Worcestershire Acute Hospitals NHS Trust

Policy and Procedure for Non Medical Practitioners to Perform Chest Drain Insertion and Pleural Aspiration in Adult Patients

This guidance does not override the individual responsibility of health professionals to make appropriate decision according to the circumstances of the individual patient in consultation with the patient and /or carer. Health care professionals must be prepared to justify any deviation from this guidance.

Introduction

This document and its principles of matching skilled and experienced operators to clinical need for patient safety is intended to support appropriately trained non-medical practitioners in performing chest drain insertion and pleural aspiration in adult patients with pleural effusion or pneumothorax.

This guideline is for use by the following staff groups:

These procedures may be performed by a suitably trained non-medical practitioner who has undergone a period of assessment by a person/persons competent in this procedure.

Lead Clinician(s)

Dr C Hooper	Respiratory Consultant (Pleural Lead)
Heather Lloyd	Pleural Lead Nurse
Approved by Respiratory Directorate Committee on:	7th March 2022
Approved by Medicines Safety Committee on:	13th April 2022
Ratified by Divisional Management Board on:	11th May 2022
Approved by Respiratory Directorate Committee on:	21st January 2025
This is the most current document and should be used until a revised version is in place	21st January 2028

Key amendments to this guideline

Date	Amendment	Approved by:
May 2023	Incorporates the new haematology recommendations for pausing DOACs prior to procedures as well as level 3/4 ultrasound competence being required as per BTS guidelines for independent practice.	Dr C Hooper Heather Lloyd
17/01/2025	Incorporates new BTS clinical statement on pleural procedures recommendations	Dr C Hooper Heather Lloyd
17/01/2025	Added that physicians assistants will need to ask colleague to request and interpret CXR and prescribe lidocaine	Dr C Hooper Heather Lloyd

Introduction

In 2008 the National Patient Safety Agency (NPSA) released an alert highlighting risks associated with chest drain insertion. This followed a national review of all reported serious injuries and fatalities resulting from the insertion of chest drains. A key theme that emerged from the 2008 rapid response report that followed was that inexperience of junior doctors and inadequate supervision increased the risk of complications associated with the procedure. The NPSA rapid response report (2008) gave responsibility to each acute hospital Trust to develop local policy to reduce the risks associated with chest drain insertion. The training of suitable non-medical practitioners in thoracic ultrasound and in the skills required to perform pleural procedures has developed as a result. This provides the opportunity for ambulatory/out-patient/day case management and reduction in hospital length of stay. Its aim is to ensure the safe insertion of chest drains/performance of pleural aspiration and subsequent management of these patients.

The British Thoracic Society (BTS) clinical statement on pleural procedures (2023) provides comprehensive guidance and recommendations that should be reviewed by all staff involved in performing chest drain insertion and pleural aspiration and are included in this guideline.

These procedures may be performed by a band 7 (or above) non-medical practitioner who has appropriate experience of working within respiratory medicine and has relevant qualification at MSc level (health assessment and prescribing modules), plus Irmer training and completion of a chest XRay interpretation course; or a physician's assistant with a minimum of 12 months dedicated, supervised clinical experience in respiratory medicine, thoracic ultrasound and pleural procedures. Direct supervision and training in both thoracic ultrasound and pleural procedures must be received from the pleural lead nurse (band 8) and pleural lead consultant who is responsible for confirming competence and continued accreditation in writing.

Chest radiographs will be used to identify pneumothoraces, and thoracic ultrasound to identify pleural effusion and to guide drain/aspiration placement. The non-medical practitioner must therefore undertake relevant educational training including an accredited thoracic ultrasound course and clinical supervision (provided by the pleural Lead nurse and pleural Lead consultant) in order to achieve Level 4 competence in thoracic ultrasound prior to undertaking independent practice (Stanton et al 2020).

The practitioner must be performing these procedures regularly with the requirement of a minimum of one procedure per week to remain accredited. Competency will be based on a minimum of 25 procedures supervised by the pleural Lead nurse or pleural Lead Consultant. At least 5 of these must be supervised by the pleural lead consultant directly.

POLICY AND PROCEDURE FOR NON MEDICAL PRACTITIONERS TO PERFORM CHEST DRAIN INSERTION AND PLEURAL ASPIRATION IN ADULTS

Summary of training requirements
These procedures may be performed by a non medical practitioner who has:

- Undertaken training **using a combination of didactic lecture, simulated practice and supervised practice until considered competent.**
- Supervision will be provided by the pleural Lead nurse, senior respiratory registrar or pleural lead consultant.
- Undertaken a theoretical course in thoracic ultrasound and achieved Level 3 competence (See Appendix 2: Competency document), level 4 for independent practice.
- Achieved a level of band 7 or is a qualified physicians assistant and has appropriate experience working within respiratory medicine and supervised clinical experience in thoracic ultrasound and pleural procedures.
- Observed at least 10 procedures.
- Been observed performing 25 procedures using correct technique.
- Been assessed using guidelines recommended by the BTS (see Appendix 1: Competency document)
- On completion be deemed competent by the pleural lead consultant.

SAFETY AND PREPARATION

1.1 Pleural procedures should only be performed by competent and qualified individuals who have assessed the patient, reviewed available radiology and assessed the timing and suitability of the clinical area for performing the procedure. **Pleural procedures should not take place out of hours except in an emergency.**

1.2 The procedure will be performed in a dedicated procedure room where possible, a clinical room in out-patients and only at the patient's bedside if there is no suitable alternative. **Chest drains should be inserted in a clean area, using full aseptic technique including gowns, sterile drapes, sterile gloves and skin cleansing.**

1.3 Patients with chest drains should be managed on wards familiar with chest drains and their management.

1.4 The request for the procedure will come from a respiratory Consultant or the pleural Lead nurse who will retain responsibility for the patient. A log book must be maintained recording patient details, procedure performed and any complications and the procedure must be documented in the patient's notes.

1.5 The respiratory Consultant, respiratory registrar or pleural lead nurse must be contactable via telephone to offer advice if required.

1.6 The procedure will be performed in a suitable clinical environment where medical or nursing assistance can be summoned easily if needed.

1.7 A set of routine blood tests (FBC, clotting, U&E, LFT) should be taken and checked prior to the procedure (usually within 7 days) and **a recent chest radiograph or ultrasound should be available to confirm the indication for the procedure and the side of the pathology.**

1.8 The patient must not have had any oral or treatment dose parenteral anticoagulant therapy within 24-48 hours of the procedure and antiplatelet therapy should be paused as per medication check section below (See WAHT-APC-005, WAHT-HAE-002 and WAHT-ANA-014, WAHT –KD-017).

1.9 Informed patient consent must be taken and clearly documented before the procedure, in line with GMC recommendations. The discussion should include recognised risks and any risk of serious harm, however unlikely it is to occur. For those without capacity,

those close to them or advocating for them should be involved and appropriate consent form completed.

1.10 A patient information leaflet should be provided (see appendices 3 and 4).

1.11 A safety checklist (LocSSIPs) should be completed before and after the procedure (See appendix 6).

1.12 A nurse/colleague should be available to support the patient during the procedure.

1.13 Physiological measurements (NEWS) should be taken before and after the procedure to ensure complications are recognised and to maintain safety. However after chest drain insertion further NEWS should be taken at 15 minutes, then every 30 minutes for 1 hour followed by 4 hourly NEWS and chest drain observations as per chest drain observation chart (see appendix 7)..

1.1.1 The following patients are considered unsuitable for pleural aspiration/chest drain insertion by a non-medical practitioner:

- Any patient with INR greater than 1.5
- Any patient on anticoagulant/antiplatelet therapy (excludes prophylactic parenteral anticoagulant/aspirin)
- Any patient with platelet count below $50x10^9/l$
- Any patient who is uncooperative.
- Any patient whereby the procedure would be better performed under departmental ultrasound or CT guidance.

MEDICATION CHECK including antiplatelets and anticoagulation

In line with guidelines published in the British Journal of Haematology (2016) and WAHT-HAE-002, when a decision has been made to interrupt medication for an elective procedure:

- It is recommended that Warfarin is stopped 5 days before the procedure with an INR check pre-procedure to confirm INR is ≤ 1.5 (WAHT-HAE-002).
- If patients are considered high risk for thrombosis (eg; patients with artificial heart valves) discuss with cardiology and if 'bridging' required refer to WAHT-HAE-002.
- We recommend Direct Oral Anticoagulation Medication should be stopped 48 hours before the procedure. This guidance is based on the drugs half life, the bleeding risk of the procedure and a clinical evaluation of individual risk factors for thrombosis and bleeding (see Table 1 for more detailed recommendations if renal function deranged).
- Clopidogrel and prasugrel should be stopped 5 days pre-elective procedure and ticagrelor 7 days pre-procedure. Aspirin therapy can be continued.
- Therapeutic dose enoxaparin should be stopped 24 hours prior to the procedure.
- It is suggested that phosphodiesterase inhibitors such as dipyridamole should be stopped at least 24 hours before a procedure.

