

SURGICAL PROGRAM PROCEDURE

CATEGORY: System-Level Clinical
ISSUE DATE: December 1993
SUBJECT: CHEST TUBE MANAGEMENT

REVISION DATE: April 2021

Page 1 of 16

Document Owner: Nurse Clinician, Surgical Inpatient Unit	Name: Diane Delvecchio
Update Schedule: Every three years, or sooner if required.	
Stakeholder Consultation and Review: Cardiology Program Council Critical and Emergency Care Program Council Medicine Program Council Community Care and Rehabilitation Program Council Nurse Clinician Forum Surgical Program Council	Date: June 8, 2021 June 10, 2021 June 17, 2021 June 24, 2021 June 7, 2021 June 21, 2021
Approval: Cathy Langlois Chair, Clinical Policy and Procedure Committee	Date: August 4, 2021

PURPOSE

To ensure the safe care and maintenance of a chest tube and attached drainage system.

PROCEDURE

Equipment

The following equipment must be kept at the bedside at all times:

- 2 non-traumatic clamps
- 4x4 gauze and sterile Vaseline
- Jelonet dressing **for cardiac patients only**
- Cloth tape

Special Instructions

- A chest tube is used to:
 - facilitate the evacuation of fluid, blood and air from the pleural space and/or mediastinum
 - restore negative pressure to the pleural space
 - promote re-expansion of a collapsed lung
- Some conditions that may require a chest tube drainage system include:
 - Pleural effusion
 - Pneumothorax (spontaneous, traumatic, tension)
 - Hemothorax
 - Chylothorax
 - Cardiac tamponade
 - Post-operative chest or heart surgery
- A closed chest tube drainage system allows for air or fluid to be drained, and prevents air or fluid from entering the pleural space.

CATEGORY: System-Level Clinical

SUBJECT: CHEST TUBE MANAGEMENT

- Unless specifically ordered by a physician, a chest tube is **never routinely clamped**.
- A chest tube may only be temporarily clamped without an order:
 - To facilitate changing of the drainage system or tubing
 - When assessing the source of an air leak
- Secure the tube to the patient's skin below the dressing using tape or a securing device to provide strain relief at the site and to prevent tube and dressing dislodgement.
- Check the function of the chest tube and drainage system on insertion, with vital signs and with any change in the patient's condition.
- Chest tubes are sterile, flexible vinyl or silicone, non-thrombogenic catheters that vary in size from 6 to 43 Fr:
 - A small-bore chest tube (SBCT or pigtail catheter) is 14 Fr or smaller
 - A large-bore chest tube (LBCT) is larger than a 14 Fr
- SBCT are used for evacuating both air and fluid because fewer complications are associated with them. When clogging is a concern (massive hemothorax/empyema) a LBCT is typically used.
- Chest tube location depends on what is being drained from the pleural cavity.
 - If air is in the pleural space, the chest tube will be inserted above the 2nd intercostal space at the mid-clavicular line.
 - If fluid in the pleural space, the chest tube is inserted at the 4th to 5th intercostal space, at the mid-axillary line **or may also be inserted posteriorly**.
 - A chest tube may also be inserted to drain the pericardial sac after open heart surgery, and may be placed directly under the sternum (mediastinal chest tube).
- **Immediately** post chest tube insertion by a physician, assess and document cardiopulmonary status, level of consciousness, vital signs and oxygen saturation by pulse oximetry (SpO₂) Q15 minutes until stable, then as per physician order and PRN.

Method

See Appendix A for Traditional Closed Drainage Systems

See Appendix B for Digital Thoracic Closed Drainage Systems

See Appendix C for Mobile Closed Drainage Systems

See Appendix D for One Way Chest Drain Valves

For product setup and management, refer to the links below.

EDUCATION AND TRAINING

Education/Training Related Information

PLEUR-EVAC A-6000 Instructional Video

<https://www.youtube.com/watch?v=jr-xvB-vyxA>

PLEUR-EVAC A-6000 Product Training

<https://www.youtube.com/watch?v=OlzXZck3iw>

Medela Thopaz+ University Resources and Training Videos

<https://www.youtube.com/watch?v=KMqSphcR3AA>

Express Mini 500 & Pneumostat Instructional Video

<https://www.youtube.com/watch?v=G4eIRVJg-6U>

CATEGORY: System-Level Clinical
SUBJECT: CHEST TUBE MANAGEMENT

APPENDIX A

Traditional Closed Drainage Systems

Examples

- Pleur-Evac A-6000 dry suction water seal
- Atrium Oasis dry suction water seal
- Wet suction with a traditional water seal (less common at HSN)

Special Instructions

- Do not tip the drainage unit or lay it flat.
- Ensure the drainage system is placed **below the drainage site** and secured in an upright position (attached to the floor, bed rail or an IV pole) to prevent it from being knocked over.
- Do not raise the drainage unit above the chest level.



