Chest Drain Guideline - Insertion and Management of Chest Drains

Summary

**Decision to insert chest drain** – this should be made by a consultant except in emergency situations or in trauma when ATLS guidelines are being followed.

**Chest drain insertion** – this should be done by someone experienced in chest drain insertion or under the direct supervision of someone experienced in chest drain insertion.

**Chest drain aftercare** – It is the responsibility of the person who inserted the chest drain to inform the nurse looking after the patient that a chest drain has been inserted and about the immediate post insertion management (e.g. fluid to be drained, arrangements for CXR). It is the responsibility of the nurse looking after the patient to continue with chest drain care, to document it on a chest drain observation chart and escalate concerns about the chest drain either to senior nursing or medical staff.
1. Aim/Purpose of this Guideline

1.1. Aim

These guidelines are intended to be used in all clinical areas of RCHT where chest drains are placed.

They cover indications for chest drain insertion, technique of insertion, care for drain and drainage system and drain removal.

These guidelines bring together information from other national and international guidelines including the British Thoracic Society (BTS) Pleural disease guideline and the Advanced Trauma Life Support (ATLS) manual and the National Safety Standards for Invasive Procedures (NatSSIPs) 2015

2. The Guidance

2.1. Introduction

Chest drains (ICD) are used to remove fluid or air form the pleural space. Pleural disease is common and presents frequently both to respiratory medicine clinics and as acute admissions. In 2008 the National Patient Safety Agency issued a rapid response report highlighting 12 deaths related to ICD insertion between 2005 and 2008. Serious complications of drain insertion included solid organ injury caused by mal-positioned drains, trocars and dilators. There were additional reports of guide wires lost into the pleural space intrapleural and drain site infection. Serious complications and deaths were reported as a consequence of both Seldinger and blunt dissection drain insertion

2.2. Indications

In general chest drains are placed for 4 indications: trauma, pleural fluid, pneumothorax and intraoperatively.

In the context of trauma a blunt dissection drain is usually recommended in accordance with ATLS guidance

**Pneumothorax does not always need a drain and may be treated with aspiration.** If a drain is used then a small bore Seldinger drain is usually most appropriate. *The BTS pleural disease guideline provides a flow chart for management of pneumothorax. (Appendix 3)*

Pleural effusion will sometimes need to be drained. **Usually in the management of undiagnosed unilateral pleural effusion diagnostic and therapeutic aspiration is a more appropriate initial management step.** The BTS flow chart for investigation of unilateral pleural effusion is (appendix 4)

The intraoperative placement of chest drains is out with the scope of this guideline
2.3. Choice of Technique

Blunt dissection chest drain placement involves dissection down to the pleural space through the chest wall and direct placement of a drain through this track, usually with a large bore tube.

Seldinger chest drain placement involves reaching the pleural space with an introducer needle; passing a wire through that needle, dilating up the track and then placing the drain through the dilated track into the pleural space.

In theory most indications for chest drain can be managed with either technique and the experience of the operator may influence choice of technique. In certain situations one technique will be more appropriate. In traumatic haemothorax or pneumothorax blunt dissection should be used. In spontaneous pneumothorax or pleural effusion a smaller bore Seldinger drain is recommended.

2.4. Insertion

Consent

Except in emergency situations written consent should be obtained prior to chest drain

Chest Drain WHO Safety Checklist – must be completed by the operator and assistant prior to insertion (see Appendix 5).

Aseptic technique

Drains should be inserted with full aseptic precautions (gloves, gown, antiseptic skin preparation and an adequate sterile field)

Where available drains should be inserted in a clean procedure room on a ward

Imaging

CXR will normally be the first investigation to evaluate the need for chest drain insertion

CT scanning can be helpful especially in the setting of tethered pneumothorax or severe bullous disease

Bedside ultrasound is strongly recommended for all pleural procedures involving fluid

The marking of a site using thoracic ultrasound for subsequent remote aspiration or chest drain insertion is not recommended

Seldinger chest drains must not be inserted without bedside ultrasound.

Position

The position of choice for drain insertion is within the “safe triangle”
The boundaries of the safe triangle are: the lateral edge of pectoralis major, the lateral edge of latissimus dorsi and the line of the 5th intercostal space.

Inserting drains in positions other than this (especially posteriorly) increases the chances of intercostal vessel damage and serious bleeding complications.

![Figure 1 The 'triangle of safety'. The triangle is bordered anteriorly by the lateral edge of pectoralis major, laterally by the lateral edge of latissimus dorsi, inferiorly by the line of the fifth intercostal space and superiorly by the base of the axilla.](image)

2.5. Chest Drain Insertion (Seldinger Technique)

Think

- **Does my patient need a drain?** Would aspiration be more appropriate?
- **Does it need to be done now?** Avoid “out of hours" drain placement except in emergency
- **Is there a sufficiently skilled operator to insert drain?**

Prepare

- Provide written information sheet and allow time to read it
- Obtain written consent
- Review imaging to date and consider if further imaging is needed
- **Bedside ultrasound will need to be done if drain is inserted for fluid**
- Review baseline observations and ensure IV access
- Ensure that an assistant is available

Position

- For pneumothorax semi-reclined position will provide best access to triangle of safety
- For pleural fluid patient position will be determined by optimum patient comfort and bedside ultrasound findings. The triangle of safety remains the first choice
position for drain insertion provided that ultrasound has confirmed the presence of fluid there