Table 1.DOAC perioperative management scheme.

DOAC	Procedural bleeding risk	Perioperative DOAC management									
		Day -5	Day -4	Day -3	Day -2	Day -1	Day 0	Day +1	Day +2	Day +3	Day +4
Direct Xa inhibitors and Dabigatran (CrCl ≥ 50mL/min)	Low	✓	✓	✓	✓	OMIT	Day of procedure Do not administer any DOAC	✓	✓	✓	✓
	High	✓	✓	✓	OMIT	OMIT		OMIT	Resume day +2 or day +3		✓
Dabigatran (CrCl < 50mL/min)	Low	✓	✓	✓	OMIT	OMIT		✓	✓	✓	✓
	High	✓	OMIT	OMIT	OMIT	OMIT		OMIT	Resume day +2 or day +3		✓

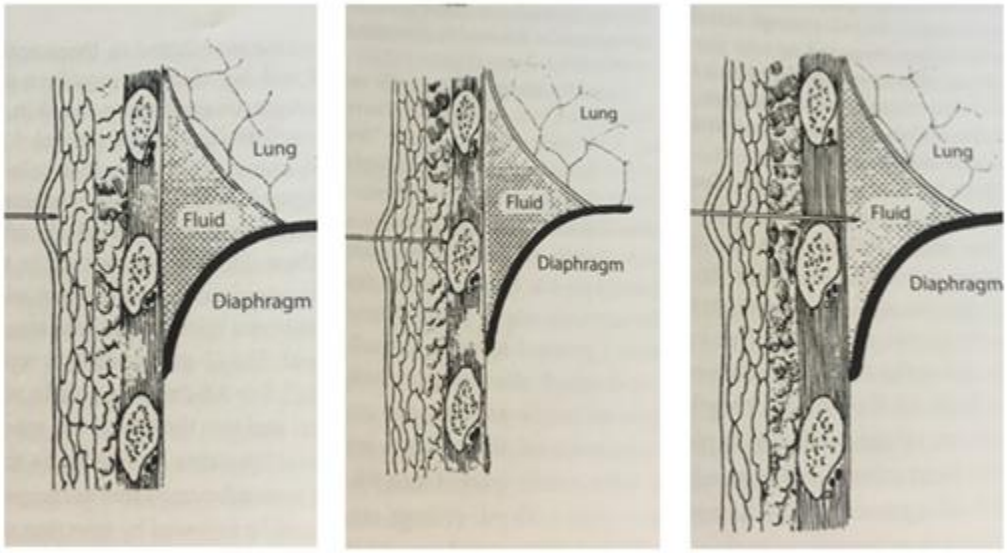
✓ = DOAC may be taken or administered

Adapted from Douketis et al, JAMA Intern Med. 2019;179(11):1469-78

Local anaesthetic

Lidocaine 1% (10mg/ml) is the most common preparation used for local anaesthesia at a dose of up to 3mg/kg (max 200mg=20mls).

Figure1. Local anaesthesia



a.skin injection b. periosteal injection c. entry into pleural space

PRE-PROCEDURE

- Prior to the procedure discuss with the consultant/pleural lead nurse if samples are required in addition to the standard biochemistry, microbiology and cytology (e.g. lymphocyte subsets/flow cytometry, AFB/TB culture, haematocrit or triglycerides and cholesterol). See appendix 5.
- Check if the patient is taking any anti-coagulation or antiplatelet drugs ensuring they have been omitted (see medication check section above). Discuss with the consultant before proceeding if there are any concerns (Ref:WAHT-APC-005, WAHT-HAE-002 and WAHT-ANA-014)
- Ensure INR ≤ 1.5 and PLT $> 50x10^9$/l and review CXR.

- Fully explain the procedure, provide information leaflet (See appendices 3 and 4) and answer any questions regarding the procedure.
- Obtain written consent highlighting the risks and benefits of the procedure as indicated on the patient information leaflet and e-consent form.
- A treatment room or procedure room should be sought if possible and aseptic technique followed throughout the procedure.
- Complete safety briefing checklist section of LocSSIPs form.

FOR CHEST DRAIN INSERTION

EQUIPMENT

Dressing trolley
Chlorhexidine skin cleansing agent
Sterile gloves
Seldinger chest drain kit
Local anaesthetic (1% lignocaine ***(lidocaine hydrochloride)*** injection)
Size 2 silk suture
Clearfilm dressing
Self adhesive fabric tape
50ml luer lock syringe
Drain bottle
Drain tubing
Sterile water
Specimen bottles+/-blood gas syringe

PROCEDURE FOR PERFORMING CHEST DRAIN INSERTION

- Position the patient comfortably and safely to ensure optimisation of rib space.
- Perform thoracic ultrasound to identify the most suitable site for drain insertion.. **The preferred site for insertion of the needle for pleural aspiration/chest drain insertion should be the triangle of safety** if sufficient fluid is identified here on ultrasound.
- The procedure should be performed directly above a rib to minimise risk of damage to the neurovascular bundle.
- Make an indentation to the skin (using the blunt end of a needle) to mark the appropriate site before removing traces of ultrasound gel from the skin.
- Open the Seldinger chest drain kit and prepare all equipment using aseptic technique throughout. Check that the drain bottle is primed with sterile water and connection tubing prepared.
- Wash hands, apply sterile gown and gloves as per infection control policy.
- Cleanse the skin thoroughly using chlorhexidine and allow to dry. Apply sterile drapes before cleansing once more with chlorhexidine.
- **Local anaesthetic (lidocaine hydrochloride 1%) should be infiltrated prior to the procedure paying particular attention to the skin, periosteum and the pleura (see Figure 1 above).** 1% lidocaine hydrochloride (10mg/ml) should be infiltrated depending on the patients reaction to a maximum 3mg/kg dose (dose should be based upon ideal body weight, maximum single dose is 200mg/20mls). The lidocaine should be prescribed and administration recorded in the once only section of the drug chart. A physicians assistant who isn't able to prescribe must ask a prescriber to do this and obtain a second check from a qualified nurse/doctor. A dermal bleb should be raised

using a small gauge 25G/16mm (orange) needle prior to deeper infiltration using a 21 gauge/40mm (green) needle through to the pleura. The depth of the pleural space is then noted.

- **During chest drain insertion an attempt should be made to aspirate the pleural contents with a small needle. If this is not possible chest drain insertion should not continue.**
- Once fluid or air is aspirated make a small incision at the site with the scalpel. Insert the introducer needle aiming directly above the rib to avoid the neurovascular bundle with the bevel directed appropriately (the bevel allows the drain to be directed basally for effusions or apically for pneumothoraces).
- Ensure the tip of the introducer needle is inserted through the parietal pleura and air or fluid is easily aspirated.
- Remove the syringe and pass the guidewire through the introducer needle; there should be no resistance and the guidewire should pass freely.
- Remove the needle over the guidewire.
- Pass the dilator gently over the guidewire using a slight twisting action into the pleural space. **The dilator should not be inserted further than 1cm beyond the depth from the skin to the pleural space.**
- Remove the dilator over the guidewire, preventing the guidewire from being pulled out of, or pushed into the pleural cavity.
- Insert the drain (chest drain catheter) over the guidewire to a depth of approximately 10-12cm (based on average sized person) ensuring the last drainage hole is well within the pleural space.
- Remove the guidewire and inner stylet from the drain.
- Attach the 3 way tap, leaving it closed until the drain is secured and attached to the drainage system.
- Secure the drain to the skin with 1 or 2 suture/s. It is recommended that the knot around the drain is tightened so that the drain tubing is slightly indented.
- Apply transparent dressing to enable wound site inspection and omental tag dressing to prevent tube kinking and tension at the insertion site.
- Connect the drain to the drainage tubing via the 3 way tap. Obtain pleural fluid samples using a 50 ml luer lock syringe via the 3 way tap then open the 3 way tap to allow drainage.
- **Large pleural effusions should be drained in a controlled manner to reduce the risk of re-expansion pulmonary oedema. The recommended standard approach is to stop draining at 1000mls by clamping the 3 way tap, or at any point earlier if the patient develops any of the key red flags/triggers below:**

Severe pain or chest discomfort
Persistent cough, worsening breathlessness or vagal symptoms.
A deteriorating NEWS score.
Drainage can be restarted after 1 hour, allowing up to 500ml per hour to drain before allowing free drainage (ARNS 2020)

- **Clamping a bubbling chest drain should be avoided unless under specialist pleural supervision and in specific circumstances only,** due to the risk of causing tension pneumothorax.
- Clear away all equipment and dispose of all sharps into the appropriate container.
- Request and review a CXR. Physicians assistants will need to ask a colleague to do this whilst they currently do not have requesting rights and also to review the image.
- Document the procedure in the medical notes, complete LocSSIPs form and give relevant instructions to nursing colleagues.