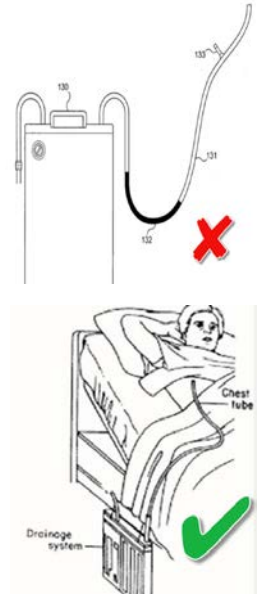
Monitoring

What	How
Cardiopulmonary Status	<ul style="list-style-type: none"> • Vitals signs and oxygen saturation as ordered and PRN • Auscultate air entry and lung sounds Q4H and PRN • If patient has a mediastinal tube, check for signs of cardiac tamponade (narrowing pulse pressure and muffled heart sounds) • Report: Respiratory distress (grunting tachypnea, retractions, dyspnea, agitation, hypoxia), decreased or absent breath sounds, fever, tracheal shift to the unaffected side, tachycardia, arrhythmias, hypotension
Pain	<ul style="list-style-type: none"> • Assess and treat pain, as pain can interfere with deep breathing • Report: Chest pain or excessive pain to the insertion site
Dressing	<ul style="list-style-type: none"> • Assess dressing for drainage/integrity Q4H • Change dry dressing Q72H and PRN when it becomes loose or soiled. A Vaseline occlusive dressing is not required while the chest tube is in situ unless specifically ordered. • Date and initial all dressings • With each dressing change, assess site for bleeding, signs of infection/inflammation or air leak from the site • Report: Redness, purulent drainage or bleeding, air leak from insertion site
Subcutaneous Emphysema	<ul style="list-style-type: none"> • Indicates leakage of air into the subcutaneous tissue. It can be identified by swelling of tissue or a crackling sound or sensation on palpation. • Palpate for presence of subcutaneous emphysema (crepitus) around and superior to chest tube insertion site. If present, mark border with pen and assess Q4H and PRN for any increase. • Report: New or increasing subcutaneous emphysema

CATEGORY: System-Level Clinical
SUBJECT: CHEST TUBE MANAGEMENT

Monitoring Tubing

1. Secure all tubing connection sites with a tie wrap band (preferable) or tape to prevent accidental disconnection. If using tape, avoid obscuring visualization of the tubing.
2. Ensure that drainage tubing is free of dependent (fluid-filled) loops by placing the tube horizontally on the bed and down into the collection chamber, or coiling the tubing on the bed. If a dependent loop cannot be avoided, lift and drain the tubing. Dependent loops may create back pressure and cause resistance to flow out of the chest.
3. Assess the tubing from the insertion site to the drainage system to ensure the chest tube and tubing is free of kinks or clamps.
4. If the chest tube is a pigtail catheter with a stopcock attached, ensure that the stopcock is maintained in the "on" or "open" position. Consider securing it with tape to maintain it in the "open" position.
5. Do not strip the tubing. If clots are present, gently squeeze (milk) them in the direction of the drainage system. Routine milking of the tubing is not recommended. If clots are obstructing the tubing and cannot be moved, change the tubing.



Monitoring Drainage

1. Assess and document the amount, colour and nature of drainage in the collection chamber Q1-4H until the amount decreases, or as ordered by the physician.
2. To record, mark a line at the current fluid volume level on the drainage container and enter the date and time beside it. To determine the new drainage amount, subtract the mL volume of the previous marking (if any) from the current mL volume level.
3. Change the drainage container prior to reaching the capacity volume.
4. Report any sudden increase, decrease, or absence of drainage, or change in the characteristics of drainage (unexpectedly bloody, cloudy or milky; new onset of clots). Sanguineous drainage that is bright red, greater than 100 mL/hr, free flowing with few or no clots should be immediately reported to the physician.
5. When draining large pleural effusions it is important not to drain the fluid off too quickly. Clarify with the physician if any maximum initial fluid drainage limits and temporary clamping orders are required to prevent complications such as re-expansion pulmonary edema. (**Example:** "Clamp tube after draining 1000 mL x 20 minutes and repeat until drainage slows")

Monitoring for Air Leak

An air leak may be caused by the movement of air into the lung parenchyma and pleural spaces (indicating that the lung is not healed) **or** if the system is not airtight.

