

# Clinical Skills Mastery Programme

## Blunt Dissection & Wide Bore Chest Drain Educational Reading Pack



**Authors:**

**Dr Janet Skinner**  
**Dr Andrew Leitch**  
**Miss Fiona Carnochan**  
**Dr Marie-Clare Harris**  
**Dr Shirin Brady**  
**Dr John McCafferty**  
**Dr Elly Hampton**  
**Dr James Tiernan**  
**Dr Simon Edgar**

Consultant Emergency Physician  
Consultant Respiratory Physician  
Associate Specialist Cardiothoracic Surgery  
Consultant Emergency Physician  
Consultant Emergency Physician  
Consultant Respiratory Physician  
Clinical Teaching Fellow  
Consultant Respiratory Physician  
Director of Medical Education

Updated May 2015

# **NHS Lothian Clinical Skills Mastery Programme Blunt Dissection & Wide Bore Chest Drain Reading Pack**

## **Contents**

1. Mastery Programme Overview and Procedural Phases
2. Introduction and Intended Learning Outcomes
3. Indications
4. Patient Safety Considerations
  - Risk Factor Considerations
  - Patient Education
5. Risk Assessment
  - Absolute and Potential Contraindications
6. Potential Complications and Recommended Actions
7. Anatomy and Physiology
8. Equipment and Resources
9. Blunt Dissection & Wide Bore Chest Drain Procedure
10. Appendices
  1. Trouble-shooting Guide
  2. Failed Insertion Guide
  3. Pleural Fluid Parameters and Patterns
  4. Patient Information and Consent Example Form
  5. Procedural Documentation Sticker Template
  6. Equipment Checklist
  7. Procedural Checklist
  8. Skills Assessment Checklist
  9. References

## NHS Lothian Clinical Skills Mastery Programme

Welcome to the NHSL Mastery Programme Blunt Dissection & Wide Bore Chest Drain Reading Pack.

We hope you find this pack a valuable learning resource to compliment your simulated practice sessions.

**In order to optimise your learning, you must read this pack and watch the associated video before your first simulation session.**

The NHSL Mastery Programme has been developed to enhance the technical and non-technical skills of clinicians undertaking complex clinical procedures.

Each procedural skill will be approached via a combination of written and video educational resources with subsequent simulated practice, facilitated by appropriately skilled trainers.

### **Acknowledgements**

The authors would like to thank the following people for their generous contributions to this pack and many other aspects of this programme:

Mrs Jennifer Gierz (Medical Education Directorate)

Mrs Marion Mackay (Medical Education Directorate)

Miss Samantha Wyllie (Medical Education Directorate)

Mr Stephen Punton (Medical Photography Dept)

Mr Nathan Oliver (Clinical Simulation Programme Manager)

Mr Lanty O'Connor (Simulation Programme Manager, Northwestern Uni, Chicago)

Dr Douglas Miller (CT1) for filming the associated mastery video

Particular thanks goes to Dr Janet Skinner and the Clinical Skills Managed Educational Network for their work on chest drains<sup>1</sup>, which was utilised in the development of this pack and to the authors of the 'Seldinger Chest Drain Reading Pack'<sup>2</sup>, from which this document has been adapted.

## Intended Learning Outcomes

After participation in the NHSL Clinical Skills Mastery Programme:

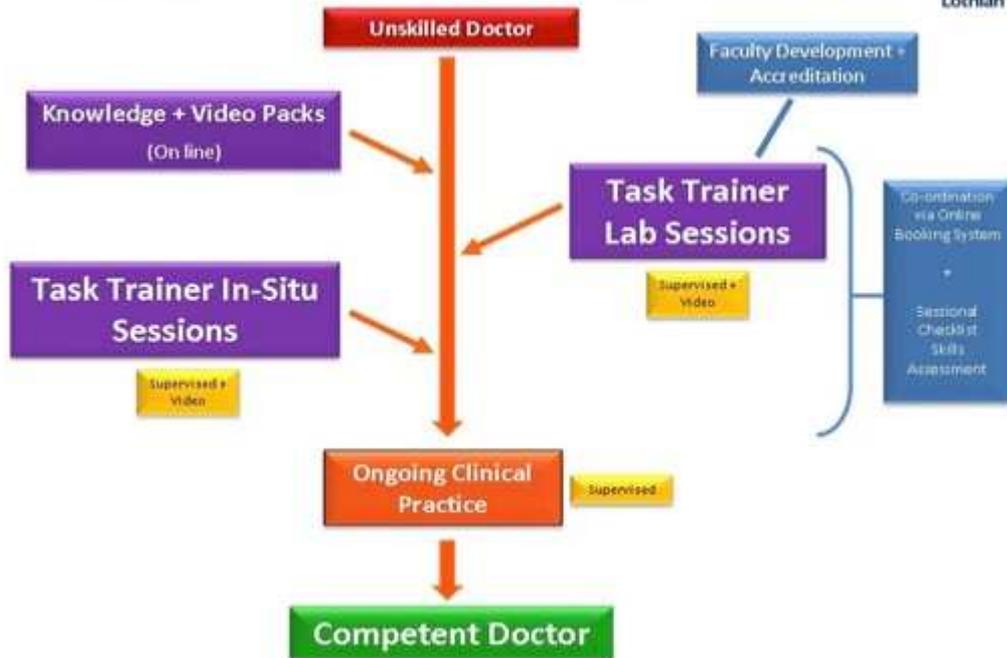
- Trainee clinicians will have the skills required to achieve competency in mandatory and desired procedural skills to the level of safe clinical performance under supervision.
- Faculty clinicians will be able to teach clinical procedural skills to doctors in training in an effective and structured fashion, receiving appropriate recognition for their contributions.

## Methods

The flow diagram (below) describes the envisaged path to procedural competency for clinicians in NHS Lothian. This involves a sequence of:

- Knowledge Packs: combination of written and video educational resources for each procedural skill, with a consistent emphasis on patient safety.
- A 2-phase supervised simulated procedural training programme, including checklist-based formative assessment throughout.
  - Task trainer in skills lab (non-clinical)
  - Task trainer in-situ (clinical environment)
- Co-ordination via online booking site TUBS ([www.tutorialbooking.com](http://www.tutorialbooking.com))
- Training of faculty with accreditation through the regional Clinical Educator Programme.

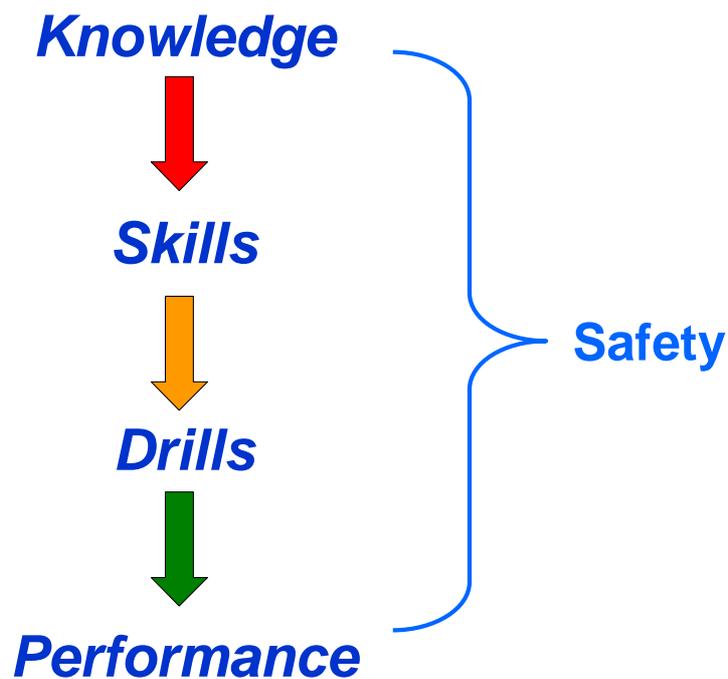
**NHS Lothian Clinical Skills Mastery Programme** **NHS**  
Lothian



## NHS Lothian Clinical Skills Mastery Programme

We recognise that the traditional model of “see one, do one, teach one” is no longer acceptable. Our new approach allows development of fundamental skills in a manner that minimises risk to patients.

