyl/evacuator tubing with a sterile 2x2 gauze and place sterile drape under work area.
7. Take the second alcohol wipe and vigorously cleanse, for 15 seconds with friction, the hard vinyl/evacuator tubing for a length of 20 cm, from the patient down towards the Y-shaped connector. Place the cleansed tubing on the sterile drape and allow to dry for greater than 30 seconds.
8. Using sterile scissors cut the tubing in the center of the cleansed area (about 10 cm from where the vinyl tubing connects with the soft silicone tubing).
9. Firmly insert one end of the double male luer-lock into the tubing end that goes to the patient. Twisting while inserting will assist with insertion. Make sure to insert firmly to prevent from slipping out.
10. Insert the male end of the 3-way stopcock into the cut end of the tubing that attached to the Hemovac device. Twisting while inserting will assist with insertion. Make sure to insert firmly to prevent from slipping out.
11. Connect the two ends together (male luer-lock connects to stopcock) so that Hemovac device is now connected to the patient in a straight path.
12. Attach the needleless connector to the perpendicular port on the stopcock.
13. Ensure the stopcock is in the open position to allow flow from the patient to the Hemovac. The OFF indicator should be in the direction of the needleless connector for normal operation.
14. Clean up work surface, remove gloves and perform hand hygiene.

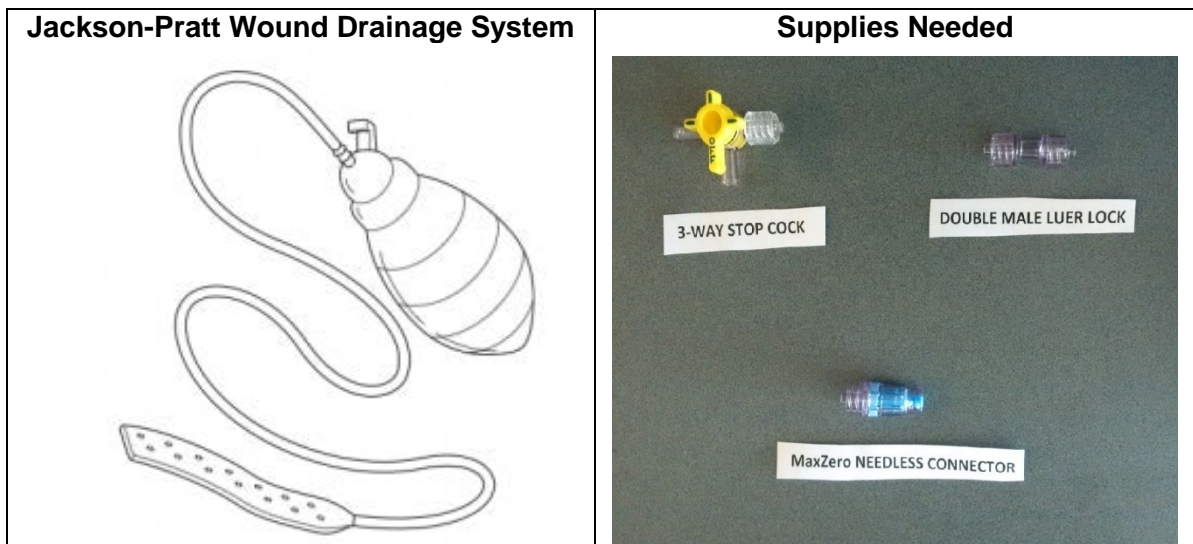


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Modifying a Jackson-Pratt/100cc drainage system

Equipment and Supplies:

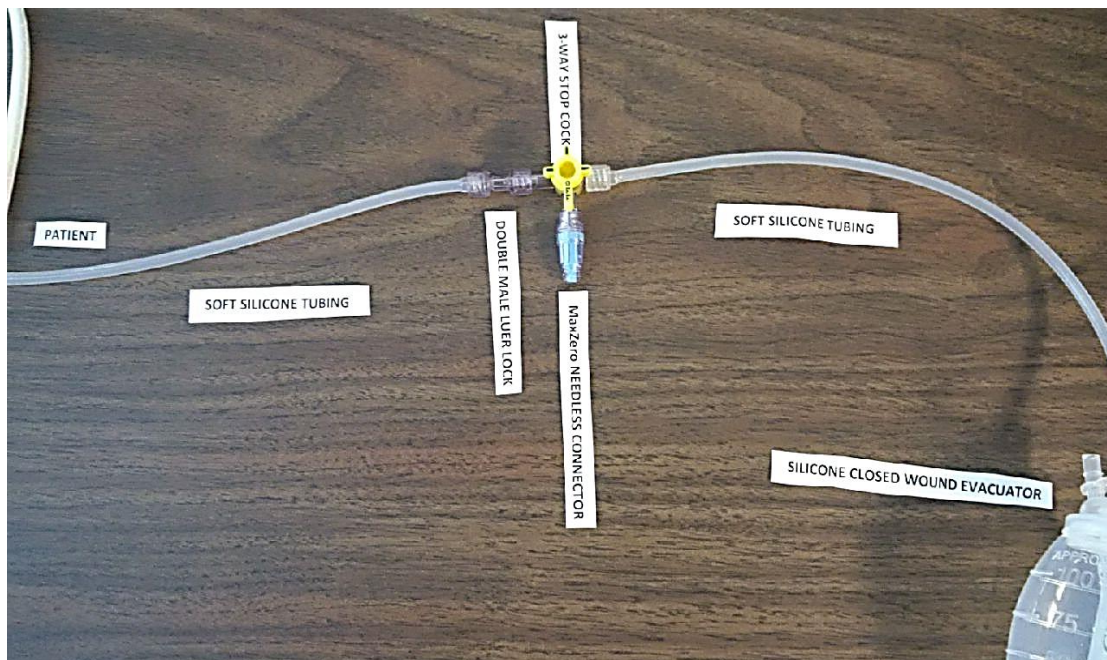
- Personal Protective Equipment as needed
- Sterile dressing tray
- Sterile gloves
- Sterile scissors
- Alcohol wipe
- Sterile 3-way stopcock
- Sterile double male luer-lock
- Sterile needleless connector



Procedure:

1. Gather supplies as above.
2. Perform hand hygiene and prepare/position patient.
3. Perform hand hygiene; prepare sterile dressing tray and supplies.
4. Perform hand hygiene and put on Personal Protective Equipment.
5. Put on sterile gloves.
6. Pick up soft silicone tubing with a sterile 2x2 gauze and place sterile drape under work area.
7. Take the alcohol wipe and vigorously cleanse, for 15 seconds with friction, the soft silicone tubing for a length of 20 cm, from patient down towards the drainage collector. Place the cleansed tubing on the sterile drape and allow to completely dry (greater than 30 seconds).
8. Using sterile scissors, cut the tubing in the center of the cleansed area (about 10 cm away from the patient).
9. Firmly insert one end of the double male luer-lock into the tubing end that goes to the patient. Twisting while inserting will assist with insertion. Make sure to insert firmly to prevent it from slipping out.

10. Insert the male end of the 3-way stopcock into the other cut end of the tubing. Twisting while inserting will assist with insertion. Make sure to insert firmly to prevent it from slipping out.
11. Connect the two ends together (male luer-lock connects to stopcock) so that drainage device is now connected to the patient in a straight path.
12. Attach the needleless connector to the perpendicular port on the stopcock.
13. Ensure the stopcock is in the open position to allow flow from the patient to the drainage device. The OFF indicator should be in the direction of the needleless connector for normal operation.
14. Clean up work surface, remove gloves and perform hand hygiene.