1. Instruct the patient to breathe normally, then cough while observing the water seal chamber/air leak meter for indications of an air leak (intermittent or continuous bubbling). If the system is connected to suction, briefly discontinue the suction to assess.
2. If an air leak is observed, determine the source. Briefly clamp the chest tube close to the patient using non-traumatic clamps.
 - A. If the bubbling stops, the air is from the patient's lung.
 - B. If the bubbling continues, the leak is between the clamp and the collection unit.
 - i. Sequentially clamp along the tubing until you reach the collection unit to discover the location of the leak.
 - ii. Check all connections to ensure they are airtight.
 - iii. Replace the drainage container and/or tubing if you suspect damage/crack or leak in the system.

CATEGORY: System-Level Clinical

SUBJECT: CHEST TUBE MANAGEMENT

- iv. Check for an accidentally dislodged chest tube or protrusion of the eyelets of the chest tube from the patient's chest (remove the dressing to make this observation).
3. To document the air leak, note the numbered column through which the bubbling occurs. (**Example:** If bubbling is present in the first three columns of the air leak meter, document "air leak + 3"). Note if bubbling is continuous, intermittent or with cough.
4. Report new or increasing air leaks observed.
5. If an existing air leak abruptly ceases, assess the chest tube and tubing for kinks, clamps, or obstructions and monitor the patient for signs of respiratory distress/changes in cardiopulmonary status.

Monitoring for Tiding

1. Assess the water-seal chamber for tiding (fluctuation of the water level with inspiration and expiration) Q4H with patient assessment. If the system is connected to suction, briefly discontinue suction to assess. Tiding up and down or back and forth indicates effective communication between the pleural space and drainage system (patency) and provides an indication of lung expansion.
2. Report absence of tiding if resolution of pneumothorax or lung expansion is not suspected and assess/troubleshoot for potential obstruction (clot, kink) in the chest tube and/or tubing.

Monitoring Levels

1. Ensure the water seal level is maintained at **2 cm**. Follow manufacturer directions to add or remove fluid PRN. If the system is connected to suction, briefly discontinue suction to assess.
2. Suction may be ordered and applied for greater air or fluid evacuation. Ensure that the prescribed suction level is maintained.
 - A. The suction control dial on the drainage device determines the amount of suction imposed.
 - B. Suction level is usually preset at -20 cmH₂O but can be adjusted to the prescribed level of suction by rotating the control dial. Suction can be set at -10, -15, -20, -30 and -40 cmH₂O.
 - C. The suction tubing is connected to the top of the device and attached to the suction source vacuum (wall suction). Set the suction source at -80 mmHg or higher (typically).
 - D. Visualize the orange float in the suction indicator/monitor window to verify that the appropriate suction level set has been reached.
3. To convert drainage systems from suction to water seal **ONLY**, disconnect the suction tubing from the drainage unit and leave the port on the drainage unit uncapped.

Changing the Drainage Container

Change the drainage container when:

- The collection container is near to full
 - There is suspected damage, crack or leak in the system
 - The unit is inadvertently kicked over and drainage has:
 - entered the water seal chamber
 - entered multiple collection columns, making it difficult to record accurate output
1. Prepare the new drainage system as per manufacturer instructions.
 2. Temporarily cross-clamp the chest tube close to the patient's chest **as briefly as possible**.
 3. Disconnect the old tubing and attach the new tubing/container.
 4. Unclamp the chest tube.
 5. Ensure connections are secured and assess the function of the drainage system.
 6. Clamp the old tubing as close to the container as possible and dispose of in the appropriate waste receptacle.

CATEGORY: System-Level Clinical
SUBJECT: CHEST TUBE MANAGEMENT

Note: If changing a traditional drainage system to an alternate drainage device ordered, prepare the new system as per manufacturer instructions and select the appropriate connection adapter from the package before clamping the chest tube.

Obtaining Drainage Samples

1. Create a dependent loop of fluid in the sampling port.
2. Cleanse the needleless sampling port with an alcohol swab and attach a luer lock syringe.
3. Withdraw the required drainage and transfer it to an appropriate specimen container.