In addition, this novel approach allows refreshment of old skills, minimising the effects of potentially harmful skill decay.



# NHS Lothian Clinical Skills Mastery Programme

## General Principles

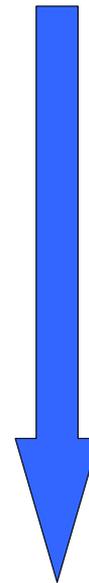
Complex procedural skills can be daunting prospects initially. It is not uncommon for novices to become overwhelmed when performing such procedures, resulting in avoidable error or harm.

It can be helpful to fragment the task into discrete, manageable parts, ensuring one is complete before moving onto the next.

Our Mastery Procedural Phases (shown below) is one method of approaching any complex skill. This will be discussed more in the videos and simulation skills sessions.

## Procedural Phases

1. **Preparation, Assistance and Positioning**  
Non technical skills + clinical decision making
2. **Asepsis + Anaesthetic**
3. **Procedural Pause**  
3 Point Check
4. **Insertion**
5. **Anchoring + Dressing**
6. **Completion**  
Documentation / Communication / Trouble shooting



## Intercostal Chest Drains

Intercostal chest drain (ICD) insertion is a complex and potentially harmful procedure, most commonly required for patients within acute medical and surgical specialties (e.g. respiratory, A+E, thoracic and general surgery). They must be performed by competent practitioners with appropriately skilled assistants. Clinicians learning to perform this skill must do so under appropriate supervision until competent.

The purpose of an ICD is to remove either air or fluid (or both) from the pleural space. ICDs are used for therapeutic/symptomatic purposes e.g. removal of blood from the pleural space or treatment of a pneumothorax in trauma cases.

This resource will focus on 'Blunt Dissection and Wide Bore Chest Drains'. An educational pack for 'Intercostal Chest Drain Seldinger Technique' is available and can be accessed on the medical education website ([www.med.scot.nhs.uk](http://www.med.scot.nhs.uk)).

Clinical competency in performing 'Blunt Dissection & Wide Bore Chest Drains' is listed as an essential procedural competency in the UK curricula for trainees in Emergency Medicine<sup>3</sup> and Acute Core Common Stem (ACCS)<sup>3</sup> and desirable in core<sup>4</sup> and general surgical training<sup>5</sup>.

### Intended Learning Outcomes

After reading this educational pack and watching the associated video resource, the clinician in training will have:

- An understanding of the indications for performing blunt dissection & wide bore chest drain insertion and its use in clinical practice.
- An understanding of risk assessment, patient safety concerns and contraindications of the procedure.
- An understanding of the potential complications of the procedure and the basic principles of their management.
- An understanding of the practicalities of insertion of blunt dissection & wide bore chest drain insertion in a safe and structured fashion.
- An awareness of their own personal limitations and when to obtain help from a senior clinician.

## **Common Indications for placement of blunt dissection drains**

*Wide bore chest drains often required post cardiac or thoracic surgery*

### Pneumothorax

Traumatic  
(Blunt dissection and large bore chest drains are the standard treatment)

Secondary Spontaneous  
(Known existing lung disease e.g. COPD not amenable or resistant to seldinger drainage)

### Pleural Fluid

Haemothorax  
(Blunt dissection and large bore chest drains are the standard treatment – large or evolving with a drop in Hb should trigger immediate discussion with cardiothoracics)

Empyema  
(Pus in pleural space not amenable to seldinger drainage)

## **Patient Safety Considerations**

As with any clinical procedure, the ultimate goal is to successfully perform the chest drain in a safe environment, having removed or minimised any potential risk factors. If there is any concern that significant risk of harm may compromise patient safety, delay the procedure and seek senior advice.

### **Questions to consider before performing a Chest Drain**

1. Are there any absolute or relative contraindications to insertion?
2. Does it need to be done?
3. Does it need to be done now?
4. Am I competent to do this?
5. Is supervision / assistance available?
6. Am I familiar with the equipment?
7. Does the patient have capacity to consent?

Specific safety considerations for performing an ICD are listed below:

Mandatory Component	Comments
Full resuscitation equipment	<ul style="list-style-type: none"> <li>Including airway &amp; suction gear</li> <li>Oxygen should be available and vital signs monitored</li> <li>Establish IV access pre-procedure</li> </ul>
Competent practitioner	Supervisor for trainee if not fully competent
Appropriate Assistant	Must be present throughout procedure, familiar with the environment and competent to contribute to equipment checking, patient comfort etc.

## **Patient Safety Considerations (cont.)**

### **Thoracic Ultrasound**

- Thoracic ultrasound is a useful adjunct to clinical examination and chest x-ray in skilled hands, and can assist in differentiating between a pneumothorax and fluid in the pleural space. However, it should not delay appropriate treatment of the underlying problem.

### **Timing of procedures**

- **Pleural procedures should not take place out-of-hours except in an emergency<sup>3</sup>.**
- Pneumothoraces are more likely to require urgent, out-of-hours attention than pleural effusions. If intervention is being considered out-of-hours, consultation with a senior, appropriately experienced clinician must occur (e.g. respiratory consultant).
- Tension pneumothorax is a medical emergency and requires immediate intervention. Temporising measures including insertion of large cannula to 2<sup>nd</sup> ICS mid clavicular line. An ICD must be inserted subsequently by a skilled operator. The patient may remain significantly unstable following this emergency procedure and urgent senior involvement and procedure to chest drain insertion is essential.

### **Patient Education**

Good communication is extremely important. A patient that knows what to expect from the procedure will be less anxious and fearful which can only be beneficial to the outcome. The patient should be made aware of why he/she is having the procedure, the benefits and the potential complications before obtaining informed written consent. Establish if the patient has any known allergies prior to the procedure - the patient may have an allergic reaction to local anaesthetic or antiseptic skin preparation.

If the patient does not have capacity to give informed consent and the procedure is deemed clinically necessary, complete an 'Adults with Incapacity Certificate'<sup>6</sup>.

## **Risk Assessment**

**If there is concern regarding any of the issues below, senior advice must be obtained**

### **Absolute Contraindication**

- Unskilled clinician without supervision
- Lab-skilled clinician without supervision

### **Potential Contraindications** (see details below)

If encountered, consider the urgency of the need for chest drain insertion and seek senior advice as appropriate.

- Significant bleeding risk due to anti-coagulation, liver disease or potential injury to major thoracic vessel
- Respiratory compromise
- Skin – local infection – consider alternative insertion site if appropriate
- Agitated or confused patient – consider urgency of procedure and, if required, safe procedural sedation by a clinician experienced in carrying it out
- Possible alternative procedure – e.g. patient needs to go to theatre or could be managed with a ‘seldinger’ drain
- Significant bullous lung disease
- Uncertainty about imaging (CXR, CT or USS) appearances
- Non-emergency procedure out of hours
- Raised hemi-diaphragm on side of planned chest drain

## Bleeding Risk

**In emergencies (e.g. tension pneumothorax) the risk of bleeding versus cardiorespiratory compromise must be considered – procedure is likely to be required immediately, accepting higher bleeding risk.**

If there is concern regarding any of the issues below, senior advice from the haematology department must be obtained<sup>7,8</sup>.

Bleeding Risk	Advice
Thrombocytopenia	Do not perform if platelet count < 80,000 <sup>9</sup> Take advice from haematology team before proceeding.
Warfarin + New oral agents (e.g. rivaroxaban)	Discontinue chronic warfarin therapy 4–5 days before procedure and check INR. INR should be 1.4 or less at the time of the procedure. Consider if patient requires iv heparin substitute e.g. in setting of metallic heart valve Please consult relevant literature & discuss with haematology regarding patients on newer oral anticoagulants.
Antiplatelet medications	No contraindications with aspirin, dipyridamole or NSAIDs. Thienopyridine derivatives (clopidogrel and ticlopidine) should be discontinued 7 days and 10 days, respectively, prior to procedure. GP IIb/IIIa inhibitors should be discontinued to allow recovery of platelet function prior to procedure (8 hours for tirofiban and eptifibatide, 48 hours for abciximab).
LMWH	Delay procedure at least 12 hours from the last dose of thromboprophylaxis LMWH dose. For therapeutic dosing of LMWH, at least 24 hours should elapse prior to procedure. LMWH should not be administered within 4 hours after the procedure.
Unfractionated Subcutaneous or IV Heparin	Delay procedure for 4 hours after last dose, document normal APTT. Heparin may be restarted 4 hours following procedure.
Thrombolytics/fibrinolytics	There are no available data to suggest a safe interval between procedure and initiation or discontinuation of these medications.

