Whittington Health NHS

Spontaneous Pneumothorax; Management

Subject:	Spontaneous pneumothorax
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Policy Executive Owner:	ICAM Divisional Director
Designation of Author:	Consultant, Dr R Kaiser
Name of Assurance Committee:	As above
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Review Date:	3 years hence
Target Audience:	All medical personnel in the emergency department and medical wards involved in management of pneumothorax
Key Words:	Pneumothorax, spontaneous, aspiration, chest drain, seldinger

Version Control Sheet

Version	Date	Author	Status	Comment
1.0	Feb 2015	Dr R Kaiser		New guideline

Abbreviations contained within this document:

Primary Pneumothorax	PSP
Secondary Pneumothorax	SSP
Chronic obstructive pulmonary disease	COPD
Tuberculosis	TB
Chest x-ray	CXR
Video-assisted thoracoscopic surgery	VATS
Computed tomography	CT

➢ Criteria for use

All medical, nursing and support staff responsible for the care of patients diagnosed with spontaneous pneumothorax attending the emergency department or inpatients on medical wards at the trust.

It does not cover traumatic pneumothorax.

➢ Introduction

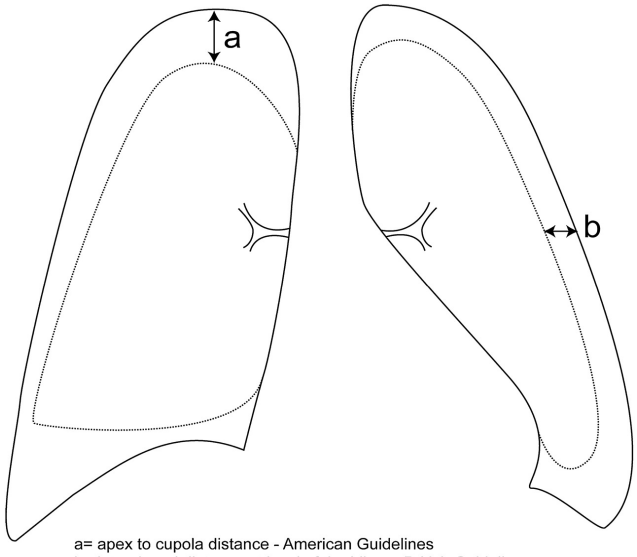
Pneumothorax refers to air in the pleural cavity.
Primary Pneumothorax (PSP) by definition occurs in patients with no underlying lung disease.
Secondary Pneumothorax (SSP) is associated with underlying lung disease - known lung disease (e.g. Asthma, COPD, TB, Pulmonary fibrosis), age > 50 years and significant smoking history, or evidence of underlying lung disease on exam or CXR.

➢ Clinical and radiological evaluation

Symptoms (chest pain and dyspnoea) in PSP may be minimal or absent. In contrast, symptoms are greater in SSP, even if the pneumothorax is relatively small in size. Patients with pre-existing lung disease tolerate a pneumothorax less well, and the distinction between PSP and SSP should be made at the time of diagnosis to guide appropriate management.

Severe symptoms and signs of respiratory distress and/or haemodynamic compromise suggest the presence of tension pneumothorax.