- **To reduce pain associated with chest drains, analgesia should be considered as premedication and should be prescribed for all patients with a chest drain in place.**
- Ensure all specimens are correctly labelled and sent to the laboratory with the necessary forms (see appendix 5)
- Document the procedure in log book.

FOR PLEURAL ASPIRATION

Pleural aspiration describes the procedure whereby fluid or air may be aspirated via a system inserted temporarily into the pleural space. This may be for diagnostic purposes or therapeutic to relieve symptoms.

For both diagnostic and therapeutic pleural aspirations the same pre procedure principles apply as outlined above for chest drain insertion. Written consent and TUS should be performed before and aseptic technique maintained throughout.

EQUIPMENT

Dressing trolley
Chlorhexidine skin cleansing agent x 2
Sterile gloves
Sterile gown
Sterile drape
Local anaesthetic (1% lignocaine ***(lidocaine hydrochloride)*** injection)
10ml syringe
2 green and one orange needle
Sterile gauze
Simple dressing e.g.; mepore
Pleural aspiration kit .
Specimen bottles+/-blood gas syringe

PROCEDURE FOR PERFORMIMG THERAPEUTIC PLEURAL ASPIRATION

- Follow the first 8 steps as outlined for chest drain insertion replacing Seldinger chest drain kit with pleural aspiration kit. A small incision is made at the insertion site with a scalpel. The pleural aspiration needle is connected to the drainage bag and 50ml luer lock syringe to the 3 way port. It is then advanced into the pleural space whilst aspirating continually until the pleura is breached and air/fluid withdrawn. The cannula is then advanced over the needle until it lies flush to the patients skin. The needle is then withdrawn, screw cap applied and the cannula secured to the patients chest wall with a sterile dressing. Samples can be obtained via the 50ml syringe then allow free drainage of fluid via gravity or use the 50ml syringe to aspirate air/fluid into the syringe and then dispel via the 3 way tap into the collection bag. Repeat this process until the procedure is terminated.
- A maximum of 1.5 litres of fluid may be drained but the procedure should be terminated prior to this if the patient develops any of the key red flags/triggers discussed above that may suggest re-expansion pulmonary oedema.
- When drainage is completed cover the insertion site with sterile gauze and remove the cannula.

- Cover insertion site with sterile dressing.
- Clear away all equipment and dispose of all sharps into the appropriate container. Request and review a CXR. Physicians assistants will need to ask a colleague who has requesting rights to do this and who is also able to review the image**. A CXR is useful to identify/exclude potential complications following the procedure, it can assist with determining the speed of reaccumulation and whether patient has non-expansile lung which may help guide further management.**
- Ensure all specimens are correctly labelled (whilst with the patient) and send to the laboratory with the necessary forms (see appendix 5).
- Document the procedure and relevant instructions for nursing colleagues in medical notes and in log book.

FOR DIAGNOSTIC PLEURAL ASPIRATION

EQUIPMENT

Dressing trolley
Chlorhexidine skin cleansing agent x 2
Sterile gloves
Apron
Sterile drape
Local anaesthetic (1% lignocaine ***(lidocaine hydrochloride)*** injection)
10ml syringe
2 green and one orange needle
Sterile gauze
Simple dressing e.g.; mepore
50ml luer lock syringe and green needle
Specimen bottles+/-blood gas syringe

PROCEDURE FOR PERFORMING DIAGNOSTIC PLEURAL ASPIRATION

- Follow the first 8 steps as outlined for chest drain insertion/pleural aspiration.
- Assess whether local anaesthetic is required; for a simple diagnostic aspiration it is not usually necessary but should be considered if difficulty accessing the pleural space is likely (i.e., with an inexperienced operator or if the patient has a thick chest wall).
- Infiltrate with local anaesthetic if necessary as discussed above.
- Using aseptic technique insert the green needle attached to the 50ml luer lock syringe at the marked point directly above the rib aspirating until 50-60mls of pleural fluid is obtained.
- Withdraw the sample and cover with a sterile dressing.
- Clear away all equipment and dispose of all sharps into the appropriate container.
- Request and review a CXR if necessary. Physicians assistants will need to ask a colleague who has requesting rights to do this and who is also able to review the image**. A CXR after a simple diagnostic pleural aspiration is not required unless air is withdrawn, the procedure is difficult, multiple attempts are required or the patient becomes symptomatic.**
- Document the procedure and relevant instructions for nursing colleagues in the medical notes.
- Ensure all specimens are correctly labelled (whilst with the patient) and send to the laboratory with the necessary forms (see appendix 5)..
- Document the procedure in log book.

ESCALATING INCIDENT/PROBLEMS

In the event of a clinical problem encountered during the procedure the pleural lead nurse and/or respiratory consultant in charge of the patient's care will be informed.
If any assistance is required during the procedure the pleural lead nurse, respiratory consultant or registrar will respond to the request for assistance.
The consultant in charge of the patient will be informed if the procedure cannot be performed (e.g. not enough fluid on TUS/unexpected ultrasound findings/deranged clotting).
Any incident, accident or near miss related to chest drain insertion/pleural aspiration will be reported appropriately, according to Trust guideline using electronic incident reporting system (Datix).

Monitoring Tool

Auditing will be undertaken by the Respiratory Nurse Practitioner on a yearly basis and will include

- Adherence to guidelines
- Any untoward incidents or complaints
- Review of patient satisfaction and waiting times
- Number of procedures undertaken

Page/ Section of Key Document	Key control:	Checks to be carried out to confirm compliance with the policy:	How often the check will be carried out:	Responsible for carrying out the check:	Results of check reported to: *(Responsible for also ensuring actions are developed to address any areas of non-compliance)*	Frequency of reporting:
	WHAT?	**HOW?**	**WHEN?**	**WHO?**	**WHERE?**	**WHEN?**
	All practitioners must be assessed as competent by the pleural lead following practical and theoretical education	Spot check	Yearly	Non-medical Practitioner Respiratory Consultant	Respiratory Consultant	Yearly
	All practitioners must carry out an average of one procedure a week	Audit Spot check of log book	Yearly	Non-medical Practitioner Respiratory Consultant	Respiratory Consultant	Yearly
	Correct procedure followed	Audit BTS	Yearly	Non-medical Practitioner Respiratory Consultant	Respiratory Consultant	Yearly
	Written consent must be obtained	Audit	Yearly	Non-medical Practitioner Respiratory Consultant	Respiratory Consultant	Yearly
	Contemporaneous documentation in medical notes	Audit	Yearly	Non-medical Practitioner Respiratory Consultant	Respiratory Consultant	Yearly

APPENDIX 1:

Worcestershire Acute Hospitals NHS Trust
ASSESSMENT OF COMPETENCY FOR NON MEDICAL PRACTITIONER PERFORMING CHEST DRAIN INSERTION/PLEURAL ASPIRATION IN ADULTS

ASSESSMENT SPECIFICATION: The candidate should be able to demonstrate competence in the technique of chest drain insertion/pleural aspiration using the following knowledge evidence and performance criteria

KNOWLEDGE EVIDENCE: The candidate should be able to:

a) Name the anatomy of the chest and describe the reasons for chest drain insertion and pleural aspiration.
b) List potential complications associated with chest drain insertion/pleural aspiration.
c) Demonstrate skill in the technique of chest drain insertion/pleural aspiration.
d) Discuss the principles of safe practice with regards to chest drain insertion.
e) Discuss the role, responsibility and accountability with reference to the Code of Professional Conduct

You need a mentor who has been deemed competent in chest drain insertion/pleural aspiration; either a specialist respiratory registrar or consultant.
If the candidate still feels they lack competence after supervised practice of at least 25 chest drain insertions/pleural aspirations, they should seek further training or supervised practice. Prior to independent practice the candidate must be deemed competent by the pleural lead consultant.