**Procedure**

- Full aseptic technique
- Clean skin and apply drapes
- Infiltrate skin with local anaesthetic
- Infiltrate tissue down to ribs and pleura with local anaesthetic. Ensure that you have given adequate local anaesthetic to the pleura (it has many nerve endings and failing to do this will likely result in significant discomfort for patient)
- **Confirm aspiration of fluid/air. If you cannot do this you must not proceed**
  - While waiting for local anaesthetic to take maximum effect, prepare the introducer needle and guide wire
  - Make small nick in skin with scalpel
  - Insert introducer needle down the track that you have anaesthetised. Hold the needle lightly about 3cm from its distal end to prevent inadvertent over insertion.
  - If the patient notices any discomfort you will need to remove the introducer needle and give more anaesthetic.
  - While inserting the introducer needle draw back on the syringe gently.
  - When fluid or air is aspirated insert the introducer needle 5-10mm more aspirating all the time
  - Secure needle and remove syringe
  - Insert guide wire through needle into pleural space. Guide wire has 10cm intervals marked on it. Do not insert more than 30cm.
  - **There should be little or no resistance. Do not push hard. If significant resistance is felt do not continue.**
  - Secure guide wire and remove introducer needle
  - Use scalpel to enlarge skin nick. Make sure that the skin right next to the guide wire is cut
  - Insert dilator over guide wire. Push gently and firmly along the same plane as you inserted the introducer needle. A rotating motion can help ease through skin. If the dilator won’t go in the most common reason is that the nick in the skin is not big enough.
  - Remove dilator.
  - Insert drain over guide wire to a depth so that all side holes are within the pleural space. Generally inserting to 12-14cm works well. More drain may need to be inserted if patient has lots of chest wall soft tissue.
  - Remove guide wire and central “stiffener”
  - Attach 3 way tap
  - Take samples, if needed, with 50ml syringe

**Stitch and stick**

- Attach drain to underwater seal
- Confirm drainage of fluid/air
• Secure drain with one or two stitches to the skin. Silk thread will secure drain and has the advantage of being easy to tie. The thread should be wound round the drain and needs to be pulled tight enough to produce a little dent in the drain
• Apply a sterile dressing which allows the insertion site to be viewed
• Apply an “omenta tag” to the drainage tubing. This provides another point of security and is important in preventing the drain from falling out. To form the omental tag tape is placed over the drainage tube, it is then stuck to itself behind the tube and then to the patient (see diagram)

Aftercare

• Document using the chest drain insertion paperwork. This will include: indication, operator, consent, insertion site, anaesthetic used, drain size, depth, complications, sutures and fixation device, samples and post procedure instructions
• If drain is for fluid clamp after 1000ml has drained. Repeat observations. If observations are stable and patient is not unwell then drain can be opened up again after an hour.
• Prescribe analgesia
• Prescribe regular flushes for the drain
• Send any samples taken
• Request X-ray (timing at the discretion of clinical team)

2.6. Chest Drain Insertion (Blunt Dissection)

Think

• Is drain required in line with relevant guidelines (BTS ATLS)?
• Does it need to be done now? Avoid “out of hours” drain placement except in an emergency
• Is there a sufficiently skilled operator to insert the drain?

Prepare

• Obtain written consent if not an emergency
• Review imaging to date and consider if further imaging is needed
• Bedside ultrasound if available and drain is for fluid
• Review baseline observations and ensure IV access
• Ensure an assistant is available
Position

- For pneumothorax a semi-reclined position will provide best access to triangle of safety.
- For pleural fluid patient position will be determined by optimum patient comfort and bedside ultrasound findings. The triangle of safety remains the first choice position for drain insertion provided that ultrasound has confirmed the presence of fluid there.
- If drain is being placed for trauma and the patient has other injuries these may take priority and determine the way the patient is positioned during chest drain insertion.

Procedure

- Full aseptic technique
- Clean skin and apply drapes
- Infiltrate skin with local anaesthetic
- Infiltrate tissue down to ribs and pleura with local anaesthetic. Ensure that you have given adequate local anaesthetic to the pleura and that anaesthetic has been given to all the soft tissues that you will be dissecting.
- Make a transverse incision through skin and superficial soft tissues large enough to accommodate the drain you have chosen
- Use blunt dissection with artery forceps through the subcutaneous tissue in the horizontal plane over the upper border of a rib
- Puncture the pleura with the tip of the forceps and put a gloved finger into the incision and the pleural cavity. Sweep around with the finger to ensure that there are no adhesions or internal organs that may be injured
- **Trocars must not be used for chest drain insertion**
- Take the chest drain and insert it into the pleural cavity for the desired length. Direct the tube posteriorly along the inside of the chest wall.

Stitch and stick

- Attach drain to underwater seal
- Confirm drainage of fluid/air
- Secure the drain with sutures. You may want to place one untied suture on either side of the drain to help with closure of the hole on removal. Purse string sutures should be avoided
- Apply a sterile dressing which allows the insertion site to be viewed
- Apply an “omentum tag” to the drainage tubing. This provides another point of security and is important in preventing the drain from falling out. To form the omental tag tape is placed over the drainage tube, it is then stuck to itself behind the tube and then to the patient (see diagram)

Aftercare

- Document using the chest drain insertion paperwork. This will include: indication, operator, consent, insertion site, anaesthetic used, drain size, depth, complications, sutures and fixation device, samples and post procedure instructions
• Manage traumatic haemothorax in line with ATLS guidelines
• If drain is for fluid clamp after 1000ml has drained. Repeat observations. If observations are stable and patient is not unwell then drain can be opened up again after an hour.
• Prescribe analgesia
• Send any samples taken
• Request X-ray (timing at the discretion of clinical team)

2.7. Chest Drain Care

Patients should be managed on a ward where nursing staff are familiar with caring for patients with chest drains.

