Lung

Lung USS is a limited ultrasound that aims to detect:

1. Absence of Lung sliding (possible pneumothorax)
2. A-lines (normal lung artefact)
3. Significant B-lines (fluid or inflammation)
4. Consolidation
5. Pleural effusion

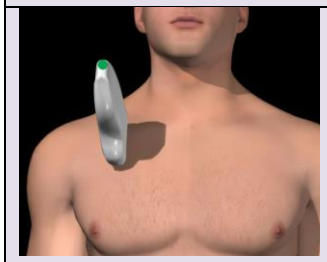
Patient details

Indication for scan (e.g. Respiratory distress, hypoxaemia)

Pulse **BP** **RR** **Sats**

Examination Findings

Probe Position



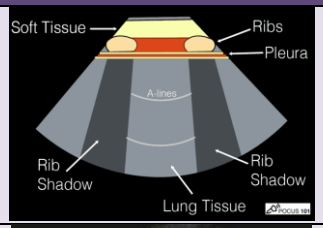
Technique

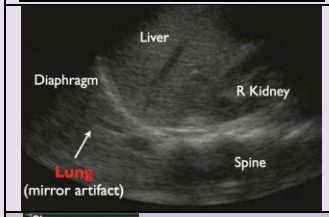
- Rock probe to make pleura parallel
- Tilt to find A-lines
- Scan in mid-clavicular line, mid-axillary line, paraspinal
- Scan superiorly to diaphragm

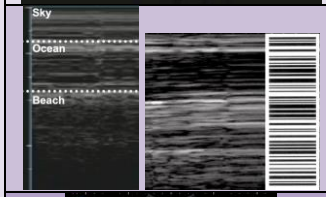
Preparation

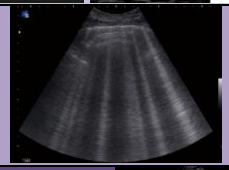
1. **Patient data** entry, label images
2. **Probe**: curvilinear or linear (for pleura only), marker pointing to head
3. **Pre-set**: lung (ensure harmonics & compound imaging off, low dynamic range)
4. **Position:** sitting, lying, on side, on parent's lap. Machine on right
5. **Image optimisation:** depth ~10cm, Res/Gen/Pen, gain, TGC

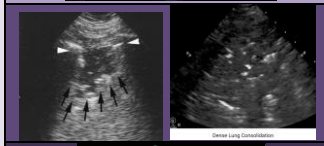
Views

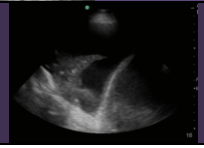












Pathology

Normal anatomy

- Rib shadows
- A-lines – reverberation artefact
- Lung sliding – 'ants marching' at pleural surface, can also use M-mode looking for seashore sign.

Inferior R4/ Inferior L4 normal view

- Diaphragm: double line
- Liver (R4), Spleen L4)
- Spine should only be seen below diaphragm
- May see mirror image of spleen/liver
- Lung curtain sweeps down

Absent lung sliding

- Absence of 'ants marching' or barcode sign in M-mode (Seashore is normal)
- DDx: PTX, consolidation, apnoea/ RMB intubation, pleural disease/ pleurodesis, severe hyperinflation, effusion

B-lines

- Ray-like vertical lines extending off the bottom of the screen, start at pleura.
- Confluent – pneumonia, oedema
- Diffuse – viral pneumonitis, oedema

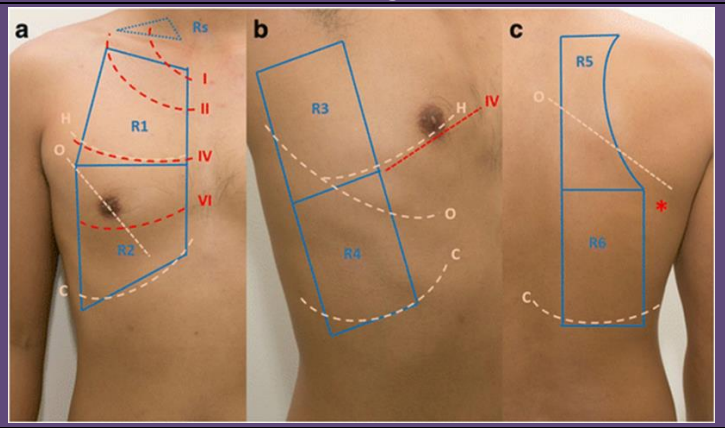
Consolidation

- Air bronchograms, subpleural hypoechoic regions, c-lines, "shredding" appearance
- >1cm more likely bacterial, viral <0.25cm

Pleural effusion

- Usually hypoechoic (acute), best seen in dependent areas (above diaphragm)
- Loss of spine sign, A-lines, pleural sliding

Findings



B-lines	B0	1-3 B-lines per ICS is normal
	B1	>3 discrete B-lines per ICS
	B2	Confluent B-line
Consolidation	C0	No consolidation
	C1	Subpleural consolidation <1cm height
	C2	Large consolidation >1cm height
Pleural effusion	E0	None
	E1	Present
Pneumothorax	P0	Absent
	P1	Present

Right zone 1		Left zone 1	
Right zone 2		Left zone 2	
Right zone 3		Left zone 3	
Right zone 4		Left zone 4	
Right zone 5		Left zone 5	
Right zone 6		Left zone 6	

Notes

Conclusions (Note: USS findings must be consistent with clinical suspicion: integrate history, examination, investigations and USS findings). *e.g. B-pattern focal, multifocal or diffuse, size of pleural effusion and echogenicity,size of pneumothorax*

Accuracy: High sensitivity and specificity for pneumothorax; pleural effusion (sens. 92%, spec. 93-97%), better than CXR; pneumonia (sens. 96%, spec 93% - misses central pneumonia 1.5% of cases)

Clinician	Signature	Date	Time	Resource adapted from V. Manivel, POCUS 101