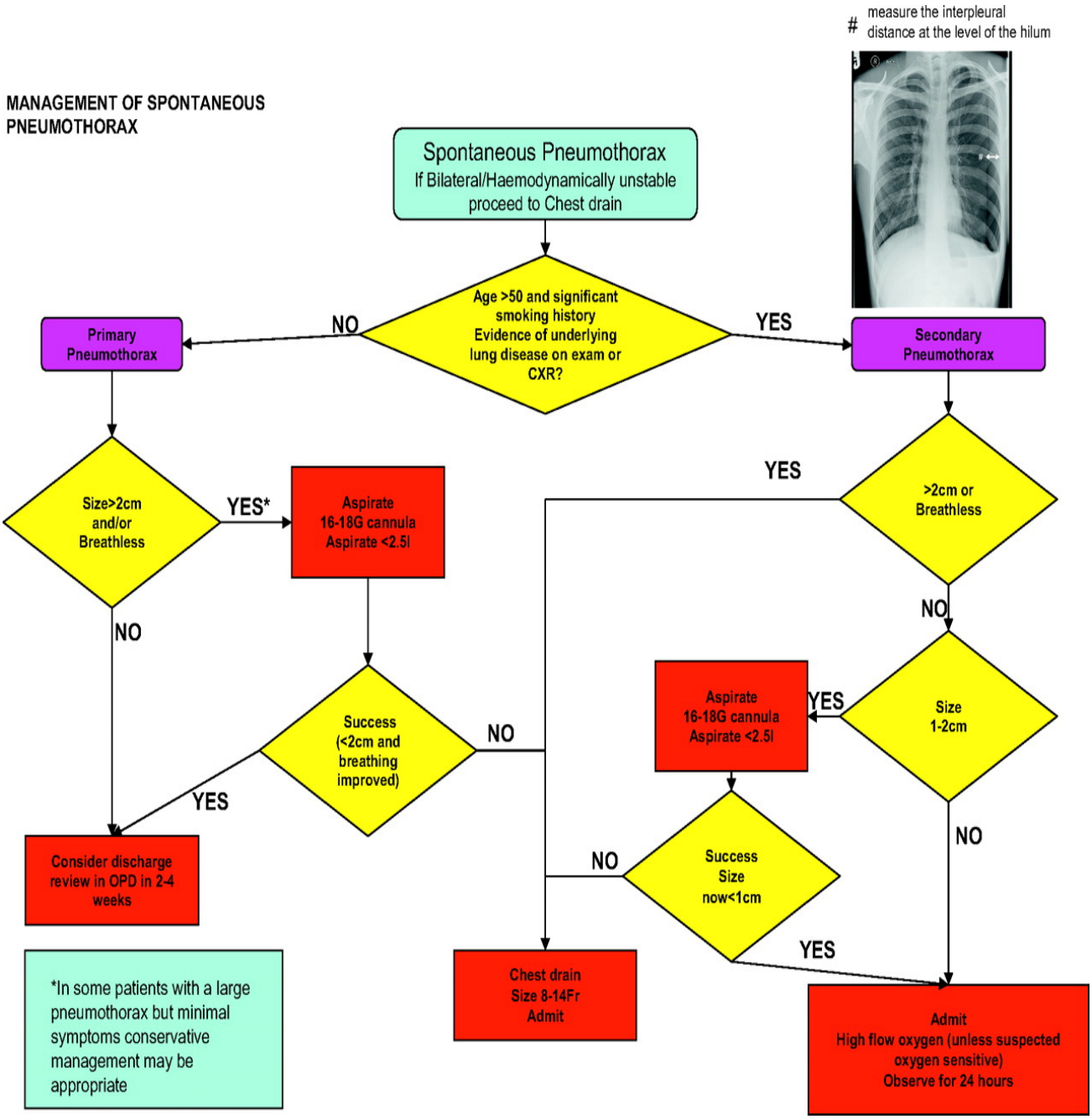
The presence of breathlessness influences the management strategy and the need for active intervention. The size of a pneumothorax is less important than the degree of clinical compromise. Patient with PSP or SSP and significant breathlessness associated with any size of pneumothorax should undergo active intervention.



a= apex to cupola distance - American Guidelines
b= interpleural distance at level of the hilum - British Guidelines

The differentiation of a 'large' from a 'small' pneumothorax is the presence of a visible rim of more than 2 cm between the lung margin and the chest wall, <u>at the level of the hilum</u> as defined in the BTS Guidelines, (b) in figure.
A 2cm radiographic pneumothorax approximates to a 50% pneumothorax by volume.

Algorithm for the management of a Spontaneous Pneumothorax (From BTS Guidelines 2010)



Primary Pneumothorax :
If discharged from ED/MAU, referral to chest clinic to be seen in 2 weeks
Discharge advice :

- return to ED immediately if more breathless or chest pain
- avoid diving
- avoid air travel until further advice in chest clinic
- Stop smoking

Secondary Pneumothorax :
Admit ALL, observe at least 24 hours if no intervention done
Adminster oxygen

Indications for Chest drain in Spontaneous Pneumothorax

- Large (> 2 cm) symptomatic Primary Pneumothorax, after failed aspiration
- Large (>2 cm) Secondary Pneumothorax
- 1-2 cm Symptomatic Secondary Pneumothorax, after failed aspiration (If shallow pneumothorax may need CT guided drain).
- Pneumothorax of any size in a ventilated patient

ENSURE THAT YOU ARE COMPETENT TO INSERT A CHEST DRAIN

Key Points of note

Refer to Pleural Procedures trust Guideline for further details of technique of chest drain insertion.