Drain Bottle

• Must be kept below the level of the insertion site
• Must be kept upright at all times
• Must never be filled below the “zero” level
• Should be replaced with a new bottle when almost full

Immediate Post Insertion Care

• Ensure drain is adequately secured with stitch, dressing and omental tag
• Confirm that drain is swinging and note whether it is bubbling or draining fluid
• Confirm that a chest X-ray had been asked for
• Ensure that the nurse looking after the patient is aware that the drain has been inserted and what the indication is
• Drains for pleural fluid should be clamped (or turned off at the 3 way tap) after 1000ml of fluid has drained. The patient’s observations should be repeated again one hour later
• Never clamp a bubbling chest drain

Monitoring and Observation

• Observations should be obtained immediately after drain insertion
• The frequency of subsequent observations must be at least every 4 hours and should be guided by the patient’s clinical condition and his early warning score
• Chest drain specific observations should be documented on the chest drain chart. They should include
• Date, time, Swinging, bubbling, drainage type, and drainage amount hourly, total drained, site checked, bottle changed, suction, clamped, signature

2.8. Flushing a Chest Drain

Drains are flushed for 2 reasons: to help the drain to remain patent or as an attempt to relieve blockage in a drain that has stopped working.

If flushing a drain to try to remove a blockage make sure that you have inspected the drain for other mechanical causes (twisting, full drainage bottle or patient sitting on tubing).
- Wash hands and put on gloves
- Fill 2 syringes with 20ml of saline

If drain has 3 way tap

- Close tap to patient
- Attach syringe to side port
- Close tap to distal chest drain tubing
- Flush 20ml of fluid into the chest
- Attempt to aspirate
- Close tap to patient
- Attach second syringe
- Flush 20ml of saline into drainage bottle
- Remove syringe
- Reattach side port
- Open drain up again

If drain does not have 3 way tap

- Blunt dissection chest drains do not have 3 way taps. If the drain is a Seldinger one and frequent flushes are needed ask medical staff to put a 3 way tap into the system. If inserting a Seldinger drain then remember to include 3 way tap.
- Clamp drain proximally
- Disconnect drain tubing
- Attach syringe to drain
- Unclamp drain
- Flush 20ml (50ml if blunt dissection drain) into chest
- Attempt to aspirate
- Clamp drain proximally
- Remove syringe and reconnect tubing
- Unclamp drain

2.9. Changing a Chest Drain Bottle

- Explain the procedure to the patient
- Take a clinical trolley, gloves, orange clinical bag for contaminated, clinical waste
- Wash hands and put on gloves and apron
- Fill the chest drain bottle with sterile water for irrigation up until the underwater seal line. The line is marked as “zero”. It will take about 500ml of water to fill to this line.
- Seldinger drain- turn the 3 way tap off to the patient, unscrew the tubing from the used bottle and connect to the new bottle
- When underwater seal is in place turn on the 3 way tap
- Place all items on to the clinical trolley, remove gloves and apron, and wash hands in the bay.
- Take clinical trolley to the dirty utility. Add solidifying agent to the pleural fluid and wait to solidify.
When the fluid is solid, double bag with an Orange clinical bag for contaminated waste.

Document in the patients records

2.10. Chest Drain Clamping

Effusion

Drains placed for fluid should be clamped (or turned off at 3 way tap) after 1000ml has drained. Provided the patient remains well with stable observations the drain can be opened again one hour later.

Pneumothorax

A bubbling chest drain must never be clamped

Sometimes, when the lung is re-inflated a chest drain for pneumothorax may be clamped and a repeat CXR arranged to look for evidence of a slow leak. The decision to clamp the drain should be made by a consultant.

Patients must not leave the ward (even to go to other hospital departments) with a clamped drain

If you are called to see a patient with a clamped drain for pneumothorax that has become unwell the first thing to do is unclamp the drain

2.11. Chest Drain Suction

Effusion

Suction is not applied to drains for effusions

Pneumothorax

Suction is not part of the first line management of pneumothorax

The decision to apply suction should be made by a consultant respiratory physician

Suction is normally applied at 10 to 20cm water (1-2 Kpa)

Patients who are receiving suction and require chest X-ray should have this as a mobile X-ray while still attached to suction

Chest Drain Suction

- Prepare a high volume, low pressure thoracic suction unit and enough suction tubing for the patient to move around the bed space- check that the filter is clean, this gets changed between each patient
- Ensure that the patients on either side do not need to have the high pressure suction for their nursing care, if not remove the high pressure suction unit from the wall
- Attach the high volume, low pressure thoracic suction unit to the wall, turn it to the lowest kPa/cmH2O.
• Ask the patient to inform you if there is any pain on attaching the suction
• Attach the suction tubing to the port on the drainage bottle and turn up to 5cm water (0.5Kpa)
• As long as there is no pain increase the suction pressure as prescribed. This will usually be 10 to 20 cm of water (1-2Kpa). Do not increase beyond 2Kpa unless specifically instructed.
• Explain to the patient, the suction tubing must never be left attached to the drainage bottle when the suction is turned off; this is dangerous and creates a closed circuit and positive pressure, potentially leading to a tension pneumothorax.
• Show the patient how to remove the suction tubing from the bottle so that they can mobilise and go to the toilet.
• Only staff trained and signed off as competent to care for chest drains should care for the chest drain
• Document in the patients records