Clinical Supervisor *(please print):* …… Signature: …… Date: ……

Candidate *(please print)*: …… Signature: …… Date: ……

Ward/Department: …….. Directorate/ PCT: …… Location: ……

Comments by Supervisor	**Comments by Candidate:**

When you have completed your competencies a copy should be retained as evidence of your competency for your professional portfolio and a PHOTOCOPY of this form sent to your manager for your personal folder and to Training & Development, Charles Hastings Education Centre, WRH.

PERFORMANCE CRITERIA FOR ASSESSMENT OF COMPETENCY FOR NON MEDICAL PRACTITIONER PERFORMING CHEST DRAIN INSERTION/PLEURAL ASPIRATION

PERFORMANCE CRITERIA		COMPETENT- Mentor Initial & Date									
		1	2	3	4	5	6	7	8	9	10
1	**Patient Preparation**										
	Correct patient and site of effusion/pneumothorax identified										
	Explanation of procedure, and patient information leaflet provided										
	Written consent obtained										
2	**Preparation of equipment**										
	Correct equipment assembled										
3	**Procedure**										
	Position patient reclining on bed/sitting over table										
	Identify correct site for insertion using ultrasound guidance										
	Consider appropriate use of pre-medication										
	Ensure sterile technique using gloves, gowns and drapes										
	Insertion site cleaned and allowed to dry										
	Ensure adequate local anaesthetic used (safe doses)										
	Safe drain insertion/aspiration technique demonstrated										
	Aspiration of fluid/air with small needle and appropriate incision										
	Correct insertion of needle, guide-wire, dilators and drain/aspiration kit										
	Drain secured with suture, secure knot and appropriate dressing										
	Ensure appropriate analgesia prescribed post procedure										
4	Correct Disposal of all equipment/sharps										
5	Patient reassured, comfortable, reviewed and CXR requested if necessary										
6	Document procedure in patient notes and log book										

I declare that I have supervised this practitioner and found him/her to be competent as judged by these knowledge and performance criteria **Clinical Supervisor** (*please print):* ……... **Signature**: …… **Date:** ……	**I declare that I have expanded my knowledge and skills and undertake to practice with accountability for my decisions and actions** **Candidate** *(please print)*: …… **Signature:** …… **Date:** ……..

https://www.rcr.ac.uk/**focused-ultrasound-training-standards**

APPENDIX 2: Ultrasound-guided drainage of pleural effusions: training competency assessment sheet

Core knowledge base – Level 1					
	Trainer Signature	**Date**		**Trainer Signature**	**Date**
Physics and technology			**Administration**		
Practical instrumentation/use of ultrasound controls			**Sectional and ultrasonic anatomy**		
Ultrasound techniques			**Pathology in relation to ultrasound**		
RIS/PACS					
Competencies/skills to be acquired – Level ¾ To be competent to perform/diagnose the following					
	Trainer signature	**Date**		**Trainer Signature**	**Date**
Normal anatomy of pleura and diaphragm			**Consolidated lung and its differentiation from effusion**		
Identification of heart, liver and spleen			**Estimation of depth of effusion and its measurement**		
Pleural effusion and different echogenic patterns			**Guided thoracocentesis and drain placement**		
Pleural thickening and its differentiation from fluid			Know when to refer to a more expert ultrasonologist		

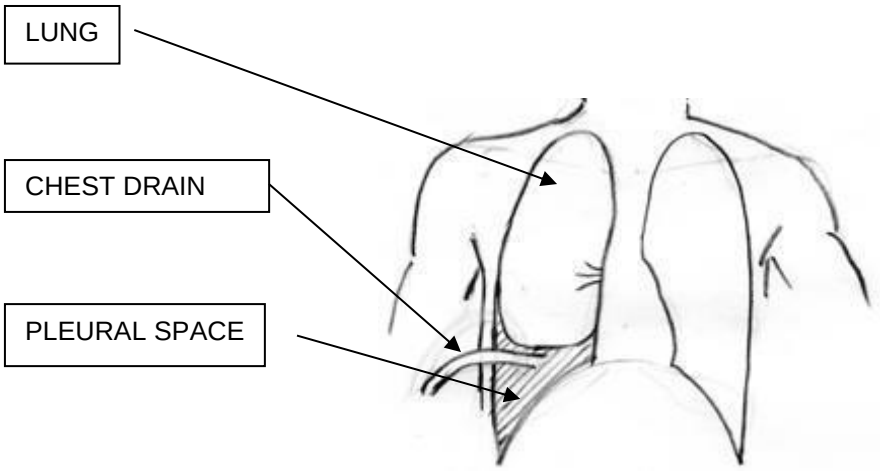
APPENDIX 3.

Department of Medicine
Investigative/treatment patient information leaflet

Name of procedure: CHEST DRAIN INSERTION

INTRODUCTION

It has been recommended that you have a chest drain inserted to drain fluid, air, pus or blood from your pleural cavity to allow full expansion of your lungs. Occasionally the drain is used to introduce medications into the pleural space. The drain will be placed by a competent doctor/practitioner between the ribs and into the space between the inner and outer lining of your lung (the pleural cavity). This leaflet explains why we use chest drains and what you can expect if you are having one inserted.



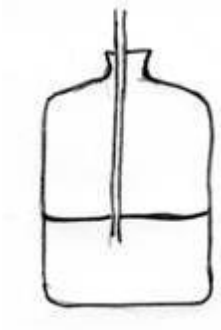
Information about the procedure

The procedure will take place in either a designated procedure room, at the bedside on the ward or in the radiology department. You will be positioned either lying in bed or in a sitting position. An ultrasound machine may be used to identify a suitable site for placing the drain. This is usually the side of your chest just underneath the armpit. Ultrasound enables the practitioner 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. The doctor/practitioner will wear sterile gloves and a gown and the skin, where the drain is to be inserted, will be cleaned with an antiseptic solution to help reduce the risk of infection. Some local anaesthetic will then be injected into a small area of skin and surrounding tissues. This can sometimes sting. The aim of this is to make the skin numb so that the procedure is not painful. If at any time during the procedure you do feel pain, please tell the doctor/practitioner.

The chest drain is inserted through a small cut made between your ribs into the pleural space and is then connected to a bottle that contains sterile water. The water acts as a one way seal to allow air or fluid to drain out of the pleural cavity and 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 tip below the water surface.

Correct: Bottle upright, with tube tip under water.

Not correct. The bottle is tipped and the tube tip is not under water.



Stitches and an adhesive dressing are used to keep the drain in place. However, please move carefully as drains can still be pulled out. A chest x-ray will be taken to ensure the drain is in the correct position. The whole procedure usually takes about 20 to 30 minutes.

How long will the drain be in?

The chest drain usually remains in place until repeat x-rays confirm that all the fluid, blood, air or pus has drained from your chest cavity and your lung has fully expanded. Suction may be attached to the system to encourage drainage. The drain may be in place for 2 to 10 days, though occasionally longer. While the drain is in place the nursing staff will check for possible air leaks, monitor fluid drainage and observe for any complications. Deep breathing and coughing are encouraged to assist fluid drainage and help the lung to re-expand. Pain relief will be prescribed if you find this uncomfortable.

How will the drain be removed?

When the chest drain is no longer needed, it is easily removed. The dressings and suture are removed and the drain is pulled out gently. You may be asked to hold your breath when this is done. Paper stitches may be used to aid wound closure, but thread stitches are rarely required.

This leaflet explains some of the benefits, risks and alternatives to the procedure. We want you to have an informed choice so that you can make the right decision. Please ask a member of the medical team about anything you do not fully understand or want to be explained in more detail.

We recommend that you read this leaflet carefully. You and your doctor (or other appropriate health professional) will also need to record that you agree to undergo the procedure by signing a consent form, which your health professional will provide.

INTENDED BENEFITS OF THE PROCEDURE

The aim of the procedure is to treat conditions that cause the lung to collapse such as;

- Air leaks from the lung into the pleural cavity (pneumothorax)
- Bleeding into the pleural cavity (haemothorax)
- Accumulation of excessive fluid in the pleural cavity (pleural effusion)
- Lung abscesses or pus in the pleural cavity (empyema)

RISKS

Insertion of a chest drain is considered to be a safe procedure. Occasionally complications can arise because of the procedure's invasive nature.

These include;

- Bleeding;

Internal bleeding from the puncture site can occur. This bleeding will normally stop on its own. Occasionally the bleeding is more severe. This probably affects about one in 500 patients. Unfortunately, if it does happen it can be a serious problem which requires blood transfusion and/or an operation to stop it. Extremely rarely such bleeding can be fatal. Prior to the procedure your blood is checked to make sure you have no clotting abnormality that would increase this risk.

