

Sesiunea V

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Pulmonary Ultrasound

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Pulmonary Exam

ULTRASOUND?

Ultrasound

Sensitivity/Specificity

Pleural effusion

97 / 94

Alveolar consolidation

90 / 98

Interstitial syndrome

93 / 93

Complete pneumothorax

100 / 96

Occult pneumothorax

79 / 100



CT Scan

Intensive Care Med (1999) 25: 955-958
© Springer-Verlag 1999

ORIGINAL

Feasibility and safety of ultrasound-aided thoracentesis in mechanically ventilated patients

Intensive Care Med (2004) 30:276-281
DOI 10.1007/s00134-003-2075-6

ORIGINAL

Ultrasound diagnosis of alveolar consolidation in the critically ill

AM J RESPIR CRIT CARE MED 1997;156:1640-1646.

The Comet-Tail Artifact
An Ultrasound Sign of Alveolar-Interstitial Syndrome

Intensive Care Med (2000) 26: 1434-1440
DOI 10.1007/s001340000627

ORIGINAL

The "lung point": an ultrasound sign specific to pneumothorax

Crit Care Med 2005 Vol. 33, No. 6

Clinical Investigations

Ultrasound diagnosis of occult pneumothorax*

Daniel A. Lichtenstein
J Med Ultrasound 2009;

