


Spontaneous Pneumothorax Guideline

University Hospitals of Leicester 
NHS Trust

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1. INTRODUCTION

This document sets out the University Hospitals of Leicester NHS Trust guideline for management of patients with spontaneous pneumothorax.

Pneumothorax is defined as air in the pleural space. It is characterised as spontaneous in the absence of trauma or causative medical intervention (iatrogenic). The management of iatrogenic pneumothorax and pneumothorax secondary to trauma is outside the scope of this document.

Patients with pneumothorax who do not have evidence of established underlying lung disease, are less than 50 years old and no significant smoking history are considered to have a **Primary Spontaneous Pneumothorax (PSP)**. All others, who likely have abnormal lungs, are considered to have **Secondary Spontaneous Pneumothorax (SSP)**.

From 2015 UK data, incidence of spontaneous pneumothorax is 19.3/100,000 in males and 8.1/100,000 in females¹. These patients often require inpatient hospital management and specialist respiratory beds. Selected spontaneous pneumothorax patients can be safely managed in the outpatient setting as demonstrated by multiple studies, most recently including RAMPP².

The new draft British Thoracic Society (BTS) Pleural Disease Guidelines³ give more support for conservative and ambulatory management of primary spontaneous pneumothoraces depending on patient's symptoms and preference; the size of the pneumothorax itself no longer dictates management.

The aim of this updated guideline including the ambulatory pathway is to enhance the patient recovery and to reduce the need for inpatient bed days, thus easing issues with bed capacity and reduce overall costs.

1.1 AIMS

This guideline has been devised to facilitate safe and effective management of patients with pneumothorax and selected patients with pneumothorax in the outpatient setting.

This guideline outlines:

- Principles of management of primary and secondary spontaneous pneumothorax in line with up-to-date BTS Guidelines 2022;
- Which patients with pneumothorax are suitable for consideration of outpatient ambulatory management;
- The roles, responsibilities and competencies required of team members involved in management of outpatients with pneumothorax;
- Time-frames for follow up and timely referral to thoracic surgery;
- Pathway for referral to thoracic surgery in cases where pneumothorax is non-resolving.

1.2 SCOPE

This guideline applies to the Emergency Department (ED), respiratory medicine, thoracic surgery and nursing staff based at Glenfield Hospital, part of University Hospitals of Leicester NHS Trust.

This guidance must be followed for all patients with spontaneous pneumothorax managed as an inpatient or as part of the ambulatory pneumothorax pathway, in addition to guidance from the Pleural Procedures policy (available on the intranet) and guidance from the British Thoracic Society (BTS).

1.3 DEFINITIONS

Primary Spontaneous Pneumothorax is also referred to as PSP.

Secondary Spontaneous Pneumothorax is also referred to as SSP.

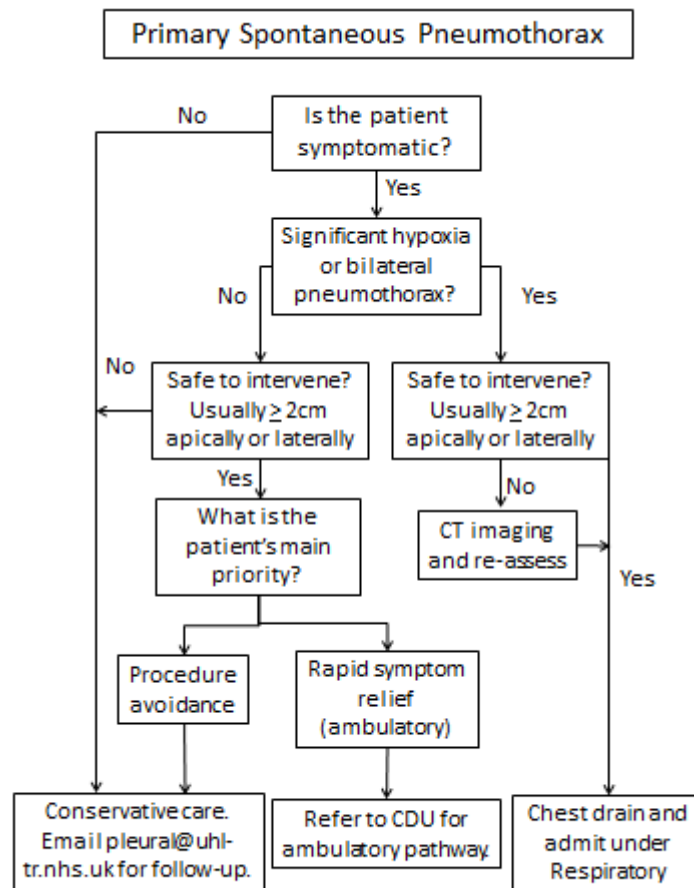
Pleural Nurse Specialist, pleural specialist nurse and Pleural CNS can be used interchangeably.