2.12. Chest Drain Removal

• Wash hands and put on apron and gloves
• Prepare a clinical trolley with a sharps bin, prepare for aseptic non-touch technique. Open a dressing pack
• Remove or significantly loosen dressing
• Check for any signs of infection
• Cut sutures with sharps safety stitch cutter
• Prepare an adhesive dressing to cover the hole
• Pull on the drain gently aiming to pull about 1cm out of chest. This will confirm that it is moving easily and will come out when pulled.
• Ask the patient to take 3 deep breaths in and out. At the end of the third breath tell him to try to breathe out against closed vocal cords. It may be easier to show him by performing the manoeuver yourself.
• While he is trying to breathe out against his closed vocal cords, remove the drain with a brisk firm movement.

Small bore drains
• Place adhesive dressing over the hole. Small bore drain holes do not need stitching

Large bore drains
• May need stitching depending on size of hole. This may involve the tying of sutures placed at the time of drain insertion or suturing after drain removal
• Chest X-ray should be asked for following drain removal. This is usually done 2-4 hours post removal and is primarily to look for pneumothorax (either as a complication of drain removal or a persistent slow leak is drain was initially placed for pneumothorax)
• Document in the patient records

2.13. Drain Problems

Drain has stopped swinging

• Check patient including observations, full chest drain observations and monitor for surgical emphysema
• Look for obvious external problem with drain – is tubing twisted, is patient sitting on it, is drain bottle full, has drain fallen out. If the patient is on suction ensure all connections are working
• If no obvious external problem the flush drain
• If flushing does not remedy the situation then escalate to the Nurse in Charge of the Ward
• The Nurse in Charge can assess the patient and drain and escalate to medical staff
• Medical staff may want to ask for a chest X-ray and decide whether drain needs to be removed or replaced.
• Document in the patients records

Drain has partially slipped out

• Check patient including observations, full chest drain observations and monitor for surgical emphysema
• Escalate to the Nurse in Charge
• The record of insertion should say to what depth it was inserted and from that you may be able to assess how much remains in chest
• The nurse in charge can escalate to medical staff
• Medical staff will need to decide whether the drain is functioning or not. If not the decision is whether to remove or replace it?
• Document in the patient records

Drain has fallen out

• Cover the drain site with an adhesive occlusive dressing
• Take note of any signs of infection
• Check patient including observations, monitor for surgical emphysema
• Escalate to the Nurse in Charge who will assess patient
• Inform medical staff of situation and escalate any concerns
• Medical staff will ask for a chest X-ray to help determine whether a replacement drain is needed and if it is does this need to be done urgently
• Document in the patients records

Drain tubing disconnected

• In emergency situations (for example when the drain was bubbling right up to the moment of disconnection) it may be necessary to reconnect the tubing immediately. In all other situations the drain should be clamped (or turned off at the 3 way tap) and a new, clean tubing set attached.
• Clamp the drain
• Immediately get new tubing and reattach to the bottle
• Unclamp the drain
• Check patient including observations
• If patient remains well and drain continues to function it may be that no further action is needed
• Medical staff may wish to ask for a chest X-ray
• Document in the patients records
Chest Drain Bottle Knocked Over

- Return bottle to upright position
- Ensure that fluid level still reaches the “zero” mark. If there is too little fluid change the bottle
- Check patient including observations
- Escalate to and inform the nurse in charge who will consider escalation to the medical team
- If patient remains well and drain continues to function it may be that no further action is needed
- Document in the patients records

Problems with dressing or sutures

- If dressing is dirty or wet then replace it using ANTT
- If the area shows signs of infection then take swabs of the site, inform the nurse in charge and the medical team
- If sutures have come undone then look to see if drain is partially or wholly out of the chest. If it is still in place then contact medical staff to re-stitch it. If it has come out partially or fully refer to advice above.
- Document in the patients records

3. Monitoring compliance and effectiveness

<table>
<thead>
<tr>
<th>Element to be monitored</th>
<th>It is a guideline only for Medical and Nursing Staff in Secondary Care. Compliance will be monitored through outcomes of patients requiring an intercostal drain for medical reasons. The British thoracic Society Pleural Audit will be applied. An Intercostal Drain care plan compliance sense check will be utilized to monitor Nursing compliance. A review of the incident system datix will also be used to highlight any near miss and error reports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead</td>
<td>Medical lead - Dr James Pickering&lt;br&gt;Nursing Lead - Sister Sarah Wonnacott</td>
</tr>
<tr>
<td>Tool</td>
<td>Pleural Audit from the BTS. An Intercostal drain Sense check attached. Appendix 8</td>
</tr>
<tr>
<td>Frequency</td>
<td>Annually</td>
</tr>
<tr>
<td>Reporting arrangements</td>
<td>Respiratory governance meetings</td>
</tr>
<tr>
<td>Acting on recommendations and Lead(s)</td>
<td>The Respiratory Team (Consultants and Senior Nurses) will change the guidance as necessary in keeping with national and international guidelines. Review will also take place following incidents and near miss events if the guideline can impact in any way.</td>
</tr>
<tr>
<td>Change in practice and lessons to be shared</td>
<td>The guideline will be shared within the hospital to departments that perform the procedure. Lessons learnt will be shared via the respiratory Governance meetings. Required changes to practice will be identified and actioned within 6 months. A lead member of the team will be identified to take each change forward where appropriate. Lessons will be shared with all the relevant stakeholders</td>
</tr>
</tbody>
</table>
4. Equality and Diversity

4.1. This document complies with the Royal Cornwall Hospitals NHS Trust service Equality and Diversity statement which can be found in the 'Equality, Diversity & Human Rights Policy' or the Equality and Diversity website.