Managing Accidental Tubing Disconnection

If tubing inadvertently becomes disconnected at any point below the insertion site:

1. If witnessed, temporarily clamp or pinch off the chest tube **as briefly as possible**, cleanse the exposed ends of the tube and tubing with antiseptic and reconnect immediately. Once attached, unclamp and have the patient perform maximum exhalation.
2. If not witnessed, place the end of the chest tube in a bottle of sterile water or temporarily clamp the chest tube **as briefly as possible** until a new collection system can be setup. Once attached, unclamp and have the patient perform maximum exhalation.
3. Monitor vital signs, oxygen saturation and chest sounds.
4. Advise the physician.

Managing Accidental Chest Tube Dislodgement

1. If there was an active air leak, or if unknown, place a sterile dressing on the site and tape it on three sides only.
2. If there was no active air leak, have the patient perform maximum expiration and quickly apply a Vaseline occlusive dressing to the site.
3. Monitor vital signs, oxygen saturation and chest sounds. **Report to the physician immediately.**

CATEGORY: System-Level Clinical
SUBJECT: CHEST TUBE MANAGEMENT

APPENDIX B

Digital Thoracic Closed Drainage Systems

Special Instructions

- Thopaz+ must remain in an upright position during use.

Monitoring

What	How
Cardiopulmonary Status	<ul style="list-style-type: none"> • Vitals signs and oxygen saturation as ordered and PRN • Auscultate air entry and lung sounds Q4H and PRN • Report: Respiratory distress (grunting tachypnea, retractions, dyspnea, agitation, hypoxia), decreased or absent breath sounds, fever, tracheal shift to the unaffected side, tachycardia, arrhythmias, hypotension
Pain	<ul style="list-style-type: none"> • Assess and treat pain, as pain can interfere with deep breathing • Report: Chest pain or excessive pain to the insertion site
Dressing	<ul style="list-style-type: none"> • Assess dressing for drainage/integrity Q4H • Change dry dressing Q72H and PRN when it becomes loose or soiled. A Vaseline occlusive dressing is not required while the chest tube is in situ unless specifically ordered. • Date and initial all dressings • With each dressing change, assess site for bleeding, signs of infection/inflammation or air leak from the site • Report: Redness, purulent drainage or bleeding, air leak from insertion site
Subcutaneous Emphysema	<ul style="list-style-type: none"> • Indicates leakage of air into the subcutaneous tissue. It can be identified by swelling of tissue or a crackling sound or sensation on palpation. • Palpate for presence of subcutaneous emphysema (crepitus) around and superior to chest tube insertion site. If present, mark border with pen and assess Q4H and PRN for any increase. • Report: New or increasing subcutaneous emphysema

Monitoring Tubing

1. Secure all tubing connection sites with a tie wrap band (preferable) or tape to prevent accidental disconnection. If using tape, avoid obscuring visualization of the tubing.
2. Assess the tubing from the insertion site to the drainage system to ensure the chest tube and tubing is free of kinks or clamps.
3. If the chest tube is a pigtail catheter with a stopcock attached, ensure that the stopcock is maintained in the “on” or “open” position. Consider securing it with tape to maintain it in the “open” position.
4. Flushing of the tubing occurs every 5 minutes or when Thopaz+ detects a siphon and prevents clogging of the patient tubing. If clots are obstructing the tubing and cannot be moved, change the tubing.

Monitoring Drainage



1. Assess and document the amount, colour and nature of drainage in the collection chamber Q1-4H until the amount decreases.
2. To record, mark a line at the current fluid volume level on the drainage container and enter the date and time beside it. To determine the new drainage amount, subtract the mL volume of the previous marking (if any) from the current mL volume level. Thopaz+ has the ability to detect the fluid amount in the canister by a level sensor in the device. However, it can be inaccurate due to positioning and/or insufficient fluid amounts.
3. Change the drainage container prior to reaching the capacity volume.

CATEGORY: System-Level Clinical


SUBJECT: CHEST TUBE MANAGEMENT

4. Report any sudden increase, decrease, or absence of drainage, or change in the characteristics of drainage (unexpectedly bloody, cloudy or milky; new onset of clots). Sanguineous drainage that is bright red, greater than 100 mL/hr, free flowing with few or no clots should be immediately reported to the physician.

Monitoring for Air Leak





1. The current size of an air leak in Thopaz+ is indicated on the screen in mL/min and is often referred to as “flow rate”. Document this value in the patient chart as “air leak rate” or “flow rate”.
2. If the air leak is **0 mL/min** (intrapleural catheters only), perform a catheter check:
 - A. Press .
 - B. Press  and scroll to Page 4.
 - C. Follow the prompts on the screen.
 - D. If “Check catheter” is indicated, check the catheter for occlusions or clots. Replace the Thopaz+ tubing as needed.
3. Report new or increasing air leaks observed.
4. If an existing air leak abruptly ceases, assess the chest tube and tubing for kinks, clamps, or obstructions and monitor the patient for signs of respiratory distress/changes in cardiopulmonary status.