Note that combinations of any of the above drugs confer additional bleeding risk and should be discussed with the haematology department.

## **Respiratory Compromise**

Invasive procedures are of significant risk to patients with any form of respiratory compromise (especially respiratory muscle weakness). Particular attention must be paid to positioning, ventilatory and physical support of such patients.

**Paradoxically, if the respiratory compromise is due to the current pleural pathology, intervening with an ICD may be part of the solution.**

If the patient is deemed fit enough, by senior clinicians, to undergo such a procedure, it should ideally be performed in as erect a position as possible.

- If any concerns, delay procedure and obtain help.

## **Skin**

Skin infection, cellulitis, at the site of drain insertion can potentially introduce infection into the pleural space and subcutaneous tissues. Skin infection/cellulitis alters tissue pH and can stop the LA being effective.

- If any concerns, delay procedure and seek help.

## **Agitated or confused patient**

The ICD procedure requires a tolerant patient and a skilled clinician. There is a higher chance of failure, trauma and infection if the patient is unable to remain still. All measures should be taken to remove the source of the patient's agitation. Where this is not possible a senior and experienced clinician should attempt ICD insertion. Additional assistants will be needed. The patient may require mild sedation and discussion with the anaesthetic department. The risks of an indwelling ICD in a confused or agitated patient must also be considered.

## **Possible alternative procedure**

Pleural effusions may be better investigated using alternative approaches, such as therapeutic aspiration or thoracoscopy (medical or surgical). CT and ultrasound imaging can help clarify the best approach. Senior, specialist clinicians must be involved with the decision to proceed to chest drainage, as opposed to such other investigations.

## Potential Complications

When performed by a competent practitioner, in an appropriate environment and under strict asepsis, chest drains are relatively safe procedures. Although difficult to establish exact complication rates, all complications are considered infrequent or rare.

In keeping with the principles of safe clinical practice, should there be any concern about any of the complications below, obtain immediate senior review of the patient.

Complication	Clinical Presentation	Recommended Action
<b>Pain</b>	Reported pain/agitation /tachycardia	<p>Make sure that adequate LA is used and allowed to work before attempted drain insertion. Warn patients about discomfort on re-expansion and if draining an effusion take the fluid off slowly.</p> <p>Some patients may require IV opiates and a small dose of IV benzodiazepine to facilitate drain insertion. Regular and PRN analgesia (stepwise)</p>
<b>Infection</b>		
Wound infection / Cellulitis	<p>Spreading cutaneous inflammatory changes / Sepsis with no other obvious source.</p> <p>No evidence of intrapleural infection.</p>	Antibiotics appropriate to severity of infection (see local microbiology guidelines).
Intrapleural infection	Pyrexia / sepsis with no other obvious source / night sweats / weight Loss	<p>IV antibiotics (including skin organism cover). May require further intrapleural drainage. Consider cardiothoracic</p>

		involvement. No flushing of chest drains
<b>Pneumothorax</b>	Worsening SOB / chest pain / pre-syncope	Usually resolves with correct drain placement. Ensure drain is UNCLAMPED.
<b>Drain dislodgement</b>	Drain accidentally removed / pulled on / worsening SOB	Re-assess entire insertion site, connections etc. Consider insertion of new drain in new site.
<b>Drain blockage</b>	Drain not swinging or bubbling	See further advice in 'Trouble Shooting Guide.' (App. 1)
<b>Visceral injury</b>	Patient unwell / signs of bleeding or hypovolaemic shock / tamponade / new abdominal pain etc.	Urgent Senior Help. IV Fluid resuscitation. Consider transfusion. Urgent CT imaging. Consider major haemorrhage protocol.
<b>Serious bleeding</b>	Patient unwell / signs of bleeding or hypovolaemic shock / new pleural fluid on CXR / tamponade / new abdominal pain etc.	Urgent Senior Help. IV Fluid resuscitation. Consider transfusion. Urgent CT imaging. Consider major haemorrhage protocol
<b>Surgical Emphysema</b>	Subcutaneous swelling around drain site. May progress to entire upper body.	See further advice in Trouble Shooting Guide (App. 1)
<b>Nerve damage</b>		
Intercostal nerves	Neuropathic thoracic pain	Retract drain 2cm depth at level of skin + re-assess.

Intrathoracic nerves	Horner's syndrome	Consider drain removal + neuropathic analgesia.
<b>Unsuccessful Attempts</b>	Failure to access pleural space	Please see 'Failed Drain Guideline'. (App. 2)
<b>Re-expansion pulmonary oedema</b>	Patient unwell/SOB Can be delayed 24hrs	Supportive – Oxygen +/- mechanical ventilation

## Local Anaesthetic

Lidocaine 1% **3mg/kg/dose** not to exceed 300mg.

Do not repeat within 2 hours.

Typically the average patient will require 10-20mls of 1% lidocaine. If a larger volume is required consider using lignocaine with adrenaline.

## Guidelines for the Management of Severe Local Anaesthetic toxicity

### Signs of severe toxicity:

- Sudden loss of consciousness, with or without tonic-clonic convulsions
- Cardiovascular collapse: sinus bradycardia, conduction blocks, asystole and ventricular tachyarrhythmias may all occur
- Local anaesthetic (LA) toxicity may occur some time after the initial injection

### Immediate management:

- Stop injecting the LA
- Call for help
- Maintain the airway
- Give 100% oxygen and ensure adequate lung ventilation
- Confirm or establish intravenous access
- Control seizures: give a benzodiazepine, thiopental or propofol in small incremental doses
- Assess cardiovascular status throughout

### Management of cardiac arrest associated with LA injection:

- Start CPR
- Manage arrhythmias using ALS protocols, recognising that they may be very refractory to treatment
- Prolonged resuscitation may be necessary; it may be appropriate to consider other options:
  - **Consider the use of cardiopulmonary bypass if available**
  - **Consider treatment with lipid emulsion**

### Treatment of cardiac arrest with lipid emulsion:

*(approximate doses are given in red for a 70-kg patient)*

- Give an intravenous bolus injection of Intralipid® 20% 1.5 ml.kg<sup>-1</sup> over 1 min
  - **Give a bolus of 100 ml**
- Continue CPR
- Start an intravenous infusion of Intralipid® 20% at 0.25 ml.kg<sup>-1</sup>.min<sup>-1</sup>
  - **Give at a rate of 400 ml over 20 min**
- Repeat the bolus injection twice at 5 min intervals if an adequate circulation has not been restored
  - **Give two further boluses of 100 ml at 5 min intervals**
- After another 5 min, increase the rate to 0.5 ml.kg<sup>-1</sup>.min<sup>-1</sup> if an adequate circulation has not been restored
  - **Give at a rate of 400 ml over 10 min**
- Continue infusion until a stable and adequate circulation has been restored

**Remember:**

- Continue CPR throughout treatment with lipid emulsion
- Recovery from LA-induced cardiac arrest may take >1 h
- Propofol is not a suitable substitute for Intralipid®

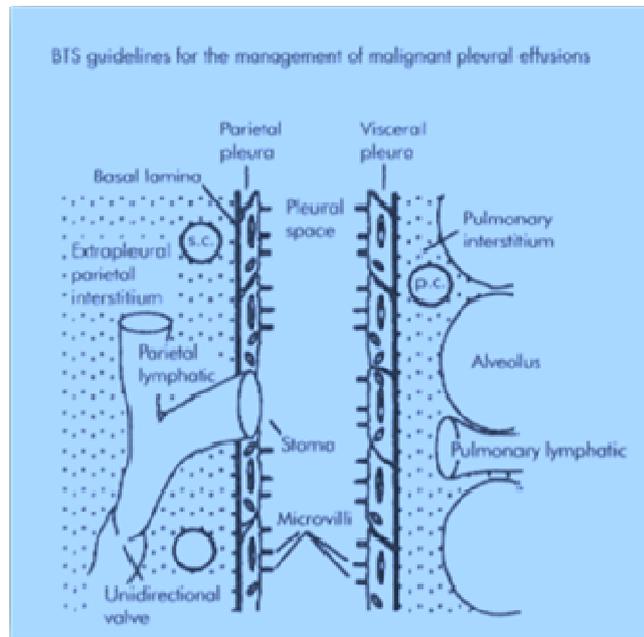
## Anatomy and Physiology

### Normal Pleural Anatomy

#### 5 Main Compartments

- Parietal Systemic Circulation
- Parietal Interstitial Space
- Pleural Space
- Pulmonary Interstitium
- Visceral Circulation

Drainage of Pleural Fluid occurs via parietal lymphatics, into the hilar lymph nodes and through to the thoracic duct.