Irrigating/Aspirating a Percutaneous Drain:

Check the Physician/NP/MRP Order for:

1. The amount and type of irrigation solution to be used; sterile Normal Saline (or alternate solution)
2. A separate order for aspiration, if aspiration is to be done
3. Confirmation of tube placement-distal end location
4. Frequency of irrigation

Equipment and Supplies:

- Personal Protective Equipment as needed
- 10 mL syringe (minimum gauge) of injectable Normal Saline (NS) without preservative (may be a pre-filled syringe) or the ordered alternate solution and a 10 mL syringe (minimum gauge)
- Alcohol wipes
- Clean gloves

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- Sterile needleless connector and/or stopcock if either are in need of replacing, e.g. soiled, broken **or** blocked see [Adding or Changing a Stopcock](#).

Procedure:

1. Gather supplies as above.
2. Perform hand hygiene and prepare/position patient.
3. Perform hand hygiene and prepare supplies.
4. Put on clean gloves.
5. If stopcock not present, add one prior to first irrigation (see above procedure).
6. Prepare a 10mL syringe with the ordered amount of Normal Saline or alternate solution
7. Using an alcohol wipe, vigorously cleanse the needleless connector for 15 seconds, allow to dry completely for greater than 30 seconds.
8. Attach the solution-filled 10mL syringe to the needleless connector and then open the stopcock to patient.
9. Slowly instill ordered volume of sterile NS or alternative solution.
 - Always use gentle pressure when irrigating
 - **If there is resistance or pain on instillation, STOP, and notify most responsible Physician/NP**
 - **Only pull back on the syringe if there is an order to aspirate the drainage fluid.**
 - Always use gentle force when aspirating, **if there is resistance or pain with aspiration, STOP, and notify the most responsible Physician/NP.**
10. Close the stopcock to the needleless connector and then remove the syringe being careful to rotate, using a controlled motion, the luer in a 360-degree counter-clockwise turn; this action will minimize fluid from escaping the connector.
11. If using a drainage bag system, leave drainage flowing from patient to drainage bag.
12. Clean up work surface, remove gloves and perform hand hygiene.

Documentation

Document procedure as determined by your agency.

Patient/Client/Family Education**Education Resources****Patient Education Materials/Pamphlets:**

(order through Patient Health Education Materials: [VCH](#) or [PHC](#))

- Caring for your Hemovac Drain at Home (FO.160.C191)
- Discharge Information for Drain Care (ED.160.D735)
- Percutaneous Transhepatic Catheter (PTC) (FK.750.P412)

Transition/Discharge Process:

Prior to discharge, the Acute Care Nurse as per the [Practice Level](#) will provide education to the patient/family in order that they:

- understand the purpose and expected duration of percutaneous tube
- understand that the drain may not be sutured in place so it must be handled carefully to avoid being dislodged/pulled out from the cavity/organ and that there may be activity restrictions
- understand the frequency of assessments post-procedure
- understand how to monitor insertion site for; leakage from insertion site, an unexpected change in type or amount of drainage, bleeding, blood clots, and/or an elevated temp greater than 38.5°C or if other signs and symptoms of infection and when to alert MRP
- Observe the acute care nurse performing a instillation/irrigation as per Physician's/NP's Orders
- Perform a return demonstration of how to instill/irrigate the drain

To provide support to the client/family until the first Community visit or should Community services not be available, the Acute Care nurse will put together a **discharge package** which is to include:

- Patient education pamphlet
- Who to call/what to do in the event of an issue with the drain
- As many 10mLs prefilled syringe(s) of Normal Saline/alternate solution and alcohol wipes as needed until the first community visit or in the case of potentially no community services, until client/family can obtain the syringes from their local pharmacy
- Dressings/tape in case the dressing needs to be reinforced
- A measuring cup and information regarding how much drainage to expect

Following discharge from hospital, the Community Health Nurse as per the [Practice Level](#) will support the client/family to manage independently by:

- Providing information as where to purchase supplies if required
- Reinforce when and how to empty/care for drainage bag or suction device
- Reinforcing the importance of keeping the percutaneous tube drainage bag/device closed to reduce risk of infection
- Reinforcing how to keep the tube and drainage bag tubing free of twists, kinks, or leaks
- Ensuring that client/family safely perform the instillation/irrigation if ordered by Physician/NP
- Informing who to call/what to do in the case of issues with the drain e.g. leaks, dislodgement

Following transfer to Residential Care facility, the **Residential Care Nurse** as per the [Practice Level](#) will do instillations as ordered and provide care for the drain/drainage bag and where appropriate, reinforce resident/family education regarding the care and safety of the drains.