- Infection;

There is a small risk of infection at the site of insertion of the drain (about one in 50 patients). Your skin is thoroughly cleaned prior to drain insertion and the insertion site is checked regularly to monitor for this. Please inform your nurse/doctor if you feel feverish or notice any increased pain or redness around the drain site.

- Reaction to local anaesthetic;

There is a small risk of a reaction to the drug used.

- Accidental injury to other organs;

There is a small risk of injury to other organs including the lung, liver, spleen or bowel – depending on the site of the drain insertion. The use of ultrasound significantly reduces this risk.

- Subcutaneous emphysema;

This is air trapped under the subcutaneous tissue and may create a crackling noise when the area is touched. This usually resolves on its own or with application of high flow oxygen.

You will be cared for by a skilled team of doctors, nurses and other healthcare professionals who are familiar with caring for patients with chest drains. If problems arise, we will be able to assess them and deal with them appropriately. As with all invasive procedures, there is a very small risk that you may die from complications associated with the procedure.

OTHER PROCEDURES THAT ARE AVAILABLE

This depends on the reason that the doctor or practitioner is recommending a chest drain for you. This is usually the safest and quickest way to deal with the conditions listed above. For some kinds of fluid collection, your doctor may suggest a permanent drain that is placed as an out-patient as an alternative. Surgery may be considered for some conditions, if the chest drain is not fully successful. Your doctor will discuss this with you if surgery is required.

ANAESTHETIC

A general anaesthetic is not usually required but as indicated above some local anaesthetic will be injected into your skin to help ensure that you are comfortable during the procedure.

PREPARATION FOR YOUR PROCEDURE

You will usually need to have a blood coagulation test performed before the drain is inserted. You will be informed of the arrangements for this test. We will usually ask you to continue taking your normal medication prior to the procedure. If we do not want you to take your normal medication, your doctor will explain what you should do. ***It is important to let us know if you are taking anticoagulant drugs (e.g.; warfarin, rivaroxaban, dabigatran or clopidogrel) .***

ON THE DAY OF THE PROCEDURE

You will usually have been admitted to hospital and will already be on a ward. Sometimes, you may be admitted on the day of the procedure. We will welcome you to the ward and check your details, an arm band with your hospital identification details will be placed around your wrist.

AFTER THE PROCEDURE

After the drain has been inserted it is important that the drain bottle is kept below the level of the point it enters the chest and is kept upright at all times with the tube below the water surface (usually it is placed on the floor). This prevents fluid/air leaking back into the pleural cavity. 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. There is no need for you to be in pain. Pain relief will be prescribed if required.

LEAVING HOSPITAL

Length of stay

How long you will be in hospital varies from patient to patient but is likely to be at least 2 days and nights and can be as long as 10 days or more.

Medication when you leave hospital

Before you leave hospital, the pharmacy will provide any extra medication that you need to take when you are at home.

Wound

A dressing will usually be applied over the site after removal of the drain. It will be replaced as required. If a suture was necessary to seal the wound this will need to be removed after about 7 days. We will arrange for this to be done by a community nurse if you have left hospital.

Exercise

You should not participate in strenuous sports for the first 10 days after your procedure. You should avoid heavy lifting and carrying heavy shopping.

Driving

You should not drive until you feel confident that you could perform an emergency stop without discomfort. It is your responsibility to check with your insurance company.

Air Travel

You should be able to fly two weeks after a chest x-ray confirms resolution of your collapsed lung (pneumothorax). It is your responsibility to check with your travel insurance company.

Work

When you return to work will depend on your job. If your job involves heavy manual work you may be advised to take a week off. If your job does not include manual work or lifting you may be able to return to work 2 days after the procedure.

Test results

We will normally send fluid samples to the hospital laboratory for tests. The results will be sent to your consultant.

Contact details

If you have any specific concerns that you feel have not been answered and need explaining, please contact the following.

- Chris Jordan, Lung Specialist Nurse (phone 01905 733053)
- Heather Lloyd, Nurse Practitioner (phone 01905 760563)

Other information

The following internet websites contain information that you may find useful.

- www.worcsacute.nhs.uk
  Worcestershire Acute Hospitals NHS Trust
- www.patient.co.uk
  Information fact sheets on health and disease
- www.rcoa.ac.uk
  Information leaflets by the Royal College of Anaesthetists about 'Having an anaesthetic'
- www.nhsdirect.nhs.uk
  On-line health encyclopaedia

Patient Services Department

It is important that you speak to the department you have been referred to (see the contacts section) if you have any questions (for example, about medication) before your investigation or procedure.

If you have any concerns about your treatment, you can contact the Patient Services Department on 0300 123 1733. The Patient Services staff will be happy to discuss your concerns and give any help or advice.

If you have a complaint and you want it to be investigated, you should write direct to the Chief Executive at Worcestershire Acute Hospitals NHS Trust, Charles Hastings Way, Worcester WR5 1DD or contact the Patient Services Department for advice.

Please contact Patient Services on 0300 123 1733 if you would like this leaflet in another language or format (such as Braille or easy read).

Bengali

"আপনি যদি এই লিফলেটটি বিকল্প কোনো ভাষায় বা ফরমেটে (যেমন ব্রেইল বা সহজ পাঠ) চান, তাহলে এই নম্বরে 0300 123 1733 প্যাশেন্ট সার্ভিসের সাথে যোগাযোগ করুন।"

Urdu

"اگرآپ کویہ دستی اشتہار کسی مُتبادل زُبان یا ساخت میں چاہیے (جیسے کہ بریل / ایزی ریڈ) تو پیشنٹ سروسز سے 0300 123 1733 پر رابطہ کریں۔"

Portuguese

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Polish

"Jeżeli pragniecie Państwo otrzymać tę broszurę w innym jeżyku lub formacie (Braille / duży druk) proszę skontaktować się z Obsługą Pacjentów pod numerem 0300 123 1733."

Chinese

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(如盲人點字版/易讀版容易的閱讀),請致電 0300 123 1733 與病患服務處聯繫。"

Comments

We would value your opinion on this leaflet, based on your experience of having this procedure done. Please put any comments in the box below and return them to the Clinical Governance Department, Finance Department, Worcestershire Royal Hospital, Charles Hastings Way, Worcester, WR5 1DD.

Name of leaflet:_____ Date:_____

Comments:

Worcestershire Acute Hospitals NHS Trust

APPENDIX 4
Patient Information

PLEURAL ASPIRATION

INTRODUCTION

Patients with pleural effusion (fluid collection between the linings of the lung) often require a diagnostic or therapeutic pleural aspiration (removal of fluid) to assist with diagnosis, determine further investigations and management and/or relieve symptoms of breathlessness. This leaflet is designed to give you information about the procedure, why it has been recommended and it will tell you about the care you will receive before, during and after the procedure.

WHAT IS A PLEURAL ASPIRATION?

A pleural aspiration is a procedure where a small needle is inserted into the space between the lung and chest wall to remove fluid or air that has accumulated around the lung. This space is called the pleural space.

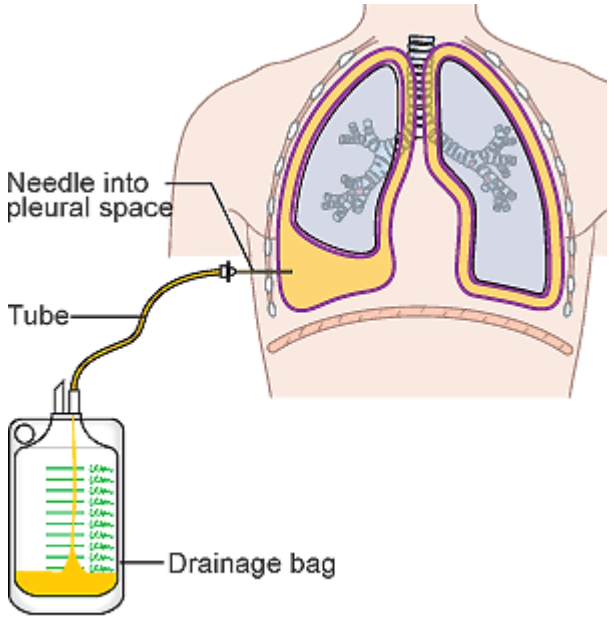

Diagram showing how a pleural effusion is drained
© CancerHelp UK

Pleural aspiration is usually carried out to determine why there is fluid around the lung (diagnostic procedure) or to improve symptoms associated with it (therapeutic procedure). Fluid around the lung may be causing symptoms such as cough, shortness of breath or chest pain.