4.2. Equality Impact Assessment
The Initial Equality Impact Assessment Screening Form is at Appendix 2.
## Appendix 1: Governance Information

<table>
<thead>
<tr>
<th>Document Title</th>
<th>RCHT Guidelines on Insertion and Management of Chest Drains 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Issued/Approved:</td>
<td>19 August 2016</td>
</tr>
<tr>
<td>Date Valid From:</td>
<td>19 August 2016</td>
</tr>
<tr>
<td>Date Valid To:</td>
<td>19 August 2019</td>
</tr>
</tbody>
</table>
| Directorate / Department responsible (author/owner): | Dr James Pickering  
Sister Sarah Wonnacott |
| Contact details: | 01872250000  
01872252102 |
| Brief summary of contents | These guidelines are intended to be used in all clinical areas of RCHT where chest drains are placed.  
They cover indications for chest drain insertion, technique of insertion, care for drain and drainage system and drain removal. |
| Suggested Keywords: | Chest Drain Insertion |
| Target Audience | RCHT  
PCH  
CFT  
KCCG  
√ |
| Executive Director responsible for Policy: | Medical Director |
| Date revised: | N/A |
| This document replaces (exact title of previous version): | New Document |
| Approval route (names of committees)/consultation: | Respiratory Consultant Group  
Respiratory Senior Nurse Group  
Respiratory Governance Team  
RCHT Quality and Safety Representative |
| Divisional Manager confirming approval processes | Dr Alistair Slade |
| Name and Post Title of additional signatories | Not Required |
| Name and Signature of Divisional/Directorate Governance Lead confirming approval by specialty and divisional management meetings | Signed original held by Medical Services Governance Lead  
Name: Sheena Wallace  
Role: Medical Services Associate Director |
Signature of Executive Director giving approval | Signed original held by Medical Services Governance Lead
---|---
Publication Location (refer to Policy on Policies – Approvals and Ratification): | Internet & Intranet
| Intranet Only
| Intranet Only
Document Library Folder/Sub Folder | Clinical/Respiratory
Links to key external standards | NATSIPs
Related Documents: | Consent policy
Training Need Identified? | For Nursing Teams:
| Chest drain e-learning
| Chest drain supervised practice.

Version Control Table

<table>
<thead>
<tr>
<th>Date</th>
<th>Version No</th>
<th>Summary of Changes</th>
<th>Changes Made by (Name and Job Title)</th>
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<tbody>
<tr>
<td>19 Aug 2016</td>
<td>V1.0</td>
<td>Initial Issue</td>
<td>N/A</td>
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</table>

All or part of this document can be released under the Freedom of Information Act 2000

This document is to be retained for 10 years from the date of expiry.

This document is only valid on the day of printing

Controlled Document

This document has been created following the Royal Cornwall Hospitals NHS Trust Policy on Document Production. It should not be altered in any way without the express permission of the author or their Line Manager.
Appendix 2: Initial Equality Impact Assessment Form

<table>
<thead>
<tr>
<th>Name of the strategy / policy / proposal / service function to be assessed (hereafter referred to as policy).</th>
<th>Chest Drain Guideline - Guideline for the insertion and monitoring of intercostal drains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Directorate and service area:</td>
<td>Is this a new or existing Policy?</td>
</tr>
<tr>
<td>Medical Services – Cardiology and Respiratory</td>
<td>New</td>
</tr>
<tr>
<td>Name of individual completing assessment:</td>
<td>Telephone:</td>
</tr>
<tr>
<td>Dr James Pickering</td>
<td>01872250000</td>
</tr>
<tr>
<td>Sister Sarah Wonnacott</td>
<td>01872252102</td>
</tr>
<tr>
<td>1. Policy Aim*</td>
<td>This guideline is to aid safe insertion of chest drains, appropriate nursing care and subsequent removal of chest drains within the Royal Cornwall Hospital by appropriately trained individuals.</td>
</tr>
<tr>
<td>Who is the strategy / policy / proposal / service function aimed at?</td>
<td></td>
</tr>
<tr>
<td>2. Policy Objectives*</td>
<td>To have harm free care for all patients requiring a chest drain</td>
</tr>
<tr>
<td>To ensure standardised treatment and care for patients</td>
<td></td>
</tr>
<tr>
<td>To reduce incidents and near misses.</td>
<td></td>
</tr>
<tr>
<td>3. Policy – intended Outcomes*</td>
<td>Safe, effective and evidence-based practice</td>
</tr>
<tr>
<td>4. *How will you measure the outcome?</td>
<td>Pleural Audit from the BTS.</td>
</tr>
<tr>
<td>An Intercostal drain Sense check attached. Appendix 8</td>
<td></td>
</tr>
<tr>
<td>5. Who is intended to benefit from the policy?</td>
<td>Respiratory patients requiring insertion of a chest drain</td>
</tr>
<tr>
<td>6a) Is consultation required with the workforce, equality groups, local interest groups etc. around this policy?</td>
<td>No</td>
</tr>
<tr>
<td>b) If yes, have these *groups been consulted?</td>
<td>Approved via the Respiratory consultant Group, Respiratory Senior Nurses, Respiratory governance team, Representative from the quality and safety team.</td>
</tr>
<tr>
<td>C). Please list any groups who have been consulted about this procedure.</td>
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7. The Impact
Please complete the following table.