Related Documents

VCH/PHC:

- Nephrostomy Tubes, Management and Irrigation ([BD-00-12-40043](#))
- Drains: Post-operative ending in the Peritoneal Cavity – Irrigation/Aspiration (*in process*)
- Chest Tubes: Thoracic Percutaneous Pigtail Drainage Catheters or Small Bore Chest Tubes - Assisting with Insertion ([BD-00-12-40016](#))
- Chest Tubes: Thoracic Percutaneous Pigtail Drainage Catheters or Small Bore Chest Tubes - Assisting with Removal ([BD-00-12-40017](#))

VCH:

- Chest Tubes: Thoracic Percutaneous Pigtail Drainage Catheters: Irrigation and Removal ([D-00-12-30008](#))
- VA: Abdominal Percutaneous Pigtail Drainage Catheter (PPDC) ([C-175](#))
- VC: Paracentesis – Intermittent Drainage of Ascites (Pleurx Catheter) ([CPD-020](#))
- VC: Paracentesis – Intermittent Drainage of Ascites (Pigtail Catheter) ([CPD-051](#))

References

University of Washington (2017). Percutaneous Abdominal or Pelvic Drain
<http://www.uwmedicine.org/health-library/Pages/percutaneous-abdominal-or-pelvic-drain.aspx>

Sutter Health California Pacific Medical Center (2014). Percutaneous Abscess Drainage Procedure
<http://www.cpmc.org/learning/documents/percutaneous-ws.html>

Sleisenger and Fordtran (2006). Gastrointestinal and liver disease [2 vol. set]: pathophysiology, diagnosis, management 8th ed.

Definitions

Instillation: the delivery of a fluid (one way only)

Irrigation: the process of washing a body cavity or wound with a stream of fluid

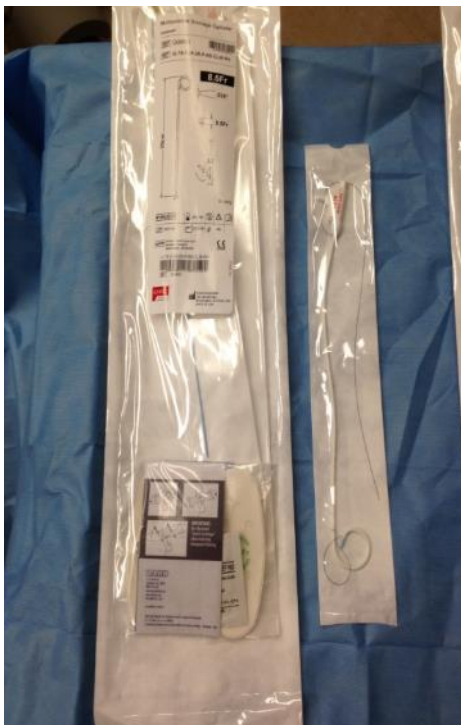
Aspiration: the withdrawal of fluid

Patient: the term 'patient' in this document refers to patient/client/resident

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	VCH/PHC Regional Nursing Skin & Wound Committee Regional Practice Initiatives Lead for WOC Nursing, VCH Professional Practice	

Appendix A: Examples of Percutaneous Tubes/Drains inserted in Radiology

French Mini Closed Loop (MCL) Pigtail Catheter – Sizes: 8.5F, 10.2F, 12F, 14F, 16F and 18F



Dawson Mueller Catheter – Sizes: 8.5F, 10F and 12F



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Appendix B: Example of a Stat-Lock Securement Device



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