HOW TO PREPARE FOR THE PROCEDURE

A chest X-ray may be requested and you will usually need to have a blood clotting test before the procedure. You will be informed of the arrangements for this test. We will usually ask you to continue taking your normal medication prior to the procedure. If we do not want you to take your normal medication, your doctor will explain what you should do. ***It is important to let us know if you are taking blood thinning medication e.g.; warfarin (marevan®), rivaroxaban (xarelto®), apixaban (eliquis®), dabigatran (pradaxa®), clopidogrel (plavix®) or enoxaparin [clexane®]).***

Please make arrangements for a relative or friend to drive you home after the procedure if attending as a day case.

INFORMATION ABOUT THE PROCEDURE

The procedure will take place either in a designated procedure room or at the bedside on the ward. You will be positioned sitting upright in a chair or on the side of the bed and leaning forward with your arms and head supported on a table. An ultrasound machine will be used to identify a suitable site for insertion of the needle directly over the fluid collection; this may be just beneath the armpit or in the back of the chest. Ultrasound enables the health professional to 'look' through the chest wall. It is painless and non-invasive. A cool gel is applied to the ultrasound probe before it is placed on your skin, the site is then marked by making a painless indentation on the skin surface, the gel is then 'wiped off'.

The health professional will wear sterile gloves and may wear a gown, the skin around the procedure site is cleaned with an antiseptic solution and the area is draped to minimise the risk of infection. Some local anaesthetic will then be injected into a small area of skin and surrounding tissues. This stings for a few seconds before numbing the area. For a **diagnostic aspiration** a needle is inserted just above the rib into the pleural space and a sample of approximately 50mls of fluid is aspirated with a syringe. In a **therapeutic aspiration** a needle or thin plastic tube is inserted into the pleural space and a maximum of 1.5 litres of fluid may be removed. The time taken for this procedure varies depending on the amount of fluid removed but is usually 30 to 50 minutes from start to finish.

It is important that you remain as still as possible during the procedure to avoid injury to your lung. Please inform the health professional if you feel shortness of breath or chest pain at any time.

After the procedure the needle/thin plastic tube is removed and a dressing applied, a chest X-ray may be requested. Your skin usually heals within a few days; the site may feel a little tender, in which case simple pain relievers may be helpful.

CONSENT

We recommend that you read this leaflet carefully. You and the health professional performing the procedure will also need to record that you agree to undergo the procedure by signing a consent form, which your health professional will provide.

WHO WILL PERFORM THE PROCEDURE

The procedure will be performed by a health professional who has been trained to carry out these procedures.

INTENDED BENEFITS OF THE PROCEDURE

Normally, very little fluid is in the pleural space. A build up of too much fluid between the layers of the pleura is called a **pleural effusion**.

Pleural aspiration is performed so that a sample of fluid can be sent to a pathologist (specialist doctor trained in analysing fluid) to determine why it has accumulated, or to relieve symptoms associated with its accumulation.

Possible causes include:

- Cancer
- Infection
- Heart failure
- Inflammation
- Kidney disease
- Liver disease

RISKS

Pleural aspiration is considered to be a safe procedure. Occasionally complications can arise because of the procedure's invasive nature.

These include:

- Bleeding

There is a small risk of the needle causing damage to underlying blood vessels. This bleeding will normally stop on its own. Occasionally the bleeding is more severe. Unfortunately, if it does happen it can be a serious problem which requires blood transfusion and/or an operation to stop it. Extremely rarely such bleeding can be fatal. Prior to the procedure your blood is checked to make sure you have no clotting abnormality that would increase this risk.

- Pneumothorax

A collection of air could develop in the space between the lung and the pleura known as a pneumothorax. This could develop due to damage to the lung during needle insertion or by inadvertently allowing air to enter the pleural space via the drainage tube/system. If this is a small leak it usually does not cause any problems and will resolve on its own. If it is large, the air may need to be drained, either with a needle, or by inserting a small drain into the pleural cavity. This may require you to be admitted to hospital for one or more days until the lung has re-inflated.

- Accidental injury to other organs;

There is a small risk of injury to other organs including the liver, spleen, heart or bowel – depending on the site of the aspiration. This is a very rare complication, but is potentially serious. The use of ultrasound significantly reduces this risk.

- Infection;

There is a small risk of infection associated with the procedure. A sterile technique and thorough skin cleansing prior to the procedure help to minimise this risk. If infection does occur, it is usually very minor and can be treated with antibiotics.

- Fluid build up within the lung

It is possible for fluid to collect within your lung and make you feel short of breath, particularly if a large amount of fluid is removed and your lung re-expands very quickly. This is an uncommon problem, the risk of this occurring is minimised by careful monitoring during the procedure

- Reaction to local anaesthetic;

There is a small risk of a reaction to the drug used (eg; dizziness, blurred vision, twitching muscles, hypersensitivity reactions).

After you are allowed to leave (if attending as a day case), seek medical attention urgently if you notice any of the following, as they may suggest a serious complication that requires immediate attention:

- A lot of bleeding from the aspiration site.

- Increased shortness of breath. This may suggest a pneumothorax.

- New or worsening pain whilst breathing deeply.

- A cough that produces blood.

OTHER PROCEDURES THAT ARE AVAILABLE

Pleural aspiration is often the safest and quickest way to assist diagnosis and relieve symptoms associated with pleural effusion. Fluid in the pleural space could be removed using keyhole surgery. This can allow pleural biopsies to be taken at the same time. Keyhole surgery is performed through small incisions in the chest wall.

A small camera is inserted through the incisions and is connected to a video monitor to allow the surgeon to take the appropriate samples. Keyhole surgery usually requires an overnight stay in hospital and a general anaesthetic so is therefore a slightly higher risk procedure. Your doctor will discuss this with you if surgery is required.

RESULTS

If you are having fluid removed to relieve your shortness of breath, you can expect significant relief in the hours after the procedure.

It usually takes about a week (7-10 days) before the results of the fluid samples are available to your doctor. He/she will discuss the results with you and explain whether further investigations or treatment are required. Unfortunately, in some cases the results of pleural aspiration do not provide enough information to explain the presence of the fluid. If this is the case, your doctor will discuss the next course of action. This may involve a repeated aspiration or referral to see a surgeon to discuss keyhole surgery.

Contact details

If you have any specific concerns that you feel have not been answered and need explaining, please contact the following.

- Heather Lloyd, Nurse Practitioner, WRH (phone 01905 760563)
- Chris Jordan, Lung Specialist Nurse, WRH (phone 01905 733053)

Other information

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Bengali

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Urdu

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Comments

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Name of leaflet:_____ Date:_____

Comments:

Thank you for your help.

Appendix 5:

Table 1. Pleural fluid diagnostics tests and sample collection guidance.

Test	Notes
Fluid appearance	
Recommended tests for all sampled pleural effusions	
Biochemistry – LDH and protein	2-5 ml in plain container or serum blood collection tube depending on local policy. Blood should be sent simultaneously to biochemistry for total protein and LDH so that Light's criteria can be applied. Lights criteria The fluid is an exudate if one or more of the following criteria are met: - Pleural fluid protein is more than half the serum protein - Pleural fluid LDH is more than 0.6 times the serum LDH - Pleural fluid LDH is more than 2/3 the upper limit of normal of the serum LDH
Microscopy and culture (MC and S)	5 ml in plain container. If pleural infection is particularly suspected a further 5 ml in both anaerobic and aerobic blood culture bottles should be sent.
Cytological examination and differential cell count.	At least 30mls in a plain universal container. Refrigerate if delay in processing anticipated (e.g. out of hours).
Other tests sent only in selected cases as described in the text	
pH	In non-purulent effusions when pleural infection is suspected. 0.5-1 ml drawn up into a heparinised blood gas syringe immediately after aspiration. The syringe should be capped to avoid exposure to air. Processed using a ward arterial blood gas machine.
Glucose	Useful in diagnosis of pleural infection where pH measurement is not reliable, and occasionally useful in diagnosis of rheumatoid effusion. 1-2 ml in fluoride oxalate tube sent to biochemistry.
Acid Fast Bacilli and TB culture	When there is clinical suspicion of TB pleuritis. Request with MC and S. 5 ml sample in plain container.
Triglycerides and cholesterol	To distinguish chylothorax from pseudochylothorax in milky effusions.