	**Please see Whittington Health Guideline:** Pleural Procedures

- Site of aspiration could be 2nd intercostal space midclavicular line or safety triangle.
- Site of chest drain insertion should be in the safe triangle.
- Ultrasound guidance is not required for chest drain insertion in pneumothorax.
- Do not confuse a large bulla with a pneumothorax : old CXRs on PACS archive may help. If in doubt, discuss with a radiologist and obtain a chest CT prior to drain insertion if appropriate.
- Proceed straight to chest drain if bilateral pneumothoraces or haemodynamically unstable

➢ Management of primary pneumothorax

- Chest drains are usually required for patients with tension or bilateral pneumothorax, who should be admitted to hospital.
- Observation is the treatment of choice for small PSP without significant breathlessness. They can be considered for discharge with outpatient review in 2 weeks. These patients should receive clear written advice to return in the event of worsening breathlessness.
- Selected asymptomatic patients with a large PSP may be managed by observation alone, but only after specialist review.
- Needle aspiration (with 14-16 G orange/grey cannula) is recommended as the initial intervention for PSP. Site for aspiration 2nd intercostal space mid clavicular line, or axillary approach in safe triangle. Cannula attached to 50 ml Luer lock syringe connected to a 3 way tap. Aspiration should be discontinued if resistance is felt or the patient coughs excessively, or more than 2.5L is aspirated.

- If successful with follow up CXR showing size < 2cm and improved symptoms, patients can be discharged with outpatient review in 2 weeks.

- Needle aspiration should not be repeated after the initial failed attempt, unless was due to technical difficulties. Following failed aspiration, small bore chest drain insertion (12F size) is recommended.

➢ Management of Secondary Spontaneous Pneumothorax

- All patients with SSP should be admitted to hospital for at least 24 hours, and receive supplemental prescribed oxygen in compliance with trust guidelines on oxygen use.

- Most patients will require the insertion of a small bore chest drain.

- If size > 2cm and breathless, then proceed straight to small bore chest drain.

- If size <1 cm and not significantly breathless, then treatment option may be to observe for 24 hours, and continue high flow oxygen, with repeat CXR next day.

- If size 1-2 cm and not significantly breathless, could attempt needle aspiration as initial intervention. The guidelines advise proceed to chest drain if aspiration attempt unsuccessfull and size remains 1-2cm. If the lung edge appears too close to chest wall to safely insert a chest drain, then a CT guided drain may be more appropriate.

➢ General management of chest drains

Refer to the 'Pleural Procedures' Guideline on the intranet for further detailed information.

DO NOT CLAMP A CHEST DRAIN. Clamping has almost no place to play in the management of a pneumothorax, and can be very dangerous if the patient has a large air leak leading to tension.

Drain not working :

If the lung has not re-inflated on follow up CXR, but there is no bubbling or swinging in the tubing & underwater bottle, then the tube is likely to be blocked or kinked. This can be corrected by untwisting or flushing the tube.

Also check the connection of the drain to the drainage bottle. Alternatively, the drain may have become displaced, in which case a replacement must be inserted through a clean incision.

A chest drain may be withdrawn to correct a malposition but should **never** be pushed in due to risk of infection. Likewise, a further drain should never be inserted through the same hole as previous dislodged drain as this can introduce infection.

Use of suction

Suction should not be routinely employed, and only after specialist respiratory opinion. A persistent air leak with or without incomplete lung re-expansion of the lung are usual indications.

The addition of suction too early after chest drain insertion may precipitate re-expansion pulmonary oedema.

High volume low pressure systems should be used (thoracic wall suction adaptors), with pressures of -10 to -20 cm H_2O (equivalent to 8-15 mmHg). Suction should not be instituted without specialist advice and the patient should be transferred to Nightingale ward for this.

Subcutaneous Emphysema

An infrequent complication of chest drainage, this is usually seen in the context of a malpositioned, kinked, blocked, or clamped chest drain. It can also occur with an imbalance between a large air leak and a relatively small bore chest drain. Generally it subsides spontaneously after a few days, but occasionally acute airway obstruction or thoracic compression may lead to respiratory compromise in which case therapeutic options include insertion of larger bore drains, tracheostomy and skin incision decompression.

Referral to thoracic surgeons

In cases of persistent air leak or failure of the lung to expand, an early (at 3-5 days) thoracic surgical opinion should be sought.

Surgical strategies include video-assisted thoracoscopic surgery (VATS) with pleurectomy and pleural abrasion. Recurrence rate is 5%.

Medical chemical pleurodesis with sterile talc can be used if a patient is either unwilling or unable to undergo surgery.

➢ Discharge and follow up

- Patients should be advised to return to hospital if increasing breathlessness develops.
- Smoking is associated with a significantly increased risk of spontaneous pneumothorax and recurrence. Smoking cessation advice should be given to all before discharge.
- All patients should be followed up by respiratory physicians until full resolution. Arrange appointment for 2 weeks.
- In patients with a history of smoking cannabis and/or significant tobacco, a high resolution CT chest should be considered to look for underlying bullous emphysematous disease.
- Air travel should be avoided until 1 week after full resolution on CXR. All normal activity except very strenuous sporting activities and contact sports may be resumed as soon as lung is fully inflated.
- Diving should be permanently avoided unless the patient has undergone bilateral surgical pleurectomy and has normal lung function and chest CT postoperatively.