Adapted from BTS Pleural Guideline 2003

### Normal Pleural Physiology

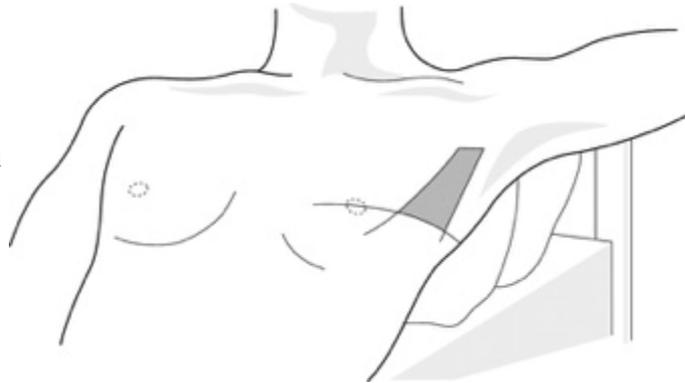
- Small volume of Pleural Fluid
- Thin film on pleural surfaces
- Fluid Constituents
  - Protein
  - Cells: Macrophages, Lymphocytes, Mesothelial etc.
  - Large MW Proteins (e.g. LDH)
  - $\text{HCO}_3$ , Na, Glucose, Cl, K

## Surface Anatomy

Diagram to Illustrate the 'Safe Triangle'<sup>10</sup>

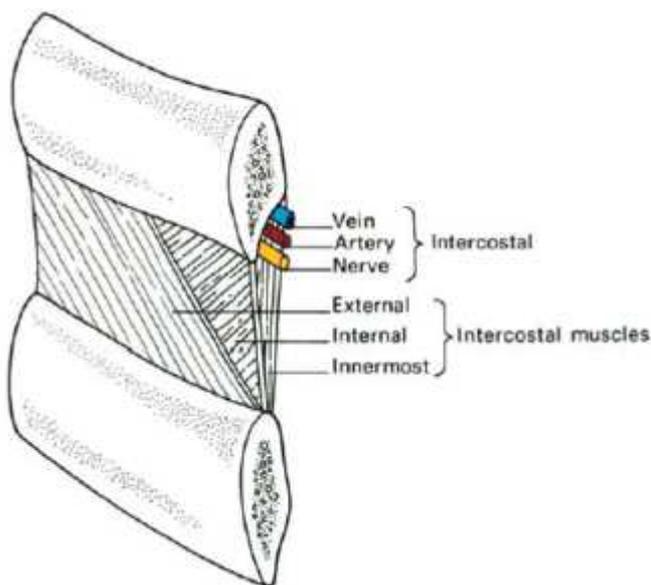
Bordered by:

1. Lateral border of pectoralis major
2. Anterior border of latissimus dorsi
3. 5th intercostal space.



Between each of the ribs lie the intercostal spaces, which are breached over by the intercostal muscles. Each intercostal space has a nerve, artery and vein running through it. These vessels lie and run just under the rib. This means that a chest drain should be inserted just above the upper border of the rib to avoid damage to the neuro-vascular bundle. The long thoracic nerve runs down the lateral border of the thorax and so chest drains should be inserted anterior to the mid-axillary line to avoid damage to this structure.

## Intercostal Spaces



The neurovascular bundles run below the ribs. They also drop down more prominently posteromedially.

Therefore insert the needle above the superior border of the ribs and laterally to avoid disturbance of the neurovascular bundle.

## Equipment and Resources

It is recommended to bring double the number of each piece of procedural equipment as reserve (only open 1x ICD kit at a time) in case of contamination, failed attempts etc.

- Experienced and skilled assistant + / - competent supervisor
- Pillows (2) or trolley with adjustable back
- Inco-pads (blue towels for protection of bed sheets)
- Large sharps bin
- Surgical gown, sterile gloves, face mask and surgical headcap
- Procedure trolley
- Universal aspiration pack (from surgical stores)
- Surgical drapes
- Adhesive tape (paper or plastic); may be needed to keep drape in position
- Antiseptic solution (1 of):
  - Chlorhexidine topical spray or solution
  - 2% Chlorprep sponge applicators
  - Iodine based solution (if no allergy)
- Sterile applicators x 3 (to hold sterile gauze)
- Lidocaine 1% - 10 -20mls (volume depends on body weight)
- 10ml syringe
- 50ml syringe for sample collection
- 1 green needle for drawing up lidocaine
- 1 blue (25G) and 1 green needle for injection of lidocaine
- Large bore chest drain kit (Size 28Fr most commonly used)
- Drain tubing and underwater seal bottle
- Sterile water for underwater seal
- Several pieces of sterile gauze
- Suture (e.g. 1.0 Silk)
- 11 blade
- Dressings
- Universal containers for pleural fluid if required for further investigation
- ABG syringe/sterile McCartney bottle for fluid pH if empyema suspected

# Chest Drain Procedure

## Phase 1 – Preparation, Assistance + Positioning

1. **Obtain informed consent**
  - Written, informed consent is the gold standard
    - Explanation + patient information leaflet if possible
    - Alternatives to procedure
    - Potential complications and their management
  - Adults with Incapacity Act Certificate if appropriate  
(See [Appendix 4 for an example patient information leaflet](#))
  
2. **Exclude contraindications**
  - Check for anticoagulant or antiplatelet medications ([See earlier Table](#))
  - Clotting screen and platelet count
  - Review imaging
  - Ensure competent practitioners and adequate supervision available
  
3. **Patient and Clinician Preparation**
  - Toilet advice (empty bladder for patient and clinician)
  - Ensure seating / standing and bed height appropriate and stable
  - Remove pager + mobile phone
  - Assistant prepared
  - Reassure patient
  - Pre-procedure analgesia (patient)
  - Establish vascular access
  - Ensure pulse oximetry and haemodynamic monitoring is available

**4. Arrange Equipment (assistant can perform this – non-touch technique)**

- Open sterile pack onto procedural trolley
- Open procedural equipment onto trolley
- Prime underwater seal drainage bottle and tubing
- Ensure trolley on correct side for clinician



**5. Patient position (Crucial to enhance procedural safety + success)**

- Take your time to ensure position is correct and comfortable
- Three Options: **Supine, Sitting Forward or Reclining**

**Note: Triangle of Safety:**



Bordered by:

1. Lateral border of pectoralis major
2. Anterior border of latissimus dorsi
3. 5th intercostal space.

**If this area is not available due to wounds, infection of flail segment seek experienced support.**

### **Supine**

In trauma, the patients are invariably supine due to, among other reasons, spinal precautions and hypovolaemia. Anatomical landmarks may be more difficult to establish due to swelling and the presence of any wounds.

### **Sitting**

Insertion site is usually more posterolateral than in the reclining position.

Sitting + leaning forward, legs over side of bed.

Use bedside table + pillow for support + to help elevate arms slightly.

### **Reclining**

Allows better access to “Triangle of Safety”: usually optimal insertion site for pneumothorax.

Leaning back in bed at approximately 45 degree angle to horizontal.

Arm raised and rested behind patient’s head (extra assistance may be needed for this).

1 pillow to rest patient’s head.

Patient must be comfortable and steady.