Placing Thopaz + on Standby and Turning Off







1. To place the unit in standby mode, press Standby for longer than 3 seconds.
2. To turn the unit off:
 - A. Clamp the patient tube.
 - B. Place unit in standby mode.
 - C. Press .

Changing Settings

In Standby Mode



1. The factory pressure setting is -2.0 Kpa. If not already changed, the pressure unit must be changed to **cmH₂O** (the default is -20).
2. To adjust the pressure setting as per physician order:
 - A. Press **Menu**.
 - B. Choose the parameter you wish to change by pressing , then press  to confirm.
 - C. Use the  and  buttons to adjust the setting of that parameter.

During Operation

1. Press  and  simultaneously.
2. Change pressure by pressing  or , then press  to confirm.
3. For patients who are ordered gravity drainage (= waterseal), physiological pressure (PHYSIO) can be activated. Press **Physio**, then press  to confirm.

Troubleshooting and Alarms

Thopaz+ distinguishes between warnings (yellow), alarms (red) and internal errors (red). An alarm will sound and a description of the problem will appear on the screen.

1. Press  and  simultaneously to silence/acknowledge the alarm.
2. Follow the troubleshooting instructions that appear on the screen.

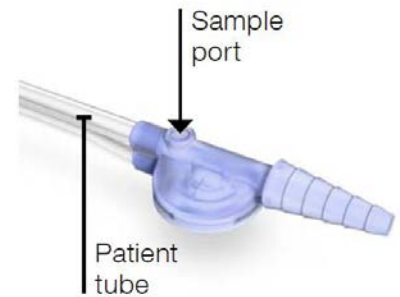
CATEGORY: System-Level Clinical
SUBJECT: CHEST TUBE MANAGEMENT

Replacing the Canister

1. Prepare a sterile canister.
2. Clamp off the patient tubing with the tube clamp.
3. Switch Thopaz+ to Standby mode.
4. Follow manufacturer instructions.

Obtaining Drainage Samples

1. Ensure that there is fluid in the tube.
2. Clamp the patient tube.
3. Switch Thopaz+ to Standby mode.
4. Follow manufacturer instructions.



Managing Accidental Tubing Disconnection

If tubing inadvertently becomes disconnected at any point below the insertion site:

1. If witnessed, temporarily clamp or pinch off the chest tube **as briefly as possible**, cleanse the exposed ends of the tube and tubing with antiseptic and reconnect immediately. Once attached, unclamp and have the patient perform maximum exhalation.
2. If not witnessed, place the end of the chest tube in a bottle of sterile water or temporarily clamp the chest tube **as briefly as possible** until a new collection system can be setup. Once attached, unclamp and have the patient perform maximum exhalation.
3. Monitor vital signs, oxygen saturation and chest sounds.
4. Advise the physician.

Managing Accidental Chest Tube Dislodgement

1. If there was an active air leak, or if unknown, place a sterile dressing on the site and tape it on three sides only.
2. If there was no active air leak, have the patient perform maximum expiration and quickly apply a Vaseline occlusive dressing to the site.
3. Monitor vital signs, oxygen saturation and chest sounds. **Report to the physician immediately.**

CATEGORY: System-Level Clinical
SUBJECT: CHEST TUBE MANAGEMENT

APPENDIX C

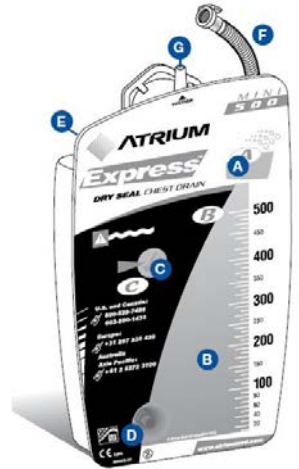
Mobile Closed Drainage Systems

Examples

- Express Mini 500
- Dry suction with a one-way valve (dry/dry or waterless)

Special Instructions

- Chest tubes are often converted to mobile closed drainage systems in hospital to facilitate patients with an air leak to be discharged home with a chest tube in situ. They are applied when fluid drainage is expected to be less than 500 mL daily.
- Do not tip the drainage unit or lay it flat.
- During patient ambulation or when the patient is confined to bed rest, always place the unit **below the patient's chest** in the upright position using the bed rail attachment. Only use belt straps as directed for patient ambulation.