'Ambulatory device' or 'pneumothorax device' can refer to either the Pleural Vent/Thora-Vent or the Pneumostat or equivalent device within this document.

2. Guideline Standards and Procedures

2.1 PRIMARY SPONTANEOUS PNEUMOTHORAX (PSP)

1. Please consult Appendix 3 for the BTS algorithm for management of Spontaneous Pneumothorax. The flow diagram below has been adapted from the BTS algorithm for use at UHL.



2. An **asymptomatic** patient with a PSP can be managed conservatively and followed up as an outpatient (provided there are no other indications for hospital admission). Consult Section 2.4 for details about referring to the ambulatory pathway. For arranging follow up, please **refer to the pleural service via ICE** or send a **referral to the pleural mailbox (pleural@uhl-tr.nhs.uk)**.

3. If the pneumothorax is not considered safe to intervene (2cm at apex or at the level of hilum on a chest radiograph or safely accessible pneumothorax seen on a CT scan), conservative care as an outpatient is considered appropriate. Patient should be given safety net advice to seek medical attention if they develop worrying symptoms such as chest pain or shortness of breath while awaiting follow up.

4. If the pneumothorax is considered safe to intervene, an informed discussion with patient needs to take place to establish their preference:

a. If **procedure avoidance** is their main priority then **conservative management** can be considered;

b. For achieving **rapid symptom relief**, **ambulatory devices** such as a chest drain with a pneumostat valve, or a Pleural vent/Thora-Vent can be considered. Please consult the ambulatory pathway and discuss with the on call respiratory registrar;

c. If the ambulatory pathway is not considered appropriate, **alternative options** include performing **needle aspiration** (in second intercostal space at mid-clavicular line or in the safety triangle) and conservative management thereafter or **chest drain** insertion if unsuccessful. It is important to consult the respiratory team during this decision making.

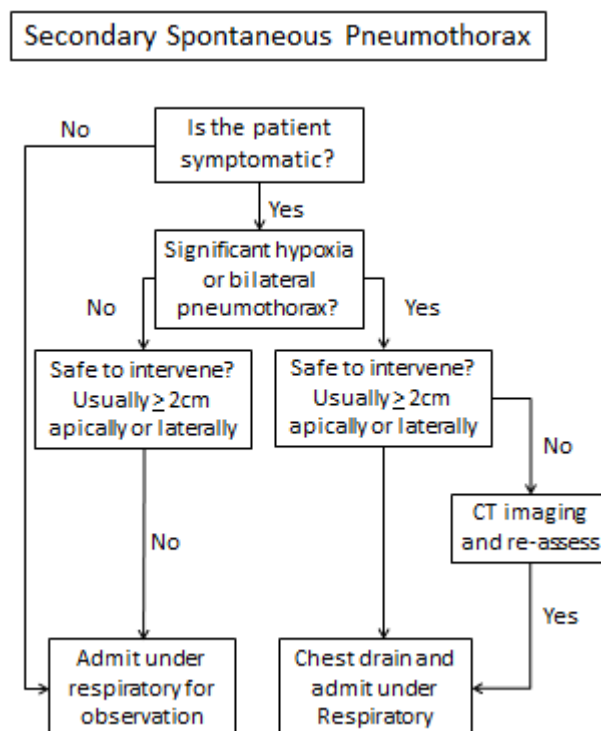
5. In a **symptomatic** patient (pain or shortness of breath) with a PSP who does not have any high-risk characteristics such as haemodynamic compromise (suggestive of tension pneumothorax), significant hypoxia or bilateral pneumothoraces, consider the options above depending on pneumothorax size and patient preference.