**6. Identify chest drain insertion site**

- Review imaging prior to identifying insertion site.
- Use of direct ultrasound guidance is mandatory if procedure for pleural fluid to be performed.
- Mark the site (e.g. blunt needle cap indentation)

**Reminder - Thoracic Ultrasound**

- **Pleural procedures involving pleural fluid MUST only be performed under Ultrasound guidance.**

**7. Prepare underwater seal and drain connection tubing**

- Assistant can prepare these components
- Use sterile water to fill the drain bottle to the 'fill level' usually marked and labelled (sometimes with volume measure 0mls)
- Place both on floor, near patient, within easy reach of clinician but ensure drain tubing remains sterile – usually drain attachment end kept inside sterile bag or rested on trolley within sterile field (drain end must not touch floor and must be replaced if it does)



## 8. Establish sterile field

- Again, assistant can perform this - **non-touch technique vital**
- Open sterile pack
- Pour antiseptic skin wash into small bowl
- Open all individual components and drop carefully into sterile field.

### ENSURE DRAIN CONNECTS TO TUBING

- NEED TO CAREFULLY CHECK THAT END OF DRAIN FITS TO DRAIN CONNECTION TUBING (in some packs this will be provided).

## Phase 2 – Asepsis + Anaesthesia

### 1. Establish Aseptic conditions for clinician and patient

- Put on surgical mask + hat
- Wash hands with surgical scrub
- Put on gown and sterile gloves
- Apply antiseptic skin wash via non-touch technique (use applicators) x 3
- Allow skin to dry

(Please also refer to associated video resource on scrubbing and gowning up)

### 2. Drape the patient

- Take care to not touch patient
- Ensure large enough sterile field (including ability to feel and re-assess landmarks without contamination)
- Assistant may need to tape corners of drape to patient's gown etc.
- Avoid fenestrated drapes if possible as they can obscure anatomical landmarks



(please note additional chest drain in situ + glue markings from dressings)

### 3. Local Anaesthetic

- Infiltrate local anaesthetic (maximum 3mg/kg, 20ml 1% Plain lignocaine in 70kg adult may be required), initially by drawing up a skin bleb with a blue needle and then using a green needle to infiltrate through the soft tissues onto the rib and pleura aspirating as the needle is advanced
- **Ensure pincer grip on needle (as shown below) for safety**
- Infiltrate perpendicular + deeper into subcutaneous tissues using green needle. Keep on top of the underneath rib at all times. Periosteum of underlying rib should be anaesthetised.
- You may enter the pleural space with green needle – **NOTE THE DEPTH. Aspiration of pleural air or fluid is useful to establish position**
- Infiltrate into pleura / pleural cavity (majority of lidocaine should be used for periosteum, pleura, pleural cavity)
- Administer analgesia (Intravenous Morphine titrated to effect) unless contra-indicated and consider use of an anxiolytic (Midazolam 1-2mg titrated to effect with caution as can cause respiratory depression)

#### **NOTE RISKS OF LIGNOCAINE TOXICITY**



## Phase 3 – Procedural Pause

(Crucial for Patient Safety)

- Visualise procedure in correct order
  - Vocalisation of the procedural sequence may benefit both clinician and assistant
  
- Perform 3 point check
  - Patient
  - Assistant
  - Clinician
  
- Provide everyone with an opportunity to speak up
  
- Final equipment check
  - Prime all components
  - Ensure components arranged in order of use
  - Clamp the furthest end of the chest drain, just proximal to where you will attach the drainage tubing
  - Clamp forceps onto the insertion end of the chest drain, through the most proximal fenestration to assist in guiding the tube through the chest. Ensure that the tip of the forceps does not protrude beyond the end of the drain.

## Phase 4 – Insertion

Please note there will be a degree of individual clinician variation within Phase 4. Clinicians may have a preferential order for skin incision, blunt dissection and drain insertion. All are valid, as long as performed in a safe manner. Shown below is one approach. For further details, discuss with your supervisor during your simulation training.

### 1. Blunt Dissection

- Make an incision parallel to the rib where the drain is to be inserted. Ensure that this is big enough for the drain (approximately 2-3cm) and goes through all the layers of the skin only.



- Many practitioners insert 'stay and close' sutures at this point.
- Using large forceps (Kelly's or similar) blunt dissect through the subcutaneous tissues (open and close forceps to separate rather than cut tissues).



- Make sure that you dissect down onto the upper border of the rib and open the pleura (*you should feel a sudden give and sometimes a hiss of air or flow of blood*)
- Carefully insert a finger into the pleural cavity and sweep round to make sure that the lung is not adhered to the chest wall, avoid damage to the lung with your finger (***CAUTION if the patient has rib fractures as these may puncture your glove***)

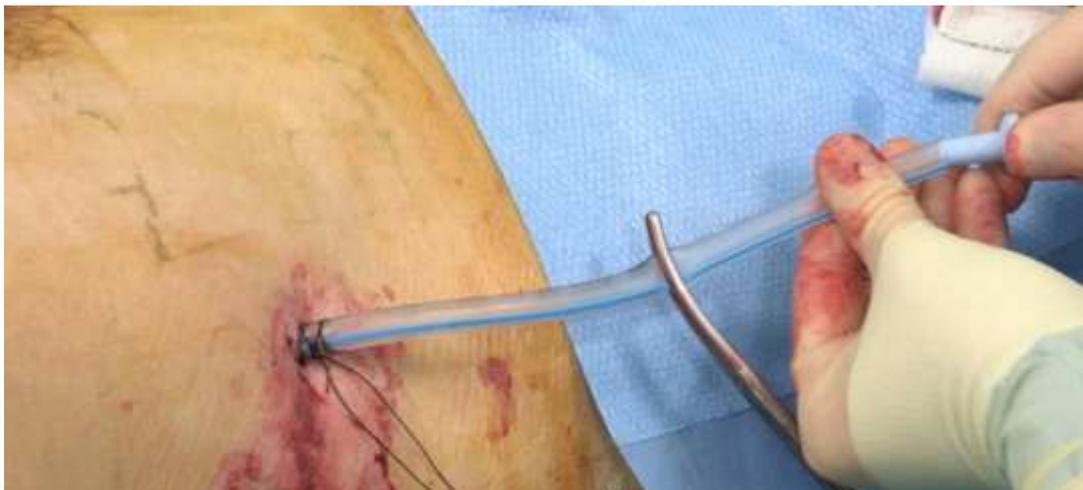
## 2. Drain Insertion

- Estimate depth of insertion by looking at the markings on the drain and distance from apex of the lung to your incision. All the holes along the length of the drain need to be within the pleural space.  
***Note: holes that are invisible due to being deeper than the skin but superficial enough to lie within the subcutaneous tissue will still cause surgical emphysema***
- Insert the drain through the hole in the pleura and into the cavity; aim the drain towards the apex (some drains come with a plastic introducer which helps to facilitate this). Always remove the introducer as this may cause damage to the lung or even the heart or diaphragm.



### 3. Attachments

- Attach the end of the drain onto the underwater drainage system and place the chest drain bottle below the patient



- Check that the water in the chest drain is bubbling or swinging, if in doubt ask the patient to cough gently.

**5. Ensure entire system is functional**

- Unclamp the chest drain
- Ensure that the water in the bottle is swinging with respiration
- Depending on the patient's pathology, there will be bubbling due to air, or fluid or blood evacuated through the drain.
- If more than 1500ml of blood is drained initially or there is ongoing blood loss of >200ml/hr contact cardiothoracics urgently as this is indicative of a large vessel bleed and potentially ongoing bleeding.
- **CLAMP THE DRAIN IF THE PATIENT IS BLEEDING**
- If there is prolonged bubbling and evidence of persistent pneumothorax seek senior advice
- Get senior advice regarding ongoing drainage rates

**Fluid may drain very quickly (before patient leaves procedure room) so careful attention required. This can be very painful for the patient and in a few cases they can get re-expansion pulmonary oedema.**

**NEVER CLAMP (OR CLOSE A TAP ON) A DRAIN FOR PNEUMOTHORAX**

**6. In case of failure to insert drain successfully**  
Follow Failed Insertion Guidance in appendix 2

## Phase 5 – Anchoring + Dressing

- **DO NOT LET GO OF THE DRAIN** until it is safely sutured in place



- Assistant should take the weight of the drain (via the collecting tubing). They can hold the drain at the end where it is being cut off.
- Tie (if inserted previously) or insert a stay suture and a close (mattress) suture that can be used to close the wound when the drain is removed. Make sure you use a strong suture like 1.0 silk or it may snap. Ensure that your stay suture is tight and slightly indents the drain
- All knots must be around the base of the drain. DO NOT 'ballet slipper' tie the tube.