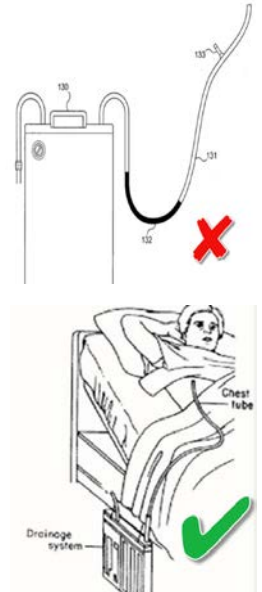
Monitoring

What	How
Cardiopulmonary Status	<ul style="list-style-type: none"> • Vitals signs and oxygen saturation as ordered and PRN • Auscultate air entry and lung sounds Q4H and PRN • If patient has a mediastinal tube, check for signs of cardiac tamponade (narrowing pulse pressure and muffled heart sounds) • Report: Respiratory distress (grunting tachypnea, retractions, dyspnea, agitation, hypoxia), decreased or absent breath sounds, fever, tracheal shift to the unaffected side, tachycardia, arrhythmias, hypotension
Pain	<ul style="list-style-type: none"> • Assess and treat pain, as pain can interfere with deep breathing • Report: Chest pain or excessive pain to the insertion site
Dressing	<ul style="list-style-type: none"> • Assess dressing for drainage/integrity Q4H • Change dry dressing Q72H and PRN when it becomes loose or soiled. A Vaseline occlusive dressing is not required while the chest tube is in situ unless specifically ordered. • Date and initial all dressings • With each dressing change, assess site for bleeding, signs of infection/inflammation or air leak from the site • Report: Redness, purulent drainage or bleeding, air leak from insertion site
Subcutaneous Emphysema	<ul style="list-style-type: none"> • Indicates leakage of air into the subcutaneous tissue. It can be identified by swelling of tissue or a crackling sound or sensation on palpation. • Palpate for presence of subcutaneous emphysema (crepitus) around and superior to chest tube insertion site. If present, mark border with pen and assess Q4H and PRN for any increase. • Report: New or increasing subcutaneous emphysema

CATEGORY: System-Level Clinical
SUBJECT: CHEST TUBE MANAGEMENT

Monitoring Tubing

1. Ensure that drainage tubing is free of dependent (fluid-filled) loops by placing the tube horizontally on the bed and down into the collection chamber, or coiling the tubing on the bed. If a dependent loop cannot be avoided, lift and drain the tubing. Dependent loops may create back pressure and cause resistance to flow out of the chest.
2. Assess the tubing from the insertion site to the drainage system to ensure the chest tube and tubing is free of kinks or clamps.
3. If the chest tube is a pigtail catheter with a stopcock attached, ensure that the stopcock is maintained in the "on" or "open" position. Consider securing it with tape to maintain it in the "open" position.



Monitoring Drainage

1. Assess and document the amount, colour and nature of drainage in the collection chamber.
2. DO NOT place markings on the exterior of the drainage container.
3. Drainage volume should be assessed and documented, then emptied by syringe via the needleless luer port at the bottom of the device.
4. Report any sudden increase, decrease, or absence of drainage, or change in the characteristics of drainage (unexpectedly bloody, cloudy or milky; new onset of clots). Sanguineous drainage that is bright red, greater than 100 mL/hr, free flowing with few or no clots should be immediately reported to the physician.

Monitoring for Air Leak

1. Fluid must be present in the collection chamber to detect an air leak. If fluid is not present, add 20 mL of sterile water or saline through the needleless luer port located on the front of the drain.
2. Temporarily tip the drain to the right until collection fluid appears in air leak window "A". Bubbling in air leak window "A" will confirm a patient air leak.
3. Immediately return the chest drain to the upright position. If fluid was added to assess for air leak, remove it through the luer port.



Prescribed Suction Level

Express Mini 500 has the capability to have suction applied. The non-adjustable dry suction regulator is preset at -20 cmH₂O. When -20 cmH₂O suction is ordered by the physician:

1. Firmly attach the suction line to the suction port.
2. Slowly increase the suction source vacuum to -80 mmHg or higher.

A √ will be visible in the vacuum indicator window when vacuum is present inside the chest drain.