6. If there are **high risk characteristics** and the pneumothorax is safely accessible then chest drain insertion and referral to respiratory team is advised. CT chest can be performed if pneumothorax does not appear safe for intervention on a chest radiograph.

7. If there is evidence of haemodynamic compromise suggestive of tension pneumothorax, emergency needle decompression (wide bore cannula in second intercostal space at the mid-clavicular line) should be performed by a competent clinician followed by a chest drain.

2.2 SECONDARY SPONTANEOUS PNEUMOTHORAX (SSP)

1. Please consult Appendix 3 for the BTS algorithm for management of Spontaneous Pneumothorax. The flow diagram below has been adapted from the BTS algorithm for use at UHL.



2. SSPs are deemed higher risk due to the underlying lung disease being present which reduces physiological reserve to tolerate the loss of lung volume.

3. If symptomatic, assuming safe to intervene, SSPs are ideally managed with a small bore (12-14Fr) Seldinger chest drain.
4. In the rarer scenario that a patient is asymptomatic, there is the option of conservatively managing the pneumothorax, but as an inpatient. The decision to conservatively manage versus medical intervention is not based upon size of the pneumothorax, but upon symptoms.
5. SSPs are more likely than PSP to have abnormalities in the pleura and lung parenchyma, and can have tethering of the lung – if radiological abnormalities are present, consider other imaging modalities (such as CT) prior to intervention.
6. If there is evidence of haemodynamic compromise suggestive of tension pneumothorax, emergency needle decompression (wide bore cannula in second intercostal space at the mid-clavicular line) should be performed by a competent clinician followed by a chest drain.

2.3 RECURRENCE

1. Approximately one third of patients with a spontaneous pneumothorax will have recurrence. Following a second episode of a primary spontaneous pneumothorax, the managing team should consider referral to the thoracic surgeons.
2. In secondary spontaneous pneumothoraces, in those patients deemed not suitable for thoracic surgery (ie. due to frailty), a talc slurry pleurodesis could be administered via the chest drain following discussion with the respiratory team, even after the first presentation.

2.4 AMBULATORY PATHWAY

2.4.1 Inclusion and Exclusion criteria

Currently the ambulatory pneumothorax pathway is only open to patients with a PSP pneumothorax with no complex current or previous respiratory disease. Inclusion and exclusion criteria are as follows:

Inclusion Criteria (ALL must be met):

- Primary spontaneous pneumothorax aged 18-50
- Haemodynamically stable with no oxygen requirements
- Able to consent for outpatient management

AND

- Can independently attend regular outpatient follow up

Exclusion Criteria

- Underlying lung condition +/- other condition requiring hospital admission
- >20 pack year smoking history
- Pregnant
- Tension pneumothorax, bilateral pneumothoraces or haemodynamic instability
- Contraindications to procedure
 - INR >1.5, Platelets <50
 - On anticoagulation (DOAC, Warfarin) or antiplatelets (eg Clopidogrel)
 - Skin site infection

2.5 PNEUMOTHORAX CLINIC OUTLINE (FOR GLENFIELD HOSPITAL ONLY)

The day patients are referred to the ambulatory pneumothorax pathway will be referred to as Day 0. The aim will be to review patients on Day 1 and then every 48hrs, with no longer than 72hrs elapsing between visits and maximum pathway length 5 days prior to either resolution or referral to thoracic surgeons. Thoracic surgery should aim to be within 8 days of initial management of primary spontaneous pneumothorax.

The proposed modified pneumothorax clinic pathway (appendix 1) is as follows:

Day 0

- Initial assessment on CDU by Respiratory SPR. Activate pathway if fulfils criteria and refer to SDEC
- Insert Pleural Vent/Thoro-Vent or chest drain +/- attach Pneumostat device/equivalent device
- If out of hours, patient kept in overnight and pleural team contacted in the morning.
- Provide patient education and supplies pack for management of ambulatory drain/device
- Screen for MRSA prior to discharge (in case referral to surgeons required)
- Give patient details to SDEC staff

Day 1

***If Day 1 falls on a Saturday or a Sunday, then this will be a face to face consult in CDU**

- Pleural team to perform telephone consultation with patient to assess symptoms, drainage and bubbling (Pneumostat)/movement of diaphragm (Pleural Vent/Thoro-Vent).
- If problems identified or no evidence of bubbling/diaphragm movement, bring to CDU/SDEC at Glenfield Hospital for review via CDU CXR prior to assessment.
- If clinically improving but diaphragm movement or bubbling persists to re-review in 24-48hrs.
- If resolved and last bubbling 24hrs ago – remove device, repeat CXR and review in pleural clinic in 2/52.
- If non-resolved, leave device in situ, issue any further equipment required for management of device and bring back on day 3.
- Consider whether early referral to thoracics appropriate.