DO NOT use purse string sutures

- Apply gauze around drain (to minimize kinking at skin). Either bespoke gauze with tubing aperture or make cut into medium size gauze to allow application around tube.
- Apply adhesive dressing over gauze. Ideally tegaderm over gauze with mepore around edges of tegaderm to ensure secure dressing. Tegaderm allows a clear window to proximal end of drain and requires less effort to remove if drain site has to be

inspected. A mepore 'mesentery' helps direct force away from insertion point (and is recommended by BTS). We usually avoid sticky dressings unless there is a problem.



- Reinforce any connecting components using “sleek” tape. **BUT do not apply sleek tape to patient skin.**

## Phase 6 – Completion

1. **Dispose of waste and sharps appropriately**

2. **Ensure patient comfortable and safe**

3. **A chest X -ray should be carried out and reviewed immediately**

3. **Provide instructions to patient and nursing staff:**

Patient Instructions:

- Report any new symptoms: breathlessness, pain, pre-syncope
- Mobilising advice – positioning and carrying of drainage bottle (below waist)
- Importance of water seal (in case drain bottle accidentally upturned with loss of seal)

Staff Instructions:

- General chest drain management + observation forms
- Drainage flow rates (e.g. 500mls - 1.5L off initially and subsequently 500mls every 4 hours)
- Ensure water seal present at all times
- Make sure the bottle is changed at 600-800mls drainage

4. **Documentation**

- Including appropriate results
- Use stickers and complete chest drain registry form (under construction in ED for data collection/audit of practise)
- Ensure chest drain chart and drainage guidance for nursing staff documented  
(Refer to [Appendix 8 for Procedural Sticker Template](#))

5. **Other Tasks**

- Prescribe regular and PRN analgesia (and laxatives if opiates required)

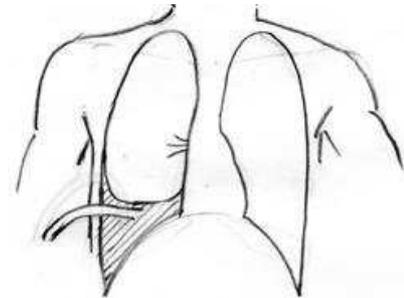
## Appendix 1:-

### Example of Chest Drain Patient Information and Consent Form

#### What is a Chest Drain and What does it Do?

Sometimes air, blood, fluid or pus can gather in the space between the lung and the chest wall. This is called the pleural space. A chest drain is a sterile plastic tube that allows these abnormal contents to be drained from the pleural space. Inserting a chest drain usually takes about 30 minutes.

Patient Details / Sticker



#### What happens before chest drain insertion?

The doctor will decide the best position to place the chest drain, normally just under your armpit. The area of skin will be cleaned with antiseptic wash. The doctor will then inject local anaesthetic under your skin to freeze a small area of skin.

#### What happens during chest drain insertion?

Next, the doctor will make an incision between two of your ribs, into the pleural space. A tube will be inserted through this incision into the pleural space. The tube is then connected to a drainage bottle containing water. The tube is then secured with a stitch and onto your skin.

#### What happens after chest drain insertion?

You will normally go for a chest X-ray so the doctors can check the position of the drain. You will receive painkillers as the drain might be uncomfortable. You must press your buzzer to get help if you experience more pain, difficulty breathing, light-headedness or any other concerns.

#### What problems might occur?

There is a small risk of bleeding and infection but every effort is made to reduce the risk of this happening. Some patients experience swelling beneath the skin, which is usually harmless. Rare complications include puncturing other organs + damage to the nerves of the chest wall. The clinical team are happy to discuss any of these further should you wish to.

#### Consent Declaration

I have read the information above, discussed any other concerns with the clinical team and agree to proceed with chest drain insertion.

Patient Signature

Print Name:

Date:

Clinician Signature:

Print Name:

Date:

## Appendix 2: Trouble shooting guide – FAQs + Potential Complications

**“Swinging”** Suction must be removed from the drain to assess if the drain is swinging.

- Gentle movement of fluid back + forth within the collection tubing.
- Movement is in synchrony with patient’s respiratory cycle.
- This confirms that the chest drain + collection system is patent.
- This should be present with all newly inserted chest drains.

**“Bubbling”**

- Bubbles visible in the collection bottle.
- May be intermittent and only reproducible on coughing / movement.
- This confirms that air is escaping through the collection system.
- This should be present with all newly inserted pneumothorax drains.

### Ideal Scenario

**Chest drain should be swinging freely (+ bubbling if inserted for pneumothorax)**

#### Potential Scenarios for Pneumothorax Drains

##### **Scenario 1: The pneumothorax drain is swinging but not bubbling**

- The drain is patent and functioning.
- The absence of bubbling suggests the air leak has healed.
- Bubbling can occasionally be intermittent so should be observed for a further 24 hours to ensure this is not the case prior to removal.
- Confirm that lung has re-expanded with CXR.

##### **Scenario 2: The pneumothorax drain is not swinging or bubbling.**

- Ask the patient to cough to see if swinging or bubbling occurs. If not this suggests the drain is not functioning.
- A drain that is not swinging will not bubble so it is impossible to determine the status of the pneumothorax.
- Closely inspect entire system for displacement, blockage or kinking.

### Potential Scenarios for chest drains

#### Scenario 1: The drain is not swinging

- The drain / collection system is not functioning.
- The drain may have become dislodged due to the drain not being adequately secured following insertion.
- If a drain has stopped functioning because it has been displaced then it should be removed and **cannot** ever be pushed back into the pleural cavity.
- **A drain can be withdrawn to improve function but never inserted further into the pleural cavity once the sterile field has been withdrawn.**

#### Scenario 2: The drain is now bubbling

- This suggests the presence of pneumothorax or air leak through the pleural cavity.
- This may be due to pre-existing hydropneumothorax or iatrogenic lung injury during insertion of the chest drain.
- The drain should remain in situ until bubbling has ceased and **a bubbling chest drain should never be clamped.**

**There may be leakage around the drain and no air leak from the lung**

#### Scenario 3: No more fluid is draining

- Again check for drain patency.
- Assuming patency your next step depends on whether the drain has drained the expected or desired volume.
- Perform CXR to assess residual pleural fluid volume. Bedside USS also useful.
- Further imaging may be required if you suspect you may only have drained part of a multi-loculated collection.
- Malignant effusions may continue to drain what they are producing (often <150ml/24 hrs) and not cease.
- Before removing a drain in malignant effusion, discuss with a senior - **pleurodesis** may be considered.

### Surgical / subcutaneous emphysema

- Surgical emphysema is the abnormal presence of air within the subcutaneous tissues.
- The development of surgical emphysema is an unfortunate but well recognised side effect of pneumothorax and intervention.
- Its presence suggests that the drain is occluded or misplaced.
- If neither is the case, then this means that the drainage system is inadequate to deal with the degree of air leak.
- The degree of drainage can be increased by applying suction, inserting a second chest drain or a larger drain.
- Other than being uncomfortable it is usually only of cosmetic importance but can be distressing for patients and relatives. In the severest of cases this may track up to the face and neck and cause airway compromise. It may occur during drain insertion due to rapid release of air through the insertion site.

If surgical emphysema develops: **don't panic - it doesn't usually cause significant problems and how you approach the patient will make a big difference to their confidence about your ability to handle the situation.**

- Ensure that the drain is patent and that there is no air leak at the site of drain insertion such as a port in the drain sitting in the chest wall.
- If unclear get a repeat cxr to check on the position of the fenestrations, which are seen as breaks in the radio-opaque line on the tubing. These should ALL be inside the thorax.
- Inspect the drain entry site to ensure the drain is sealed tight within this.
- Ensure the patient has adequate analgesia and observe to ensure there are no signs of airway compromise.
- Usually subcutaneous emphysema requires no additional treatment and resolves over a few days.
- Get senior help urgently + consider cardiothoracic referral.

