

Types:

- Spontaneous
 - Primary (congenital subpleural blebs and bullae)
 - Secondary (to existing lung disease)
 - Catamenial (at menstruation)
 - 3 to 6% of spontaneous pneumothorax in women
 - Usually aged 30 to 40 years with a history of pelvic endometriosis
 - >90% occur in the right lung
 - occurs within 72 hours of menstruation onset
 - 50% recurrence within a year if on hormonal treatment
- Traumatic
 - Open/Closed/Iatrogenic
 - Tension

Epidemiology:

- Annual incidence of 1° spont pneumothorax is up to 28/100,000 for M & 4x less for F
- 1° spontaneous pneumothorax most common in the 20s, and rare >40.
- 2° spontaneous pneumothorax typically occurs between 60 and 65.
- Aut dominant of limited penetrance and X-linked recessive predispositions described.
- Recurrence: 30% of 1° and 45% of 2° pneumothorax often within 6mo, and usually <3yrs

Risk factors:

1° spont pneumothorax: classically tall, thin young males. Usually subclinical blebs & bullae in upper zones demonstrated on CT. Smoking. Exercise is **not** apparently a risk factor.

2° spont pneumothorax: age>50, prior lung dz (asthma, lung Ca, infection, emphysema, CF, TB, sarcoid, *Pneumocystis jiroveci* in AIDS, idiopathic pulm fibrosis), smoking, Marfan's, IVDU.

History:

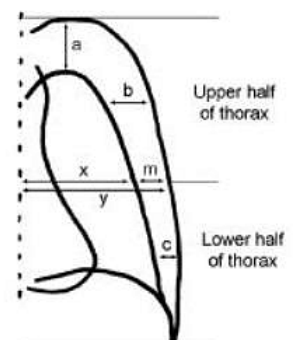
- Sudden onset unilateral pleuritic chest pain, dyspnoea +/- cough.
- Usually less SOB with spont 1° pneumothorax.
- Trauma, chronic lung disease

Examination:

- ↑RR, ↑HR, ± sweaty, hyperresonance + ↓air entry/chest excursion on affected side, ± dev of trachea away towards affected side if not tension. Pulsus paradoxus.
- If tension pneumothorax - shocked, dev of trachea away from affected side, ± ↑JVP

Investigations:

- Erect CXR if poss. If supine, check base of lungs & near cardiac shadow for line of PTX or there may be a deep sulcus sign with radiolucency along the costophrenic sulcus. Expiration films used to be preferred but not now. CT if ?Dx or complex.
- Estimating size from CXR: (NB. AID = Ave. interpleural dist = $(a+b+c)/3$)
 - **BTS guidelines:** $m < 2\text{cm}$ = small, else large.
 - **Collins' Method:** $4 + 14 \cdot \text{AID}$
 - ACCP guidelines: $a < 3\text{cm}$ = small else large
 - Rhea/Choi Method: $4 + 9 \cdot \text{AID}$
 - Light Method: $100 \cdot (1 - (x/y)^3)$ using widths at hila level (m).
Tends to ↑estimate mod & large PTX.



Treatment:

Oxygen (if low sats, or to ↑re-expansion rate. **Rel CI** if CO₂-retaining COAD) & IV access

Tension pneumothorax - immediate decompression with 16G cannula in 2icsmcl, remove needle, tape to chest, then insert chest drain.

Traumatic pneumothorax - insert chest drain

Spontaneous pneumothorax - Still international discord on best Mx.

- Small PTX < 20%
 - Conservative - Spontaneous re-expansion occurs at ~2% per day (ests 1.25-2.2%) - may be ↑4x by receiving O₂ (increases N₂ reabs gradient). 90% success.
- Mod/Large PTX > 20%, or sig. symptomatic
 - Simple Aspiration - Popular in UK/Europe, not in US. Success 50-83%, less with older patients or large PTX.
 - 1% lignocaine
 - 16G cannula 2icsmcl
 - Remove needle, add 3-way tap
 - Aspirate with 50ml syringe up to 3L or patients coughs++
 - Repeat CXR immed & in 6hrs
 - Pig-tail drain (8-14F) - Less traumatic/bulky than large ICC - allows aspiration + review & then D/C or prolonged drainage. Success 74-100%. Not in traumatic PTX.
 - Seldinger technique - most commonly in 5icsmal as for chest drain.
 - Aspirate as for simple aspiration.
 - If >2.5L attach underwater seal drain & admit
 - Chest drain (ICC) - For traumatic, decompressed tension, bilateral & most 2° PTX.
SE: more trauma/bleeding/scars. Success 66-97%.
 - Sedation/analgesia e.g. midazolam/morphine
 - Fully abduct ipsilateral arm & identify 5ics anterior/mid-axillary line
 - Clean skin with iodine/clorhexidine
 - Infiltrate skin and tissues down to pleura with 1% lignocaine
 - Make 4cm incision along line of ribs & blunt dissect with artery forceps & finger over top of 6th rib (avoid n-v bundle under 5th rib)
 - Insert 14-22F (spont PTX) or 28-32F (traumatic) without trochar
 - Connect to underwater seal drain
 - Interrupted sutures for incision & one with ends tied around tube
 - Pad with gauze and adhesive tape
 - Check drain swinging. Keep bottle below level of patient & don't clamp
 - Get check CXR - if not re-inflating then consider pulling tube back a fraction, adding gentle suction or even a second drain.
- Re-expansion pulm oedema: ↑likely with ↑delay between symptom onset & re-expansion
- If recurrent, persistent air leak, contralateral PTX, high occupational risk (diver, pilot) consider pleurodesis or video-assisted thorascopic surgery (VATS)
- Stop smoking to reduce the risk of recurrence.
- No flying/diving for at least 2 weeks.

Disposition

D/C if small 1° PTX that was aspirated or pigtail-drained & remained re-expanded after 4-6hrs in well patient. F/U CXR in (48hr +) 1-2 weeks to confirm resolution. Otherwise admit.

Prognosis: 30-40% recurrence in 5y esp age > 60, pulmonary fibrosis, or pregnancy.

Mort low in spontaneous PTX, but higher in COPD (5%), AIDS (25%)