Day 3

***If Day-3 falls on weekend patient can be seen either Friday or Monday**

- Face to face consultation with patient to assess symptoms, drainage and bubbling (Pneumostat)/movement of diaphragm (Pleural Vent/Thoro-Vent).
- This appointment will take place on 2nd day if pathway commenced on a Wednesday and on the 4th day if pathway commenced on a Thursday.
- Assess drainage/bubbling/radiographic appearances
- If resolved and last bubbling 24hrs ago – remove device, repeat CXR and review in pleural clinic in 2/52
- If non-resolved, leave device in situ, issue any further equipment required for management of device and bring back on day 5
- Consider whether early referral to thoracics appropriate

Day 5

***If Day-5 falls on weekend patient can be seen either Friday or Monday**

- Bring patient to CDU/SDEC to review with CXR
- Assess drainage/bubbling/radiographical appearances
- If resolved and last bubbling 24 hrs ago – remove device, repeat CXR and review in pleural clinic in 2/52
- If non-resolved, arrange admission for suction +/- liaise with thoracics for input
- Select patients may be managed as outpatient until direct admission to thoracics can be arranged

Pneumothorax Device/Chest Drain Removal

If pneumothorax has resolved on chest radiograph and there has been no documented bubbling of the device within the preceding 24 hours, the device/chest drain can be removed in accordance with Trust policy by an appropriately trained individual. Observations must then be monitored for a period of **two hours** and chest radiograph performed prior to discharge home.

If chest radiograph appearances are stable upon removal of device, the patient can be discharged from the ambulatory 5-day pathway and be referred for review in pleural clinic in 2 weeks with chest X-Ray on arrival.

Management of complications

- Patients are able to present to CDU at any time with an ambulatory pneumothorax alert card
 - On presentation to CDU, for nurse-led triage and CXR on arrival as per current practices
 - Alert medical team to presentation
 - In hours: Contact Pleural team – 01162583975
 - Out of hours: Contact respiratory SpR on call bleep 2903 for senior review
- CDU on call team to provide clinical review/advice/management as required

If acutely unwell, patient instructed to dial 999 and for direct Glenfield CDU admission.

During working hours of Monday – Friday 0900 – 1700 (excluding bank holidays):

- Pleural team first point of contact (01162583975) to assess and manage patient if well enough.
- Pleural team to arrange assessment, imaging and management as needed
- If direct admission required, to be admitted via CDU (011625812674) as per usual admission processes.

Out of Hours

- If acutely unwell to dial 999 and for direct Glenfield CDU admission as per usual processes

2.6 REFERRAL FOR SURGERY

Referral for thoracic surgery review should be considered early if there are indications that ambulatory management of pneumothorax will not be successful, or at latest day 5 in the pathway.

Patients should be referred to the thoracic surgical consultant on call for referrals, or to their nominated on call SpR. If suitable for continued outpatient management, patient should:

- Receive MRSA swab if not already done prior to pathway commencing
- Be referred to the Thoracic Nurse Specialist team
- Receive definitive surgical management of their pneumothorax within 8 days of initial chest drain insertion

If surgery is required, patient care will be taken over by the thoracic surgery team on the day that they are admitted for definitive management of their pneumothorax, and will remain under the care of thoracic surgery until management no longer required for that pneumothorax episode.