CXR showing  
Left sided  
surgical  
emphysema





### **Suction for chest drains**

- In pneumothorax, a persistent air leak with or without re-expansion of the lung is the usual reason for consideration of the use of suction. It is arbitrarily defined as the continued bubbling of air through a chest drain after 48 h in situ.
- The theory that underpins the role of suction is that air might be removed from the pleural cavity at a rate that exceeds the egress of air through the breach in the visceral pleura and to subsequently promote healing by apposition of the visceral and parietal pleural layers.
- It has been suggested that optimal suction should entail pressures of 10 to 20 cm H<sub>2</sub>O (compared with normal intrapleural pressures of between  $-3.4$  and  $-8$  cmH<sub>2</sub>O, according to the respiratory cycle).
- High-volume low-pressure systems are recommended either through mobile pump attachments or wall suction units with low pressure adaptors.

### **When should a chest drain be removed?**

A chest drain should not be left indwelling longer than absolutely necessary.

Chest drains should be removed when

- 1) A pleural effusion has been drained (Fluid drained <200ml/24hrs)
- 2) A pneumothorax with cessation of bubbling > 24hrs
- 3) After pleurodesis of a malignant effusion (see separate guide)
- 4) Drain is non-functioning (covered above)

### **What if a drain falls out?**

- Ensure the drain is removed properly, the drain site is clean, is sutured and dressed appropriately.
- Does the drain need replaced? In the case of an unresolved pneumothorax the answer is almost certainly yes. This decision should be made promptly with senior guidance.
- **If a chest drain needs re-sited never do so through the original incision.**
- With pleural effusions it will depend on how much residual fluid there remains in the pleural space and why it is there. It may be unacceptable to site a further drain to drain a small residual collection of fluid particularly in a malignant effusion unless there is a strong desire for pleurodesis.
- If the effusion is due to pleural infection the decision is based on volume of residual fluid and presence of ongoing sepsis and is best guided by a respiratory specialist. In the vast majority of pleural effusions a decision on whether the drain needs replaced can be delayed until working hours.

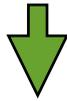
### **Removing a chest drain**

**Clinicians must observe a chest drain being removed by a competent clinician before performing the removal themselves.**

- A chest drain should be removed either while the patient performs valsalva manoeuvre or during expiration with a brisk withdrawing movement.
- Remove all dressings.
- Clean the skin.
- Remove any existing anchor sutures.
- Rehearse breath-holding with patient.
- Quickly remove drain from chest.
- A suture should be placed and a dressing applied. Arrangements should be made for the suture to be removed in <5 days.
- Dispose of clinical waste and sharps appropriately.

### Appendix 3: Failed Chest Drain Guidance

**Initial Approach – Reclining or Sitting Forward**



#### **Double check all Procedural Phases**

- **Repeat Bedside USS**
- Re-evaluate surface anatomy.
- **Identify source of error**
  - Patient Position
  - Pleural Depth
  - Angle of needle to skin (must be perpendicular)
- Re-position patient +/- clinician.
- Ensure seating and bed height correct.



**Repeat introducer needle insertion after correcting error**

No more than 3 attempts  
+  
Ensure patient comfort



**Still Unsuccessful - Get Senior Help**

## Appendix 4: Chest Drain Procedural Sticker / Documentation Template

<b><u>Pleural Procedure</u></b>		
Date:	Time:	Place:
Clinician + Grade:	Supervisor:	
<div style="border: 1px solid black; padding: 5px; min-height: 100px;">           Patient Name / Label:         </div>	Informed Consent / AWIA <input type="checkbox"/>  Indication:   Contra-indications Excluded <input type="checkbox"/>	
<b>USS Thorax Findings:</b>		
Asepsis <input type="checkbox"/>	Local Anaesthetic:	
<b><u>Procedure / Technique</u></b>		
<u>Aspiration</u> <input type="checkbox"/>	<u>Guidewire Drain</u> <input type="checkbox"/>	<u>Blunt Diss. Drain</u> <input type="checkbox"/>
Site:	Site:	Site:
Needle <input type="checkbox"/>	Size:	Size:
Cannula <input type="checkbox"/>	Depth:	Depth:
Safe-T-Centesis <input type="checkbox"/>	Sutured+Dressed <input type="checkbox"/>	Sutured+Dressed <input type="checkbox"/>
Volume Aspirated:		
<b>Samples</b>	Appearance:	
Biochemistry <input type="checkbox"/>	<input type="checkbox"/>	Microbiology <input type="checkbox"/>
Pathology <input type="checkbox"/>	<input type="checkbox"/>	AAFB <input type="checkbox"/>
pH <input type="checkbox"/>	<input type="checkbox"/>	Other:
Paired venous blood (Protein / Glucose / LDH) <input type="checkbox"/>		
<b>Difficulties / Complications / Deviations from standard practice:</b>		
<div style="border: 1px solid black; padding: 10px;"> <p style="text-align: center;"><b>Post Procedural Care</b></p> <ul style="list-style-type: none"> <li>• CXR Requested <input type="checkbox"/> CXR Reviewed <input type="checkbox"/></li> <li>• Analgesia prescribed <input type="checkbox"/></li> <li>• Fluid volume to be drained before clamping:</li> <li>• Drainage Rate:</li> <li>• Chest Drain Observation Chart <input type="checkbox"/></li> </ul> </div>		
<b>Signed:</b>	<b>Print Name:</b>	<b>Pager:</b>

## Appendix 5: Blunt Dissection & Widebore Chest Drain Equipment Checklist

Item	Obtained
<ul style="list-style-type: none"> <li>• Experienced and skilled assistant + / - competent supervisor</li> </ul>	
<ul style="list-style-type: none"> <li>• Stool for clinician to sit on during procedure if desired</li> </ul>	
<ul style="list-style-type: none"> <li>• Pillows (2)</li> </ul>	
<ul style="list-style-type: none"> <li>• Inco-pads (blue towels for protection of bed sheets)</li> </ul>	
<ul style="list-style-type: none"> <li>• Sharps bin</li> </ul>	
<ul style="list-style-type: none"> <li>• Surgical gown, sterile gloves, face mask and surgical headcap</li> </ul>	
<ul style="list-style-type: none"> <li>• Procedural trolley</li> </ul>	
<ul style="list-style-type: none"> <li>• Universal aspiration pack</li> </ul>	
<ul style="list-style-type: none"> <li>• Surgical drape (ideally a transparent window drape with adhesive edges)</li> </ul>	
<ul style="list-style-type: none"> <li>• Adhesive tape (paper or plastic) - may be needed to keep drape in position</li> </ul>	
<ul style="list-style-type: none"> <li>• Antiseptic solution (1 of):               <ul style="list-style-type: none"> <li>○ Chlorhexidine topical spray or solution</li> <li>○ 2% Chlorprep sponge applicators</li> <li>○ Iodine based solution (if no allergy)</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>• Sterile applicators x 3</li> </ul>	
<ul style="list-style-type: none"> <li>• Lidocaine 1% - calculate on patient weight</li> </ul>	
<ul style="list-style-type: none"> <li>• 20ml syringe</li> </ul>	
<ul style="list-style-type: none"> <li>• 50ml syringe for sample collection</li> </ul>	
<ul style="list-style-type: none"> <li>• 1 green needle for drawing up lidocaine</li> </ul>	
<ul style="list-style-type: none"> <li>• 1 orange (25G) and 1 green needle for injection of lidocaine</li> </ul>	
<ul style="list-style-type: none"> <li>• Large bore chest drain kit (Size 28Fr most commonly used)</li> </ul>	
<ul style="list-style-type: none"> <li>• Drain tubing and underwater seal bottle</li> </ul>	
<ul style="list-style-type: none"> <li>• Sterile saline / water for underwater seal</li> </ul>	
<ul style="list-style-type: none"> <li>• Several pieces of sterile gauze</li> </ul>	
<ul style="list-style-type: none"> <li>• Suture (e.g. 1.0 Silk)</li> </ul>	
<ul style="list-style-type: none"> <li>• Sterile scissors</li> </ul>	
<ul style="list-style-type: none"> <li>• Adhesive dressings e.g. “Mepore” + “Sleek”</li> </ul>	
<ul style="list-style-type: none"> <li>• At least 3 universal containers for pleural fluid</li> </ul>	