Changing the Drainage Container

Change the drainage container when:

- There is suspected damage, crack or leak in the system
- You are unable to empty the device via the luer port (clogged)

1. Prepare the new drainage system as per manufacturer instructions.
2. Temporarily cross-clamp the chest tube close to the patient's chest **as briefly as possible**.
3. Disconnect the old tubing and attach the new tubing/container.
4. Unclamp the chest tube.
5. Ensure connections are secured and assess the function of the drainage system.

CATEGORY: System-Level Clinical

SUBJECT: CHEST TUBE MANAGEMENT

6. Insert the blunt end of the red disposal cap into the patient line port to close off the collection chamber for disposal in an appropriate waste receptacle.

Note: If changing a mobile closed drainage system to an alternate drainage device ordered, prepare the new system as per manufacturer instructions and select the appropriate connection adapter from the package before clamping the chest tube.

Obtaining Drainage Samples

1. Fluid samples can be taken directly from:
 - A. The needleless luer port located on the front of the drain, or
 - B. The patient tube by forming a temporary dependent loop and inserting a 20 gauge needle at an oblique angle. **Do not puncture the patient tube with an 18 gauge or larger needle.**
2. Transfer the sample to an appropriate specimen container.



Managing Accidental Tubing Disconnection

If tubing inadvertently becomes disconnected at any point below the insertion site:

1. If witnessed, temporarily clamp or pinch off the chest tube **as briefly as possible**, cleanse the exposed ends of the tube and tubing with antiseptic and reconnect immediately. Once attached, unclamp and have the patient perform maximum exhalation.
2. If not witnessed, place the end of the chest tube in a bottle of sterile water or temporarily clamp the chest tube **as briefly as possible** until a new collection system can be setup. Once attached, unclamp and have the patient perform maximum exhalation.
3. Monitor vital signs, oxygen saturation and chest sounds.
4. Advise the physician.

Managing Accidental Chest Tube Dislodgement

1. Place a sterile dressing on the site and tape it on three sides only.
2. Monitor vital signs, oxygen saturation and chest sounds. **Report to the physician immediately.**

Discharge

If the patient is going home with a chest tube attached to a mobile closed drainage system:

1. Arrange home care as ordered.
2. Provide instructions on how to empty the unit in case of emergency.

CATEGORY: System-Level Clinical
SUBJECT: CHEST TUBE MANAGEMENT

APPENDIX D

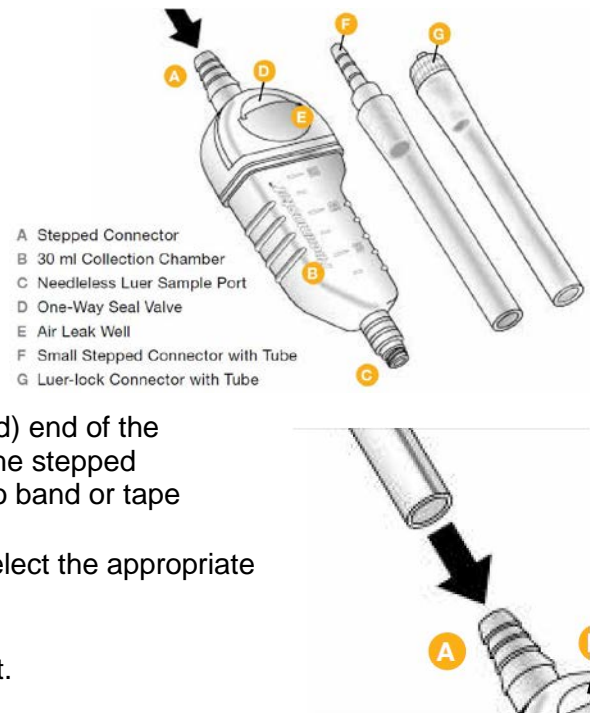
One Way Chest Drain Valve

Examples

- Pneumostat Chest Drain Valve (Atrium/Maquet)
- Heimlich Chest Drain Valve (BD)

Special Instructions

- Chest tubes are often converted to chest drain valves in hospital to facilitate patients with an air leak to be discharged home with a chest tube in situ. They are applied when fluid drainage is expected to be less than 30 mL daily.
- When applying to a **large bore** intercostal chest tube, you may need to straight cut the beveled (angled) end of the clamped chest tube to adequately insert and secure the stepped connector. Otherwise, the angle may be too severe to band or tape securely.
- When applying to a **small bore/pigtail**, ensure you select the appropriate luer lock adaptor.
- Do not obstruct the air leak well.
- Maintain the unit in a vertical position if fluid is present.