➢ Contacts

- Respiratory Consultants (via switchboard)
- Respiratory SpR (bleeps 3359/3049)
- Nightingale ward (Ext 5521, 4275, or 3117)

➢ References

1. Management of Spontaneous Pneumothorax: British Thoracic Society pleural disease guideline 2010.
Macduff A, Arnold A, Harvey J, on behalf of the BTS Pleural Disease Guideline Group. Thorax 2010;65 (Suppl 2): ii18-ii31

To be completed and attached to any procedural document when submitted to the appropriate committee for consideration and approval

		Yes/No	Comments
1.	**Does the procedural document affect one group less or more favourably than another on the basis of:**		
	• Race	No	
	• Ethnic origins (including gypsies and travellers)	No	
	• Nationality	No	
	• Gender	No	
	• Culture	No	
	• Religion or belief	No	
	• Sexual orientation including lesbian, gay and bisexual people	No	
	• Age	No	
	• Disability - learning disabilities, physical disability, sensory impairment and mental health problems	No	
2.	**Is there any evidence that some groups are affected differently?**	No	
3.	**If you have identified potential discrimination, are any exceptions valid, legal and/or justifiable?**	No	
4.	**Is the impact of the procedural document likely to be negative?**	No	
5.	**If so can the impact be avoided?**	N/A	
6.	**What alternatives are there to achieving the procedural document without the impact?**	N/A	
7.	**Can we reduce the impact by taking different action?**	N/A	

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For advice in respect of answering the above questions, please contact the Director of Human Resources.

Checklist for the Review and Approval of Procedural Document

To be completed and attached to any procedural document when submitted to the relevant committee for consideration and approval.

	Title of document being reviewed:	Yes/No	Comments
1.	**Title**		
	Is the title clear and unambiguous?	Yes	
	Is it clear whether the document is a guideline, policy, protocol or standard?	Yes	
2.	**Rationale**		
	Are reasons for development of the document stated?	Yes	
3.	**Development Process**		
	Is it clear that the relevant people/groups have been involved in the development of the document?	Yes	
	Are people involved in the development?	Yes	
	Is there evidence of consultation with stakeholders and users?	Yes	
4.	**Content**		
	Is the objective of the document clear?	Yes	
	Is the target population clear and unambiguous?	Yes	
	Are the intended outcomes described?	Yes	
5.	**Evidence Base**		
	Are key references cited in full?	Yes	
	Are supporting documents referenced?	Yes	
6.	**Approval**		
	Does the document identify which committee/ group will approve it?	Yes	
7.	**Dissemination and Implementation**		
	Is there an outline/plan to identify how this will be done?	Yes	
8.	**Document Control**		
	Does the document identify where it will be held?	Yes	
9.	**Process to Monitor Compliance and Effectiveness**		
	Are there measurable standards or KPIs to support the monitoring of compliance with and effectiveness of the document?	Yes	

	Title of document being reviewed:	Yes/No	Comments
	Is there a plan to review or audit compliance with the document?	Yes	
10.	**Review Date**		
	Is the review date identified?	Yes	
	Is the frequency of review identified? If so is it acceptable?	Yes	
11.	**Overall Responsibility for the Document**		
	Is it clear who will be responsible for co-ordinating the dissemination, implementation and review of the document?	Yes	

Executive Sponsor Approval			
If you approve the document, please sign and date it and forward to the author. Procedural documents will not be forwarded for ratification without Executive Sponsor Approval			
Name		Date	
Signature			
Relevant Committee Approval			
The Director of Nursing and Patient Experience's signature below confirms that this procedural document was ratified by the appropriate Governance Committee.			
Name		Date	
Signature			
Responsible Committee Approval – only applies to reviewed procedural documents with minor changes			
The Committee Chair's signature below confirms that this procedural document was ratified by the responsible Committee			
Name		Date	
Name of Committee		Name & role of Committee Chair	
Signature			

Tool to Develop Monitoring Arrangements for Policies and guidelines

What key element(s) need(s) monitoring as per local approved policy or guidance?	Who will lead on this aspect of monitoring? Name the lead and what is the role of the multidisciplinary team or others if any.	What tool will be used to monitor/check/observe/Assess/inspect/ authenticate that everything is working according to this key element from the approved policy?	How often is the need to monitor each element? How often is the need complete a report ? How often is the need to share the report?	What committee will the completed report go to?
Element to be monitored	**Lead**	**Tool**	**Frequency**	**Reporting arrangements**
Appropriate management of patients with pneumothorax according to algorithm in guideline Appropriate follow up of patients with pneumothorax	Respiratory Lead for Pleural Disease	Compliance with guideline	Annual	Respiratory Team and Audit Committee