**Remember to bring double the required number of needles, syringes and gloves in case of multiple attempts, accidental contamination of sterile field etc.**

## Appendix 6: Blunt Dissection & Widebore Chest Drain Procedural Checklist

Skill Phase + Component	Completed
<b>Phase 1 – Preparation, Assistance + Positioning</b>	
Obtain informed consent / Adults with Incapacity Act Form	
Exclude contraindications	
Optimise clinician comfort + minimise distraction <ul style="list-style-type: none"> <li>○ Clinician seat + bed height / lighting / remove pager / empty bladder etc.</li> </ul>	
Position patient (Supine or sitting forward)	
Identify chest drain insertion site ( <b>Ultrasound guidance if pleural fluid</b> )	
Mark the site (e.g. blunt needle cap indentation)	
Arrange equipment ( <b>Non – touch technique to ensure sterile field</b> ) <ul style="list-style-type: none"> <li>○ Assistant or clinician can open sterile pack + place equipment onto trolley</li> <li>○ Prepare underwater seal and collecting tubing</li> </ul>	
<b>Phase 2 – Asepsis + Anaesthesia</b>	
Put on surgical mask + hat / wash hands / put on surgical gown + sterile gloves	
Apply antiseptic skin wash to area + allow to dry (non-touch)	
Drape the patient (non- touch; may require assistant to tape the edges of drape)	
Infiltrate local anaesthetic <ul style="list-style-type: none"> <li>• Measure depth to pleural space + correlate with introducer needle + dilator</li> </ul>	
<b>Phase 3 – Procedural Pause</b>	
Perform 3 point check <ul style="list-style-type: none"> <li>○ Ensure patient, assistant and clinician are all prepared + content to proceed</li> </ul>	
Perform final equipment check	
<b>Phase 4 – Insertion</b>	
Make an incision parallel to the rib where the drain is to be inserted. Ensure insertion through skin layers only.	
Blunt dissection through subcutaneous tissues	
Insert finger and sweep	
Insert drain	
Remove introducer	
Apply connections + ensure entire system is functional	
<b>Phase 5 – Anchoring + Dressing</b>	
Assistant takes the weight of the drain (via the collecting tubing)	
Tie or insert a stay suture + mattress suture	
Apply gauze around drain	
Apply adhesive dressing over gauze	
Reinforce any connecting components	
<b>Phase 6 – Completion</b>	
Dispose of waste and sharps appropriately	
Provide instructions to patient and nursing staff	
Label and send pleural fluid samples (Biochemistry / Microbiology / Pathology)	
Obtain CXR + Prescribe analgesia	
Documentation (Use procedural sticker and include results when available)	

## Appendix 7: Blunt Dissection & Widebore Chest Drain (Formative skills assessment)

Date:                      Session:                      Tutor:  
Candidate Name:                      Specialty/Grade:                      Email address:

<b>Skill Phase + Component</b>	Start Yes	Start No	End Yes	End No
<b>Phase 1 – Preparation + Positioning</b>				
Optimises clinician comfort + minimises distraction (height/light/pgr)				
Establishes correct position (discussion)				
Locates safe insertion site				
Opens sterile pack / asks assistant to do so (non-touch)				
Ensures correct equipment on trolley (discussion – see list)				
<b>Phase 2 – Asepsis + Anaesthesia</b>				
Puts on surgical mask + hat / washes hands / gown + sterile gloves				
Applies antiseptic skin wash + allows to dry (non-touch)				
Drapes the patient (non- touch; tape by assistant)				
Infiltrates local anaesthetic safely				
<b>Phase 3 – Procedural Pause</b>				
Performs 3 point check: patient, assistant and clinician				
Performs final equipment check				
<b>Phase 4 – Insertion</b>				
Safely incises skin				
Safely blunt dissects through subcutaneous tissues				
Carefully inserts finger into pleural cavity and sweeps				
Inserts drain				
Applies connections + ensures system is functional				
<b>Phase 5 – Anchoring + Dressing</b>				
Inserts stay suture + mattress suture (discussion)				
Applies gauze and adhesive dressing (discussion)				
<b>Phase 6 – Completion</b>				
Disposes of waste and sharps appropriately				
Maintains asepsis throughout				
Instructions + CXR + Analgesia (discussion)				
<b>Score (out of 20)</b>				
<b>Score (%)</b>				

Pass mark 16 out of 20 (80%)

Baseline Score:                      Pass / Fail (circle)

End Score:                              Pass / Fail (circle)



Additional comments?



## Appendix 8: References

- <sup>1</sup> Clinical Skills Managed Education Network. *Chest drain online skills pack*. [http://elearning.scot.nhs.uk:8080/intralibrary/IntraLibrary?command=open-preview&learning\\_object\\_key=i287n2751048t](http://elearning.scot.nhs.uk:8080/intralibrary/IntraLibrary?command=open-preview&learning_object_key=i287n2751048t) (accessed 1<sup>st</sup> March 2015)
- <sup>2</sup> Tiernan J, Reid P et al. *Intercostal chest drain seldinger technique educational reading pack*. <http://www.med.scot.nhs.uk/Pages/Search-Results.aspx?k=mastery> (accessed 1<sup>st</sup> March 2015)
- <sup>3</sup> The College of Emergency Medicine. *Curriculum and assessment systems for core specialty training ACCS CT1 -3 & higher speciality training ST4 – 6 training programmes*. <http://www.collemergencymed.ac.uk/TrainingExams/Curriculum/Curriculum%20from%20August%202010> (accessed on 1<sup>st</sup> March 2015).
- <sup>4</sup> The Intercollegiate Surgical Curriculum Programme. *Core surgical training syllabus*. <https://www.iscp.ac.uk/surgical/SpecialtySyllabus.aspx?enc=j4VfyFXq6Hwh0loAlHujtkC075cafAX8g/MdvMtfyBw=> (accessed on 1<sup>st</sup> March 2015).
- <sup>5</sup> The Intercollegiate Surgical Curriculum Programme. *General Surgery*. <https://www.iscp.ac.uk/surgical/SpecialtySyllabus.aspx?enc=j4VfyFXq6Hwh0loAlHujtvi5dX26hnbw/8NqH1kHobI=> (accessed on 1<sup>st</sup> March 2015).
- <sup>6</sup> Scottish Government . *Adults with Incapacity (Scotland) Act 2000*. Edinburgh. Available at: <http://www.scotland.gov.uk/Topics/Justice/law/awi> (accessed 30<sup>th</sup> April 2013)
- <sup>7</sup> Joint Working Party of the Association of Anaesthetists of Great Britain & Ireland (AAGBI), Obstetric Anaesthetists' Association (OAA) and Regional Anaesthesia UK (RA-UK) (2011). *Regional Anaesthesia in Patients with Abnormalities in Coagulation*. London. Available at: <http://www.aagbi.org/sites/default/files/RAPAC%20for%20consultation.pdf> (accessed 30<sup>th</sup> April 2013).
- <sup>8</sup> British Thoracic Society (2010). *Pleural Disease Guideline*. London: BTS. Available at BTS Website. <https://www.brit-thoracic.org.uk/document-library/clinical-information/pleural-disease/pleural-disease-guidelines-2010/pleural-disease-guideline/>

---

<sup>9</sup> British Society For Haematology Guidelines (BSH) Website  
[http://www.bcshguidelines.com/4\\_HAEMATOLOGY\\_GUIDELINES.html](http://www.bcshguidelines.com/4_HAEMATOLOGY_GUIDELINES.html) (accessed 3rd  
September 2014)

<sup>10</sup> Ellis H and Mahadevan V. (2013) Clinical Anatomy: Applied anatomy for Students and junior doctors 13<sup>th</sup> Ed. Wiley-Blackwell. London.