<table>
<thead>
<tr>
<th>Equality Strands:</th>
<th>Yes</th>
<th>No</th>
<th>Rationale for Assessment / Existing Evidence</th>
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</thead>
<tbody>
<tr>
<td>Age</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Chest drain guideline
| **Sex (male, female, transgender / gender reassignment)** | ✓ |
| **Race / Ethnic communities/groups** | ✓ |
| **Disability** - Learning disability, physical disability, sensory impairment and mental health problems | ✓ |
| **Religion / other beliefs** | ✓ |
| **Marriage and civil partnership** | ✓ |
| **Pregnancy and maternity** | ✓ |
| **Sexual Orientation, Bisexual, Gay, heterosexual, Lesbian** | ✓ |

You will need to continue to a full Equality Impact Assessment if the following have been highlighted:
- You have ticked “Yes” in any column above and
- No consultation or evidence of there being consultation - this excludes any policies which have been identified as not requiring consultation. or
- Major service redesign or development

8. Please indicate if a full equality analysis is recommended.  
<table>
<thead>
<tr>
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9. If you are not recommending a Full Impact assessment please explain why.

---

**Signature of policy developer/lead manager/director**  
Signed original held by Medical Services Governance Lead  
Date of completion and submission  
19 August 2016

**Names and signatures of members carrying out the Screening Assessment**  
1. Dr James Pickering  
2. Sister Sarah Wonnacott  
Signed original held by Medical Services Governance Lead

---

Keep one copy and send a copy to the Human Rights, Equality and Inclusion Lead,  
C/o Royal Cornwall Hospitals NHS Trust, Human Resources Department, Knowledge Spa,  
Truro, Cornwall, TR1 3HD

A summary of the results will be published on the Trust’s web site.

Signed __________________

Date __________________

Chest drain guideline
Appendix 3: BTS Guidelines for the Management of Spontaneous Pneumothorax

Figure 2 BTS Guidelines for the management of spontaneous pneumothorax.
Appendix 4: Diagnostic Algorithm for the Investigation of a Unilateral Pleural Effusion

Diagnostic algorithm for the investigation of a unilateral pleural effusion

1. History, clinical examination & CXR
   - Does the clinical picture suggest a transudate? e.g. LVF, hypoalbuminaemia, dialysis
     - YES: Treat the cause
     - NO: Refer to a chest physician

2. Pleural aspiration (with ultrasound guidance)
   - Send for: cytology, protein, LDH, pH, Gram stain, culture and sensitivity.
   - (Additional tests if warranted - see text box)
     - NO: Refer to a chest physician
     - YES: Is it a transudate?
       - YES: Treat the cause
       - NO: Has the fluid analysis and clinical features given a diagnosis?
         - YES: Treat appropriately
         - NO: Request contrast enhanced CT thorax.

3. Consider LA thoracoscopy or surgical VATS
4. Consider radiological guided pleural biopsy +/- chest tube drainage if symptomatic

5. Cause found?
   - YES: Treat appropriately
   - NO: Re-consider treatable conditions such as PE, TB, chronic heart failure and lymphoma.
     Watchful waiting often appropriate.
Appendix 5: Chest Drain Insertion Safety Checklist and Insertion record

Chest Drain Insertion Safety Checklist

Pre-Procedure
- Identity confirmed Yes
- Written consent obtained Yes
- Confirm side of abnormality clinically Left / Right
- Correlate clinical signs with CXR Yes Side: Right or Left
- Allergies Yes / No
- Baseline observations recorded Yes
- I.V. access present & working Yes
- INR ............
- Platelet Count .............

Post-Procedure
- Check the sutures, tubing and connections are secure Yes
- Confirm that in cases of pleural effusions no more than 1000mls should be drained in the first hour, then clamped for another hour before re-draining 1000mls Yes
- Informed patient not to elevate the drainage bottle above level of insertion Yes
- Analgesia prescribed Yes
- Diagnostic samples sent: MC+S ........ Protein/LDH........ pH ......... Cytology .......
- CXR ordered Yes
- Nurse informed of insertion and immediate

Inserted by: (sign).........................................................
(Print name)......................................................... bleep
Date ......................... Time ...........................
### ICD Insertion Record

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Signed
Appendix 6: Patient Information Leaflet

BTS Pleural Disease Guidelines 2010

Patient Information Leaflet - Chest Drain Insertion

Introduction
This leaflet explains why we use chest drains and what you can expect if you are having one put in. It also answers the most frequently asked questions about chest drains. However, if you have any further questions, please do not hesitate to ask a member of your medical team.

Your doctor will explain why you need a drain and will also take your written consent to have the drain inserted.

What are chest drains for?
A chest drain is a sterile plastic tube that allows us to drain the space between the lung and the chest wall. The medical name for this is the “pleural space”.

![Diagram of Lung, Chest Drain, and Pleural Space]

What needs to be drained?
We may need to drain:

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<tr>
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<td>Blood</td>
<td>haemothorax</td>
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<tr>
<td>Infection and/or pus</td>
<td>empyema</td>
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</table>

Occasionally the drain is used to introduce medications into the pleural space.