	Pseudochylothorax	Chylothorax
Common causes	- TB - Rheumatoid arthritis	- Trauma (including thoracic surgery) - Neoplasia - Other lymphatic disorders (eg LAM); TB; cirrhosis; chyloascites

			- Idiopathic (10%)
	Triglycerides		>1.24 mmol/l (110 mg/dl)
	Cholesterol	>5.18 mmol/l (200 mg/dl)	Usually low
	Cholesterol crystals	Often present	Absent
	Chylomicrons	Absent	Usually present
Amylase	Pleural fluid amylase/serum amylase > 1 may suggest pancreatitis related effusion. Can usually be requested with routine biochemistry.		
Haematocrit	>50% of serum HCT supports diagnosis of haemothorax. 1-2ml sample in EDTA container sent to haematology.		
Flow cytometry and cytogenetics	Useful for the diagnosis of haematological malignancy, particularly in undiagnosed lymphocytic effusions.		
Pleural fluid ADA	Useful in diagnosis of TB pleuritis in areas of high TB prevalence as a rule out test.		

Worcestershire Acute Hospitals NHS Trust

Affix Patient Label here or record:

Name: .....

NHS No: | | | | | | | | | | |

Hosp No: | | | | | | | | | | |

D.O.B: D D / M M / Y Y Y Y Male ☐ Female ☐

Ward:..... Cons.....

Chest Drain and Aspiration for Pleural Fluid

Procedural Record and Safety Standards

Worcestershire Acute Hospitals NHS Trust

Procedure Date: Time:	Name of Assistant:
Name of Operator:	Operator Grade:
GMC / NMC Number:	Operator Signature:

Tick one procedure category to be performed:

Elective day-case ultrasound guided pleural aspiration	
Elective day-case ultrasound guided indwelling pleural drain insertion	
Elective short stay inpatient ultrasound guided Seldinger chest drain insertion	
Emergency inpatient ultrasound guided Seldinger chest drain insertion	
Emergency inpatient ultrasound guided pleural aspiration	

Give indication for planned procedure:

Circle side of planned procedure:	**Right**	**Left**

Is emergency out of hours procedure indicated? **Yes** **No**

Pleural procedures for fluid should be avoided OOH except in the following life threatening situations:

1. Very large effusion causing respiratory compromise
2. Unstable patient with traumatic haemothorax
3. Suspected pleural infection causing sepsis and physiological instability
4. Patient requiring ITU care

Selecting the right procedure and the right time is important. If this is not a life threatening situation, discuss with a member of the respiratory team before commencing the procedure.

Advice sought from:..... Designation:.....

SAFETY BRIEFING CHECKLIST (complete before starting procedure). Tick	**Yes**	**No**	**If no - justify**
Procedure to be carried out in a clean procedure room. Give location:			
Real time ultrasound guidance by US trained Clinician is arranged and available: Name of Clinician performing US:			
All equipment required has been obtained and checked (Appendix 1)			
Side of effusion confirmed by chest X-Ray, ultrasound and clinical examination			
Informed written consent taken: WAHT e-consent form or consent form 4 signed			
Anticoagulant and Antiplatelet medication history checked and stopped according to local guidelines Notes:			
Platelet count and Coagulation Screen checked and in safe range for procedure			
Nurse available to assist and support the patient Name of Nurse:			
Physiological observations documented in hour before procedure			

Worcestershire Acute Hospitals NHS Trust

Affix Patient Label here or record:

Name: .....

NHS No: | | | | | | | | | | |

Hosp No: | | | | | | | | | | |

D.O.B: D D / M M / Y Y Y Y Male ☐ Female ☐

Ward:..... Cons.....

PATIENT SIGN IN	
Patient identity confirmed	Safety briefing completed
Ultrasound guidance available	Patient allergies checked
For chest drains, confirm that respiratory ward, surgical high care or ITU bed (appropriate to presentation) is arranged.	Location of ward bed:

PROCEDURE RECORD

Describe patient positioning:

Thoracic Ultrasound Report

How much of the hemi-thorax is occupied by effusion on Ultrasound (circle) <1/3 1/3-1/2 >1/2
Depth of effusion in safe triangle _____CM
Depth of effusion in mid-scapular line _____CM
Distance from skin to fluid at planned procedure site _____CM
Fluid Appearance (circle): Anechoic Echogenic Septated Loculated
Other features and observations:

Anatomical site of procedure and reason for selection (note the safe triangle in the mid axillary line should always be selected unless there is no fluid there or patient anatomy makes that impossible):

Please fully document procedure:

Pleural fluid appearance:

For Chest drains, depth of insertion (cm):

For aspirations, volume of pleural fluid aspirated (mls):

Worcestershire Acute Hospitals NHS Trust

Affix Patient Label here or record:

Name: .....

NHS No: | | | | | | | | | | |

Hosp No: | | | | | | | | | | |

D.O.B: D D / M M / Y Y Y Y Male ☐ Female ☐

Ward:..... Cons.....

SIGN OUT	Yes	No	If No - justify
Recommended volume of pleural fluid samples, labelled, checked and sent to Biochemistry, Microbiology and Cytology (Appendix 2)			
Chest X-Ray ordered and reviewed (for all chest drains, therapeutic aspirations and for diagnostic aspirations when there has been more than 1 pass of the needle before success, OR if blood or air was aspirated)			
Post procedure physiological observations recorded			
For Chest Drains Only:			
Secured firmly with 2 sutures			
Continual direct observation for 15 minutes after insertion (no transfer in this time)			
Chest drain observation chart commenced			
Planned rate of drainage documented in medical notes (no more than 1L in first hour)			
Drain flushes considered and prescribed if needed			
Respiratory ward bed, surgical high care or ITU bed arranged			
Analgesia prescribed			
Patient instructed to keep drain bottle lower than chest			
Transfer and hand over the patient to nursing staff. Ensure they are aware of red flags/ triggers to stop drainage.			

Document any immediate complications and escalate to senior decision maker:

On-going management / follow up plan:

Chest X-Ray Review:

Name of Operator: **Date of Procedure:**

Grade of Operator: **Time of Procedure:**

Operator GMC / NMC:

Worcestershire Acute Hospitals NHS Trust

Affix Patient Label here or record:

Name: .....

NHS No: | | | | | | | | | | |

Hosp No: | | | | | | | | | | |

D.O.B: D D / M M / Y Y Y Y Male ☐ Female ☐

Ward:..... Cons.....

Appendix 1

Diagnostic pleural aspiration equipment:	Tick
Chloroprep 3 ml applicators X 2	
Sterile gloves	
Sterile field	
Sterile drape	
10ml luer lock syringe	
50ml luer lock syringe	
1 orange needle	
2 green needles	
10ml 1% lidocaine	
Gauze swabs	
4 specimen pots	
Small wound dressing or plaster	

Therapeutic aspiration equipment:	Tick
Sterile gown	
4 adhesive sterile drapes	
Therapeutic aspiration kit	
Gauze swabs	
Chloroprep 3 ml applicators X 2	
Sterile gloves	
20ml luer lock syringe	
Sterile field	
20ml 1% lidocaine	
1 orange needle	
2 green needles	
4 specimen pots	
Small wound dressing or plaster	

Seldinger chest drain equipment	Tick		Tick
Chloroprep 3 ml applicators X 2		2.0 silk suture material	
Sterile gloves		Transparnet dressings (1 large or 3 small)	
20ml 1% lidocaine		Chest drain tubing	
Complete seldinger chest drain insertion pack		Chest drain bottle	
50ml luer lock syringe		Sterile water for irrigation (use 500ml from 1000ml bottle)	
Gauze swab X 2 packs		Mefix	
4 specimen pots		Sterile scissors	

Appendix 2

1. A minimum of 40ml in plain white topped pot for cytology (hand written form). Mark the request as urgent if a chest drain has been inserted.
2. 5ml in plain white topped pot for biochemistry. Request protein and LDH (ICE request)
3. A minimum of 5ml in plain white topped pot for microbiology. Request MC and S (ICE request). if Pleural infection is the most likely diagnosis, additionally, 10ml should be sent in both blood culture bottles.
4. 1ml immediately drawn into ABG syringe if pH is required (only to distinguish between simple parapneumonic effusion and pleural infection)

Affix Patient Label here or record:

..... Male Female

Indication for chest drain:
Date of insertion:
Depth of insertion (cm):
Chart number (eg. 1 of 1):

NHS
Worcestershire Acute Hospitals NHS Trust

WAHT SELDINGER CHEST DRAIN OBSERVATION CHART AND NURSING GOOD PRACTICE POINTS

Version 1.0. 04/05/2021. Author: Dr Clare Hooper. Based on 2020 ARNS bedside observation chart

n:

ts with chest drains for non-traumatic (medical) indications may be managed on the respiratory wards, ITU (and surgical high dependency areas when ongoing surgical care ired) only.