Indications for surgical referral are as follows:

- First pneumothorax presentation associated with tension
- First secondary pneumothorax associated with significant physiological compromise
- Second ipsilateral or first contralateral pneumothorax
- Synchronous bilateral spontaneous pneumothorax
- Persistent air leak (despite 5 to 7 days of chest tube drainage) or failure of lung re-expansion
- Spontaneous haemothorax
- Professions at risk (e.g. pilots, divers), even after a single episode of pneumothorax;
- Pregnancy

2.7 FOLLOW UP AND DISCHARGE

Patients who have commenced on the pneumothorax pathway will be followed up during the time period that their drain/device is in situ by the pleural team in the ambulatory pneumothorax clinic as outlined above.

Once the pneumothorax has successfully resolved and ambulatory device is removed, the patient should then be followed up in the pleural clinic in 2-4 weeks. Any further investigations can then be followed up through the pleural clinic pathway.

Patients should be given advice regarding flying, diving and risk of recurrence.

- Patients should be advised not to fly until complete radiological resolution of a pneumothorax.
- Patients can fly seven days after radiological resolution.
- After a pneumothorax, patients should be discouraged from scuba diving unless definitive preventative measure (such as surgical pleurectomy) has been taken. The UK Medical Diving Committee advises that patients who have not had surgery can potentially dive provided they have not had a pneumothorax in the last five years and a CT scan of the chest and lung function tests do not suggest any underlying lung abnormality.

Patients should be referred for smoking cessation and advised against cannabis use where relevant.

3. Education and Training

Clinicians performing interventions such as needle aspiration or intercostal chest drain will need a valid Direct Observation of Procedural/Practical Skills (DOPS) form signed off in their portfolio.

4. Supporting References

1. Rob Hallifax, Jack Gibson, Najib Rahman, Richard Hubbard, Epidemiology of pneumothorax: UK national primary care data (1995-2015), European Respiratory Journal 2017
2. Randomised ambulatory management of primary pneumothorax. Halifax et al, ORTU, as presented at Winter BTS London 2019
3. BTS Guideline For Pleural Disease. On behalf of the BTS Pleural Guideline Development Group. Draft for Public Consultation. 4 June 2022

5. FORMS/TEMPLATES TO BE USED

5.1 – Patient information leaflets

- Patient information leaflets for spontaneous pneumothorax, pleural vent and pneumostat (available on intranet)

5.2 - Patient Equipment Pack checklist

Patients to be provided with Drain Care Pack on initial discharge from hospital with ambulatory chest drain/device:

- 20ml Luer Lock Syringes x4
- Alcohol wipes x 8
- Clear waterproof dressing
- Clamp (Pneumostat device only)
- Sterile Water – 4 ampules (Pneumostat device only)
- Patient Information Leaflets – pneumothorax and ambulatory pneumothorax device (ONE of either Pneumostat or Pleural Vent, as appropriate)
- Ambulatory device drainage diary
- Pneumothorax Alert Card

5.3 – Pleural Procedures Protocol

- Can be found on the trust intranet
[http://insitetogether.xuhl-tr.nhs.uk/pag/pagdocuments/Pleural%20Procedures%20\(Including%20Pleural%20LocSSIPs\)%20UHL%20Policy.pdf](http://insitetogether.xuhl-tr.nhs.uk/pag/pagdocuments/Pleural%20Procedures%20(Including%20Pleural%20LocSSIPs)%20UHL%20Policy.pdf)
- Must be followed if undertaking pleural procedures

5.4 – Ambulatory Device Drainage Diary

- Patients should be discharged from hospital with a drainage diary to record evidence of air leak from their device and to record volume of fluid drained at home
- One sheet located in patient information leaflet for ambulatory device
- See printable drainage diary sheet in appendix 2 if additional required

5.5 Medical alert card

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| <p>MEDICAL ALERT CARD Pneumothorax with Ambulatory Chest Drain Device</p> <p>For queries or if you have concerns, contact: In-Hours Mon-Fri 9am-5pm: Pleural Team 01162583975</p> <p>Out of hours (24hr service): Attend Glenfield CDU with this card</p> <p>If feeling significantly breathless/unwell: Dial 999, Tell them you have a chest drain and need to go to Glenfield Hospital CDU</p> <p>KEEP THIS CARD WITH YOU AT ALL TIMES</p> |
|--|

| |
|---|
| <p>MEDICAL ALERT CARD</p> <p>(Affix Label)</p> <p>Name:</p> <p>Hospital Number:</p> <p>DOB:</p> <p>KEEP THIS CARD WITH YOU AT ALL TIMES</p> |
|---|