The Working Probe



Talking



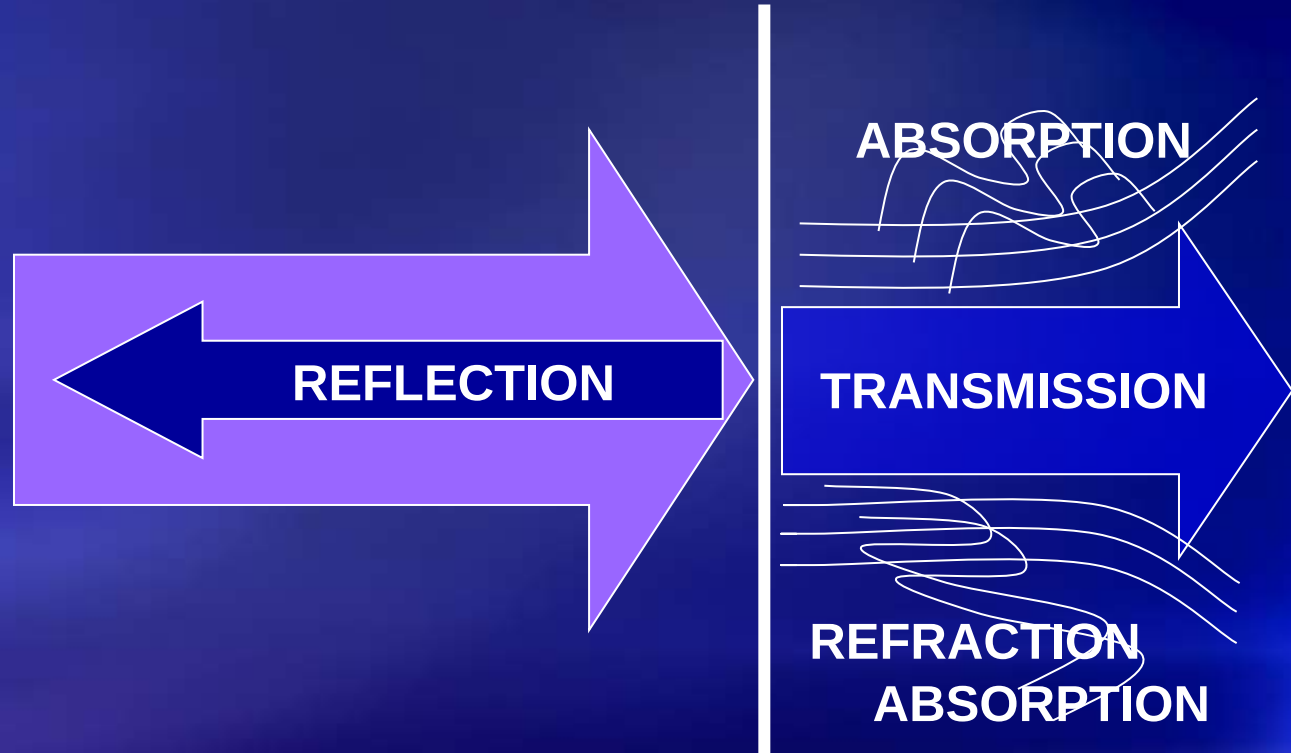
Hearing

2% of the time talking and 98% of the time listening

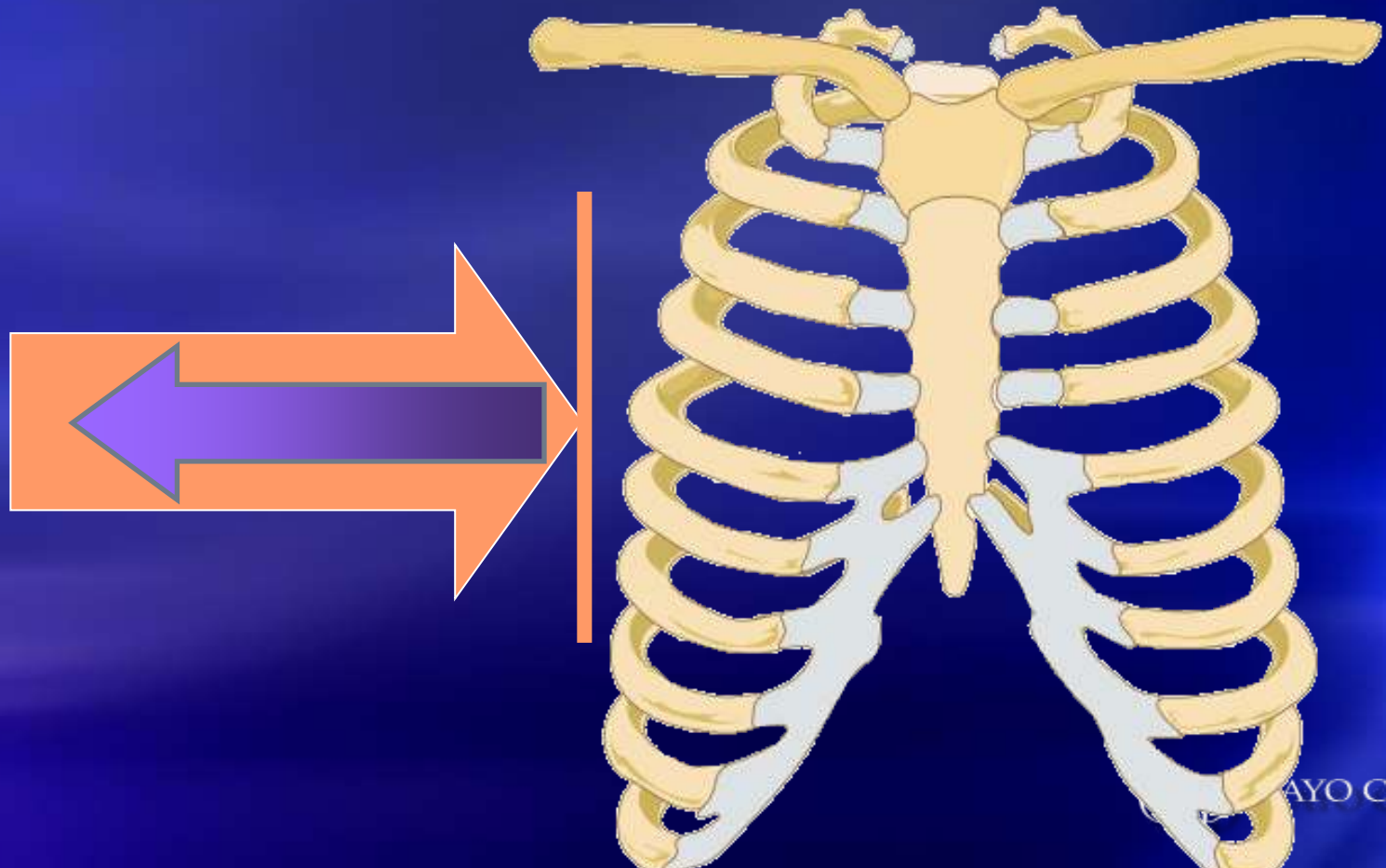
Ultrasound Conduction

As ultrasound passes through tissue, it is:

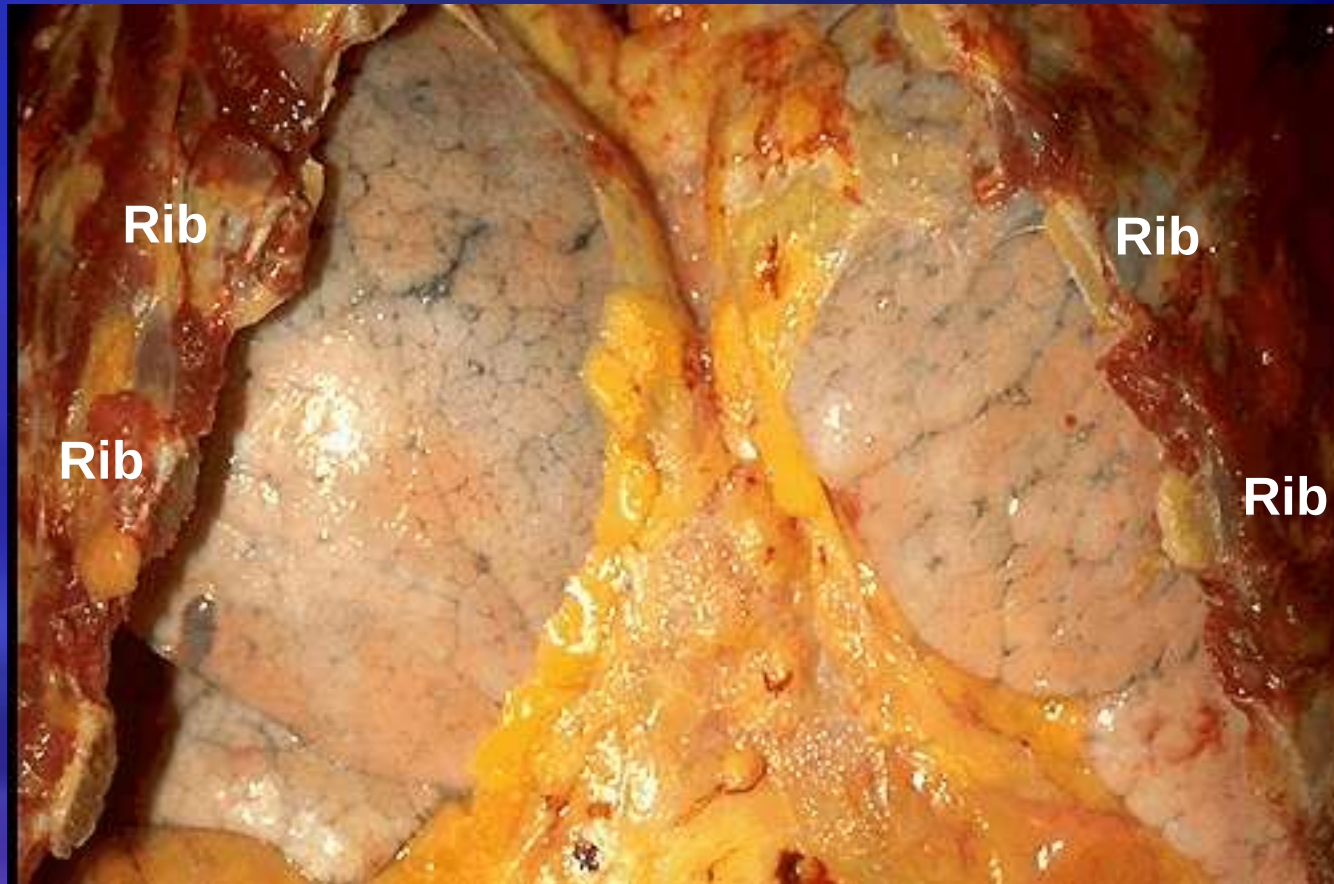
1. Transmitted
2. Reflected
3. Absorbed
4. Refracted