atic pneumothorax and haemothorax should be managed in surgical high care areas or ITU using the specific observation chart and guidance for surgical chest drains.

ate actions post drain insertion:

e continual direct observation for the 15 mins following chest drain insertion and no transfer to occur during that time.

e that the patient is informed to keep the chest drain bottle positioned below the level of the chest to prevent any backflow of fluid.

the patients comfort using the most appropriate discomfort scale for the target population and ensure that analgesia has been prescribed and administered.

e a post drain insertion chest radiograph has been requested and reviewed.

actions to ensure safe drainage rate of fluid:

ing staff should stop drainage by closing the three way tap after no more than 1L of fluid has been drained in the first hour or at any point er if the patient develops any of the key red flags/triggers:

e pain or chest discomfort Persistent cough worsening breathlessness vagal symptoms or a deteriorating early warning score

p may be reopened after 1 hour, allowing up to 500ml per hour to drain before returning to free drainage once drainage rate has slowed.

the local emergency escalation policy in the event of patient deterioration and inform a senior member of the medical team urgently.

ing staff should never close three way taps of drains placed for pneumothorax – this should only be done with a Consultant present.

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Affix Patient Label here or record:

/ / Male Female

Date	Time	Patient comfort	Swinging	Bubbling	Fluid appearance	Drain site satisfactory?	Surgical emphysema present?	Tubing connections intact?	Underwater seal intact?	Bottle changed?	Prescribed suction setting	Volume saline flush since last check (if indicated)	Volume drained since last check minus flush volume	Cumulative total volume drained since drain insertion
		0 = no discomfort, 10 = severe discomfort	Y / N	Y / N	See key below	Y / N	Y / N	Y / N	Y / N	Y / N	KPa	ml	ml	ml

Fluid appearance: Serous (straw/ yellow/ amber coloured) = S Haemoserous (flightly bloodstained) = HS Heavily bloodstained = HBS Empyema (frank pus) = E
Turbid (cloudy, green, infected looking) = T Chyle (white/ pink milky looking) = C Other = document finding

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Contribution List

This key document has been circulated to the following individuals for consultation;

Designation	
Dr C Hooper	Respiratory Consultant/Pleural lead (WRH)
Dr J Johnstone	Respiratory Consultant
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Jacob Binju	Ward Manager Ward 5 Alex
Georgina Darby	Respiratory Matron WRH
Marion Freeman	Respiratory Matron Alex
Millie Harris	Pharmacist ARU WRH
Rebecca Moore	Director of Nursing

This key document has been circulated to the chair(s) of the following committee's / groups for comments;

Committee

Supporting Document 1 - Equality Impact Assessment Tool

To be completed by the key document author and included as an appendix to key document when submitted to the appropriate committee for consideration and approval.

Please complete assessment form on next page;

Worcestershire Acute Hospitals NHS Trust

Worcestershire Acute Hospitals NHS Trust

Herefordshire & Worcestershire STP - Equality Impact Assessment (EIA) Form
Please read EIA guidelines when completing this form

Section 1 - Name of Organisation (please tick)

Herefordshire & Worcestershire STP		Herefordshire Council		Herefordshire CCG	
Worcestershire Acute Hospitals NHS Trust	✓	Worcestershire County Council		Worcestershire CCGs	
Worcestershire Health and Care NHS Trust		Wye Valley NHS Trust		Other (please state)	

Name of Lead for Activity	**Clare Hooper/Heather lloyd**

Details of individuals completing this assessment	**Name**	**Job title**	**e-mail contact**
	Clare Hooper	**Consultant respiratory physician**	**Clare.hooper1@nhs.net**
	Heather Lloyd	**Pleural lead nurse**	**Heather.lloyd5@nhs.net**
Date assessment completed	**17/01/2025**		

Section 2

Activity being assessed (e.g. policy/procedure, document, service redesign, policy, strategy etc.)	**Title:** Policy and procedure for non-medical practitioners to perform chest drain insertion and pleural aspiration in adults			
What is the aim, purpose and/or intended outcomes of this Activity?	To ensure safe practice of pleural procedures			
Who will be affected by the development & implementation of this activity?	❑ ✓❑ ❑ ❑	Service User Patient Carers Visitors	❑✓ ❑ ❑ ❑	Staff Communities Other _____
Is this:	✓❑ Review of an existing activity ❑ New activity ❑ Planning to withdraw or reduce a service, activity or presence?			

What information and evidence have you reviewed to help inform this assessment? (Please name sources, eg demographic information for patients / services / staff groups affected, complaints etc.	BTS guidelines Haematology guidelines
Summary of engagement or consultation undertaken (e.g. who and how have you engaged with, or why do you believe this is not required)	This is a review/update of an existing policy.
Summary of relevant findings	Updated policy

Section 3

Please consider the potential impact of this activity (during development & implementation) on each of the equality groups outlined below. **Please tick one or more impact box below for each Equality Group and explain your rationale**. Please note it is possible for the potential impact to be both positive and negative within the same equality group and this should be recorded. Remember to consider the impact on e.g. staff, public, patients, carers etc. in these equality groups.

Equality Group	Potential positive impact	Potential neutral impact	Potential negative impact	Please explain your reasons for any potential positive, neutral or negative impact identified
Age		✓		This guideline takes age into account.
Disability		✓		This guideline takes disability into account.
Gender Reassignment		✓		This guideline takes gender reassignment into account.
Marriage & Civil Partnerships		✓		This guideline takes marriage and civil partnerships into account.
Pregnancy & Maternity		✓		This guideline takes pregnancy and maternity into account.
Race including Traveling Communities		✓		This guideline takes race including travelling communities into account.
Religion & Belief		✓		This guideline takes religion and beliefs into account.
Sex		✓		This guideline takes sex into account.
Sexual Orientation		✓		This guideline takes sexual orientation into account.

Equality Group	Potential positive impact	Potential neutral impact	Potential negative impact	Please explain your reasons for any potential positive, neutral or negative impact identified
Other Vulnerable and Disadvantaged Groups (e.g. carers; care leavers; homeless; Social/Economic deprivation, travelling communities etc.)		✓		This guideline takes other vulnerable and disadvantaged groups into account.
Health Inequalities (any preventable, unfair & unjust differences in health status between groups, populations or individuals that arise from the unequal distribution of social, environmental & economic conditions within societies)		✓		This guideline takes health inequalities into account.

Section 4

What actions will you take to mitigate any potential negative impacts?	Risk identified	Actions required to reduce / eliminate negative impact	Who will lead on the action?	Timeframe
	None identified	·		
How will you monitor these actions?	N/A			
When will you review this EIA? (e.g in a service redesign, this EIA should be revisited regularly throughout the design & implementation)	At the next guideline review.			

Section 5 - Please read and agree to the following Equality Statement

1. Equality Statement

1.1. All public bodies have a statutory duty under the Equality Act 2010 to set out arrangements to assess and consult on how their policies and functions impact on the 9 protected characteristics: Age; Disability; Gender Reassignment; Marriage & Civil Partnership; Pregnancy & Maternity; Race; Religion & Belief; Sex; Sexual Orientation

1.2. Our Organisations will challenge discrimination, promote equality, respect human rights, and aims to design and implement services, policies and measures that meet the diverse needs of our service, and population, ensuring that none are placed at a disadvantage over others.

1.3. All staff are expected to deliver services and provide services and care in a manner which respects the individuality of service users, patients, carer's etc, and as such treat

them and members of the workforce respectfully, paying due regard to the 9 protected characteristics.

Signature of person completing EIA	Heather Lloyd
Date signed	17/01/2025
Comments:	
Signature of person the Leader Person for this activity	Heather Lloyd
Date signed	17/01/2025
Comments:	

Supporting Document 2 – Financial Impact Assessment

To be completed by the key document author and attached to key document when submitted to the appropriate committee for consideration and approval.

	Title of document:	Yes/No
1.	Does the implementation of this document require any additional Capital resources	NO
2.	Does the implementation of this document require additional revenue	NO
3.	Does the implementation of this document require additional manpower	NO
4.	Does the implementation of this document release any manpower costs through a change in practice	NO
5.	Are there additional staff training costs associated with implementing this document which cannot be delivered through current training programmes or allocated training times for staff	NO
	Other comments:	

If the response to any of the above is yes, please complete a business case and which is signed by your Finance Manager and Directorate Manager for consideration by the Accountable Director before progressing to the relevant committee for approval