| CONTACT AND REVIEW DETAILS | |
|---|----------------------------------|
| Dr Rakesh K Panchal (Consultant Respiratory Physician) & Mr Apostolos Nakas (Consultant Thoracic Surgeon) | Executive Lead: Medical Director |
| Authors: Dr Asfandyar Yousuf (Interventional Pulmonology Clinical Fellow) Dr Darren Reed (Higher Specialty Trainee Registrar (ST7) Respiratory Medicine) Miss Padmavathy Parthasarathy (Advanced Nurse Practitioner Respiratory Medicine) Dr Syed Ajmal (Consultant Respiratory Physician) | |
| Authorisers: Dr Rakesh Panchal (Interventional Pulmonology Clinical Lead) Mr Apostolos Nakas (Head of Service Thoracic Surgery) | |
| Details of Changes made during review: new guideline | |

Monitoring Compliance

| What will be measured to monitor compliance | How will compliance be monitored | Monitoring Lead | Frequency | Reporting arrangements |
|---|----------------------------------|-----------------|-----------|------------------------|
| | | | | |
| | | | | |
| | | | | |

Key Words

Pneumothorax, Ambulatory

6. APPENDIX

Appendix 1 – Ambulatory pathway clinic flowsheet

UHL Ambulatory Pneumothorax Pathway

Consider in patients with Primary Spontaneous Pneumothorax who fulfill all the criteria below

Day 0 – Day of referral

| | |
|--|--|
| <ul style="list-style-type: none"> - Initial assessment by CDU Respiratory SpR. - Ambulatory device insertion/attachment in CDU. | <ul style="list-style-type: none"> - Patient education and issue supplies as per Pneumothorax guideline. - Screen for MRSA prior to discharge. |
|--|--|

(link or QR code here)

All patients are seen on CDU and assessed by the Respiratory SPR and referred to SDEC if appropriate

Day 1 – Telephone consult

If concerns on telephone consult or pathway started on a Friday or a Saturday, then Face to Face review in CDU.

| | |
|---|--|
| <ul style="list-style-type: none"> - Assess symptoms, drainage and air leak - If non-resolved, leave device in situ, issue further equipment (as needed) and bring back on day 3 +/- 1 day. | <p>If resolved and last bubbling 24hrs ago – remove device, repeat CXR and review in pleural clinic in 2/52.</p> |
|---|--|

Inclusion Criteria (ALL must be met):

- Primary spontaneous pneumothorax aged 18-50
- Haemodynamically stable with no oxygen requirements
- Able to consent for outpatient management
- Can independently attend regular outpatient follow up
-

Exclusion Criteria

- Underlying lung condition +/- other condition requiring hospital admission
- >20 pack year smoking history
- Pregnant
- Tension pneumothorax, bilateral pneumothoraces
- Haemodynamic instability
- Contraindications to procedure, for example abnormal clotting.

Day 3 – Face to Face

| | |
|--|--|
| <ul style="list-style-type: none"> - Assess symptoms, drainage and air leak and CXR. - If non-resolved, leave device in situ, issue further equipment as needed and bring back on day 5. | <p>If resolved and last bubbling 24hrs ago – remove device, repeat CXR and review in pleural clinic in 2/52.</p> |
|--|--|

Day 5 – Face to Face

| | |
|---|--|
| <ul style="list-style-type: none"> - Assess symptoms, drainage and air leak and CXR. - If non-resolved, arrange admission for suction +/- liaise with thoracics. - Select patients may be managed as outpatient until direct admission to thoracics can be arranged. | <p>If resolved and last bubbling 24hrs ago – remove device, repeat CXR and review in pleural clinic in 2/52.</p> |
|---|--|

Contact details (In the following order):

Respiratory ANP : Padma/Sam (via CDU)
 Pleural office : x13975
 CDU SPR bleep: 2903

Appendix 2 – Ambulatory Device Drainage Diary

| Date | Time | Air Leak? | Amount Drained (mL) |
|-----------------|------|-----------|---------------------|
| e.g. 29/02/1956 | 9am | Yes | 15mL |
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Appendix 3 – BTS Spontaneous Pneumothorax Algorithm

Pneumothorax Pathway