Reflectivity



Lungs



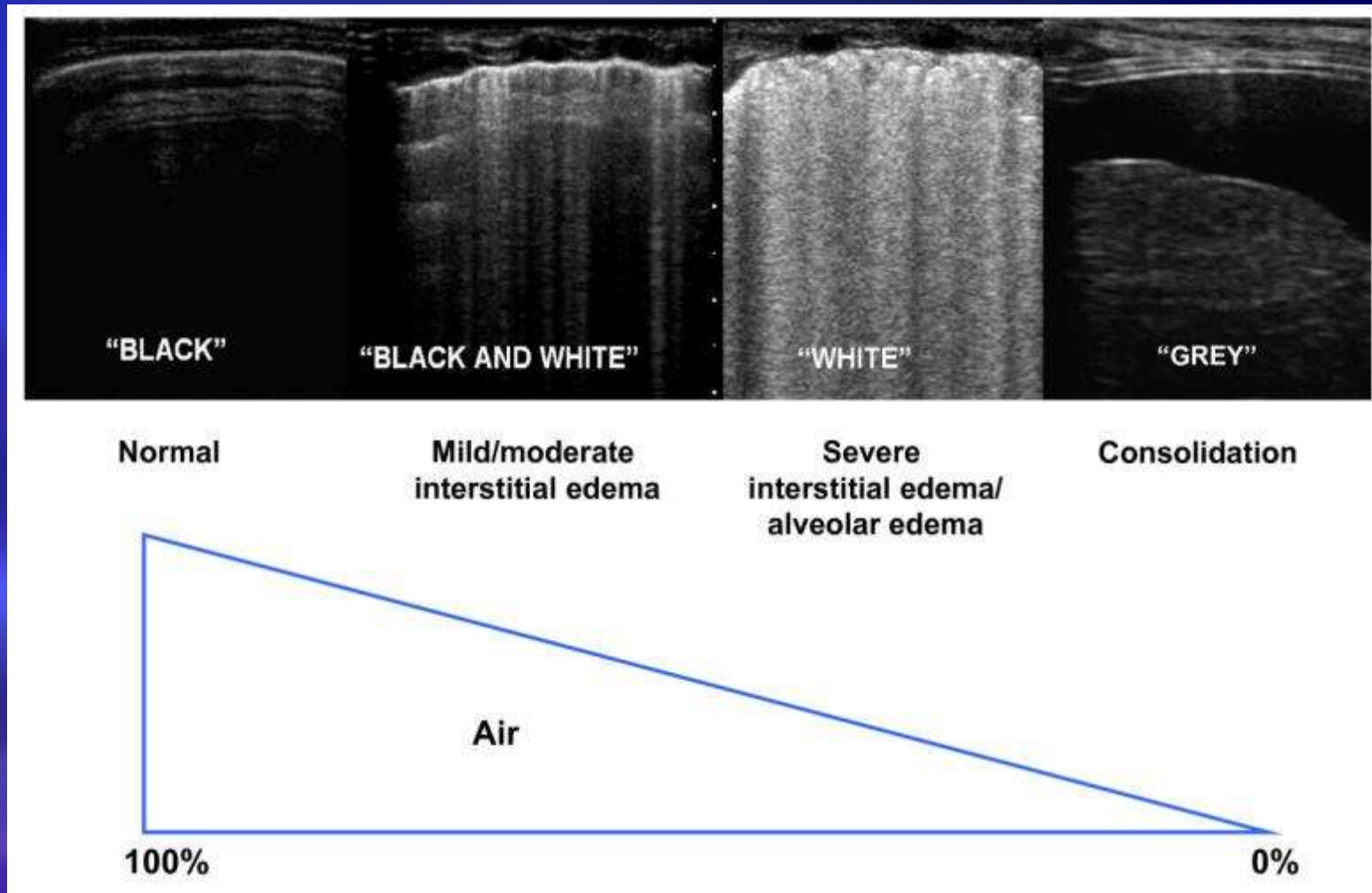
Pattern Recognition



Are we all looking at the same thing?



Physical Basis of Lung Ultrasound



 right side	Mid-axillary	Anterior axillary	Mid-clavicular	Para-sternal	Inter-costal space	Para-sternal	Mid-clavicular	Anterior axillary	Mid-axillary	left side
					II					
					III					
					IV					
					V					