Monitoring

What	How
Cardiopulmonary Status	<ul style="list-style-type: none"> • Vitals signs and oxygen saturation as ordered and PRN • Auscultate air entry and lung sounds Q4H and PRN • Report: Respiratory distress (grunting tachypnea, retractions, dyspnea, agitation, hypoxia), decreased or absent breath sounds, fever, tracheal shift to the unaffected side, tachycardia, arrhythmias, hypotension
Pain	<ul style="list-style-type: none"> • Assess and treat pain, as pain can interfere with deep breathing • Report: Chest pain or excessive pain to the insertion site
Dressing	<ul style="list-style-type: none"> • Assess dressing for drainage/integrity Q4H • Change dry dressing Q72H and PRN when it becomes loose or soiled. A Vaseline occlusive dressing is not required while the chest tube is in situ unless specifically ordered. • Date and initial all dressings • With each dressing change, assess site for bleeding, signs of infection/inflammation or air leak from the site • Report: Redness, purulent drainage or bleeding, air leak from insertion site
Subcutaneous Emphysema	<ul style="list-style-type: none"> • Indicates leakage of air into the subcutaneous tissue. It can be identified by swelling of tissue or a crackling sound or sensation on palpation. • Palpate for presence of subcutaneous emphysema (crepitus) around and superior to chest tube insertion site. If present, mark border with pen and assess Q4H and PRN for any increase. • Report: New or increasing subcutaneous emphysema

CATEGORY: System-Level Clinical
SUBJECT: CHEST TUBE MANAGEMENT

Monitoring Tubing

1. Secure all tubing connection sites with a tie wrap band (preferable) or tape to prevent accidental disconnection. If using tape, avoid obscuring visualization of the tubing.
2. Ensure that an appropriate connection adapter is in place (one that best fits to the chest tube in situ).
3. If the chest tube is a pigtail catheter with a stopcock attached, ensure that the stopcock is maintained in the “on” or “open” position. Consider securing it with tape to maintain it in the “open” position.

Monitoring Drainage

1. Assess and document the amount, colour and nature of drainage in the collection chamber.
2. DO NOT place markings on the exterior of the drainage container.
3. Drainage volume should be assessed and documented, then emptied by syringe via the needleless luer port at the bottom of the device.
4. Report any sudden increase or change in the characteristics of drainage.

Monitoring for Air Leak

1. Add 1 mL of water to the air leak well. Bubbling in the water will confirm an air leak.
2. Empty the air leak well after use.

Changing the Drainage Container

Change the drainage container when:

- There is suspected damage, crack or leak in the system
- You are unable to empty the device via the luer port (clogged)

1. Prepare the new drainage system as per manufacturer instructions.
2. Temporarily cross-clamp the chest tube close to the patient's chest **as briefly as possible**.
3. Disconnect the old device from the chest tube and attach the new device with an appropriate connector.
4. Unclamp the chest tube.
5. Ensure connections are secured and assess the function of the drainage system.
6. Dispose of the old system in an appropriate waste receptacle.

Note: If changing a chest drain valve to an alternate drainage device ordered, prepare the new system as per manufacturer instructions and select the appropriate connection adapter from the package before clamping the chest tube.

Obtaining Drainage Samples

1. Take a fluid sample directly from the needleless luer port located on the bottom of the drain.
2. Transfer the sample to an appropriate specimen container.

Managing Accidental Tubing Disconnection

If tubing inadvertently becomes disconnected at any point below the insertion site:

1. If witnessed, temporarily clamp or pinch off the chest tube **as briefly as possible**, cleanse the exposed ends of the tube and tubing with antiseptic and reconnect immediately. Once attached, unclamp and have the patient perform maximum exhalation.
2. If not witnessed, place the end of the chest tube in a bottle of sterile water or temporarily clamp the chest tube **as briefly as possible** until a new collection system can be setup. Once attached, unclamp and have the patient perform maximum exhalation.
3. Monitor vital signs, oxygen saturation and chest sounds.
4. Advise the physician.



CATEGORY: System-Level Clinical

SUBJECT: CHEST TUBE MANAGEMENT

Managing Accidental Chest Tube Dislodgement

1. Place a sterile dressing on the site and tape it on three sides only.
2. Monitor vital signs, oxygen saturation and chest sounds. **Report to the physician immediately.**

Discharge

If the patient is going home with a chest tube attached to a chest drain valve:

1. Arrange home care as ordered.
2. Provide instructions on how to empty the unit in case of emergency.