What happens next if I need a drain?
The doctor will decide where to place the drain. This is usually the side of your chest just underneath the armpit. The doctor may use an ultrasound machine to show where best to place the drain. Ultrasound enables the doctor to ‘look’ through the chest wall. It is painless and non-invasive. A cool gel is used on the skin to ensure good contact for the ultrasound tip.

You will have an injection of local anaesthetic to make the area where the drain will be inserted numb (anaesthetised). This can sometimes sting. You may also be given painkillers.

Will it hurt, what should I expect when the drain is inserted and how long will it take?
The anaesthetic injection and/or painkillers will prevent pain. However, if at any time during the procedure you do feel pain, please tell the doctor.

The doctor will explain how they would like you to sit, or lie, whilst the procedure takes place. The doctor will wear sterile gloves and a gown and your skin will be cleaned with an antiseptic to help reduce the risk of infection. You may be partly covered in a sterile sheet. The drain will then be inserted between the ribs in the anaesthetised area and connected to a tube and drainage bottle containing water. The water acts as a one way seal to prevent air or fluid to drain out and not go back into your chest.

The whole procedure usually takes about 20-30 minutes.
Who will put my drain in?
Your drain will be put in on the ward by an appropriately qualified and experienced doctor. Sometimes a qualified trainee doctor will insert the drain, but they will always be supervised by a doctor who is already fully trained in the procedure.

How will the drain be attached?
We use both a stitch, to tie the drain in, and adhesive dressing on the skin. However, please move carefully as drains can still be pulled out.

How long will the drain be in?
It depends on why you need the drain. However, your medical team will keep you informed on a regular basis. You may need several X-rays during this time to check progress.

How will the drain be removed?
This is straightforward and is usually done by a nurse. Once all the dressings are removed, the drain is pulled out gently. You may be asked to hold your breath in a special way when this is done. It can be uncomfortable but only lasts a few seconds.

Can anything go wrong?
There is a small risk of infection and bleeding but every effort is made to prevent this from happening. Air can also sometimes leak into the pleural space during the procedure but this is not usually a problem and it will usually come out when the drain is in place.

Important things to know about your chest drain
- You may see air bubbling out through the bottle. This is normal. Fluid may also drain from the chest. This is usually clear but sometimes may be blood stained. This is nothing to be alarmed about.
- There is no need for you to be in pain. If you are in pain ask for painkillers.
- The drain can come out if pulled or twisted so please take care. If the drain does come out tell someone straight away.
- You need to keep the drainage bottle below the level of the drain (at the point it enters the chest). Usually it is placed on the floor.
- If you feel more breathless, please tell the nursing staff.

The drainage bottle contains water which acts as a ‘seal’ to prevent air leaking back up the drain into the pleural space. It is essential therefore that the bottle is kept upright at all times with the tube below the water surface.

- Your drain may require ‘flushing’ with sterile water to stop it from blocking. If this is needed it will be done by the nursing staff and is not painful.

What happens after the drain has been removed?
You may have a stitch left in which is usually removed after 7 days. Some people have a little pain after the drain has been removed which may be helped by painkillers. If you have a lot of pain, difficulty breathing, or fever please tell a doctor or nurse so they can look for a cause and treat it.

August 2010
Appendix 7: Consent Form 1 – Chest Drain Insertion

Consent form for use in Cornwall

Consent Form 1

Chest Drain Insertion

Patient agreement to investigation or treatment
Guidance to Health Professionals (to be read in conjunction with consent policy)

What a consent form is for
This form documents the patient's agreement to go ahead with the investigation or treatment you have proposed. It is not a legal waiver - if patients, for example, do not receive enough information on which to base their decision, then the consent may not be valid, even though the form has been signed. Patients are also entitled to change their minds after signing the form, if they retain capacity to do so. The form should act as an aide-memoir to health professionals and patients, by providing a check-list of the kind of information patients should be offered, and by enabling the patient to have a written record of the main points discussed. In no way, however, should the written information provided for the patient be regarded as a substitute for face-to-face discussions with the patient.

The law on consent
See the Department of Health's Reference Guide to Consent for Examination or Treatment for a comprehensive summary of the law on consent (also available at www.doh.gov.uk/consent).

Who can give consent?
Everyone aged 16 or more is presumed to be competent to give consent for themselves, unless the opposite is demonstrated. If a child under the age of 16 has sufficient understanding and intelligence to enable him or her to understand fully what is proposed, then he or she will be competent to give consent for himself or herself. Young people aged 16 and 17, and legally competent younger children, may therefore sign this form for themselves, if they wish. If the child is not able to give consent for himself or herself, someone with parental responsibility may do so on their behalf. Even where a child is able to give consent for himself or herself, you should always involve those with parental responsibility in the child's care, unless the child specifically asks you not to do so. If a patient has the mental capacity to give consent but is physically unable to sign a form, you should complete this form as usual, and ask an independent witness to confirm that the patient has given consent orally or non-verbally.

When NOT to use this form
If the patient is 18 or over and lacks the capacity to give consent, you should use form 4 (form for adults who lack the capacity to consent to investigation or treatment) instead of this form. A patient lacks capacity if they have an impairment of mind or brain or disturbance affecting the way their mind or brain works and they cannot:

- understand information about the decision to be made
- retain that information in their mind
- use or weigh that information as part of the decision-making process, or
- communicate their decision (by talking, using sign language or any other means).

You should always take all reasonable steps (for example involving more specialist colleagues) to support a patient in making their own decision, before concluding that they are unable to do so.

Relatives cannot be asked to sign a form on behalf of an adult who lacks capacity to consent for themselves, unless they have been given the authority to do so under a Lasting Power of Attorney or as a court appointed deputy.
Information

Information about what the treatment will involve, its benefits and risks (including side-effects and complications) and the alternatives to the particular procedure proposed, is crucial for patients when making up their minds. The courts have stated that patients should be told about ‘significant risks which would affect the judgement of a reasonable patient’. ‘Significant’ has not been legally defined, but the GMC requires doctors to tell patients about ‘serious or frequently occurring’ risks. In addition, if patients make clear they have particular concerns about certain kinds of risk, you should make sure they are informed about these risks, even if they are very small or rare. You should always answer questions honestly. Sometimes, patients may make it clear that they do not want to have any information about the options, but want you to decide on their behalf. In such circumstances, you should do your best to ensure that the patient receives at least very basic information about what is proposed. Where information is refused, you should document this in the patient’s notes.
Name of proposed treatment/procedure
(Including a brief explanation if medical term not clear)

Special Requirements (e.g. other language other communication method etc.)

Chest Drain
(tube placed between ribs to remove fluid or air) .................................................................

Responsible health professional .................................................................

Job title: ..............................................

Statement of Health Professional (to be filled in by health professional with appropriate knowledge of proposed procedure, as specified in consent policy)

I have explained the procedure to the patient. In particular, I have explained:

The intended benefits
Improvement in shortness of breath / removal of fluid or air / diagnosis in the case of fluid……………………………………………………………………

Significant, unavoidable or frequently occurring risks:
• Risk of bleeding
• Risk of infection
• Risk of pneumothorax
• Risk of discomfort at drain site
• Risk of solid organ puncture
• Risk of failure to place drain

Any extra procedures which may become necessary during the procedure:

☐ Blood transfusion
☐ Other procedure (please specify):

I have also discussed what the procedure is likely to involve, the benefits and risks of any available alternative treatments (including no treatment) and any particular concerns of this patient.

The following patient information leaflet/tape has been given and discussed:

Title: ..............................................
This procedure will involve:

☐ General and/or regional anaesthesia
☐ Local anaesthesia  ☐ Sedation

Signed: .................................  Date: .................................................................

Name (PRINT): ..........................  Job title: ..............................................................

Ensure patient identifier details / label is on all pages

Contact details (if the patient wishes to discuss options later)

........................................................................................................................................

Statement of interpreter (where appropriate)
I have interpreted the information above to the patient to the best of my ability and in a way in which I believe he/she can understand.

Signed: .................................  Date: .................................................................

Name (PRINT): ..........................

Statement of patient
Please read this form carefully. If your treatment has been planned in advance, you should already have your own copy of page one which describes the benefits and risks of the proposed treatment. If not, you will be offered a copy now. If you have any further questions, do ask - we are here to help you. You have the right to change your mind at any time, including after you have signed this form. I agree to the procedure or course of treatment described on this form.

I understand that you cannot give me a guarantee that a particular person will perform the procedure. The person will, however, have appropriate experience.

I understand that I will have the opportunity to discuss the details of anaesthesia with an anaesthetist before the procedure, unless the urgency of my situation prevents this. (This only applies to patients having general or regional anaesthesia).

I understand that any procedure in addition to those described on this form will only be carried out if it is necessary to save my life or to prevent serious harm to my health.

I have been told about additional procedures which may become necessary during my treatment. I have listed below any procedures which I do not wish to be carried out without further discussion.
I agree / disagree that tissue and fluid samples may be used anonymously and stored for quality control and other technical purposes (*delete as appropriate)*.

I agree / disagree that tissue and fluid samples may be used anonymously and stored for clinical education (*delete as appropriate)*.

I agree / disagree that tissue and fluid samples may be used anonymously and stored for ethically approved research (*delete as appropriate)*.

Ensure patient identifier details / label is all pages

I have listed below any types of medical research for which I do not wish my samples to be used:

Patient’s signature: .............................. Date:........................................

Name (PRINT): .................................

A witness should sign below if this patient is unable to sign but has indicated his or her consent.

Young people / children may also like a parent to sign here (see notes).

Witness signature: ............................. Date:........................................

Name (PRINT): .................................
Confirmation of Consent (to be completed by health professional when the patient is admitted for the procedure, if the patient has signed the form in advance).

On behalf of the team treating the patient, I have confirmed with the patient that they have no further questions and wish the procedure to go ahead.

Signed: ........................................ Date: ..............................................................

Name (PRINT): ............................. Job title: ..........................................................

Important notes (tick if applicable):

☐ See advance decision to refuse treatment
☐ Patient has withdrawn consent (ask patient to sign / date here)

Patient’s signature: ........................................ Date: ..............................................

Name (PRINT): .................................

Copy accepted by patient  Yes / No (please circle)
## Appendix 8 - Sense Check Audit

The Care and Management of Chest Drains

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<th>Ward</th>
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<th>Insertion and management care plan commenced and signed</th>
<th>Chest drain observation chart commenced and punch complete</th>
<th>Observations completed for bubbling and suctioning</th>
<th>Chest drain flushes prescribed and administered 4 times a day</th>
<th>Site checked at each observation</th>
<th>Site recorded is clear, dry and intact</th>
<th>Fluid recorded is totalled correctly</th>
<th>The patient has received a patient information leaflet regarding the chest drain</th>
<th>All observations signed, printed, dated, timed and legible</th>
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