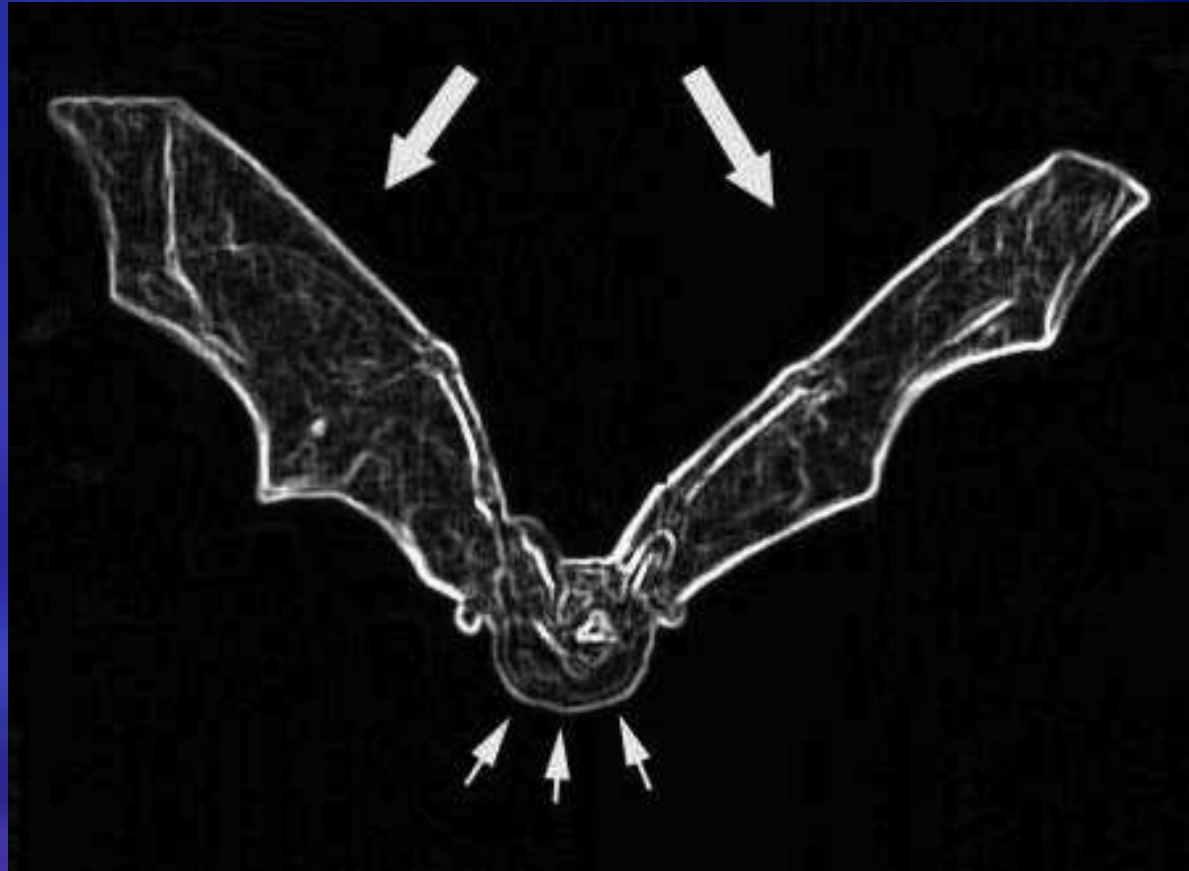
Luna Gargani

Cardiovascular Ultrasound 2011

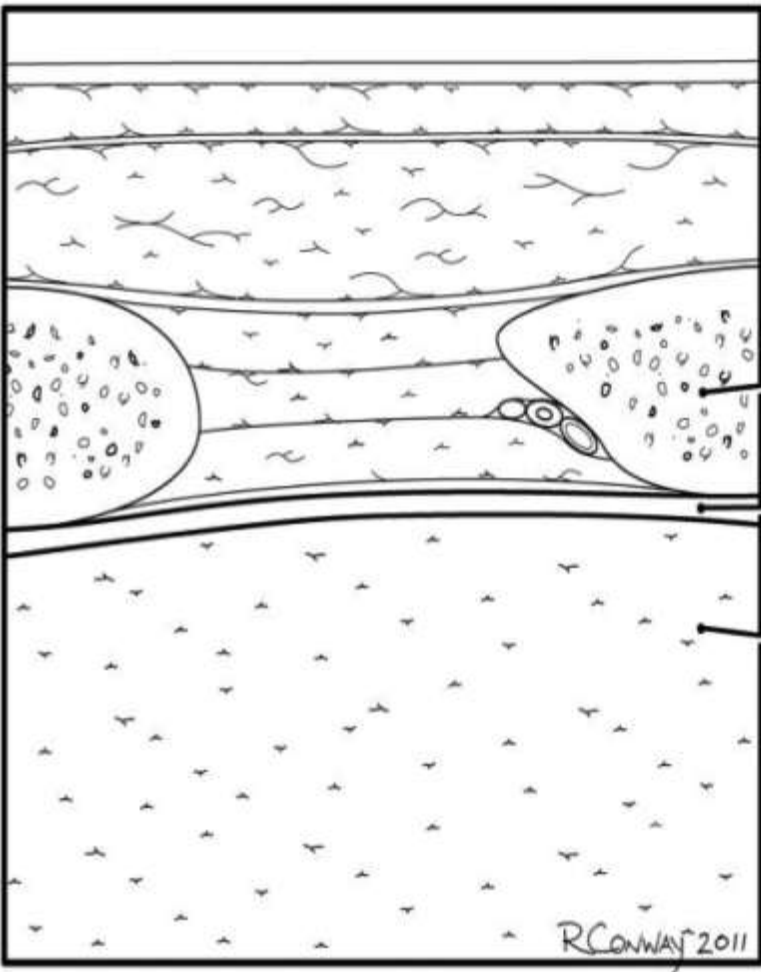
Bright white line between ribs is the pleura.



“Bat Sign”



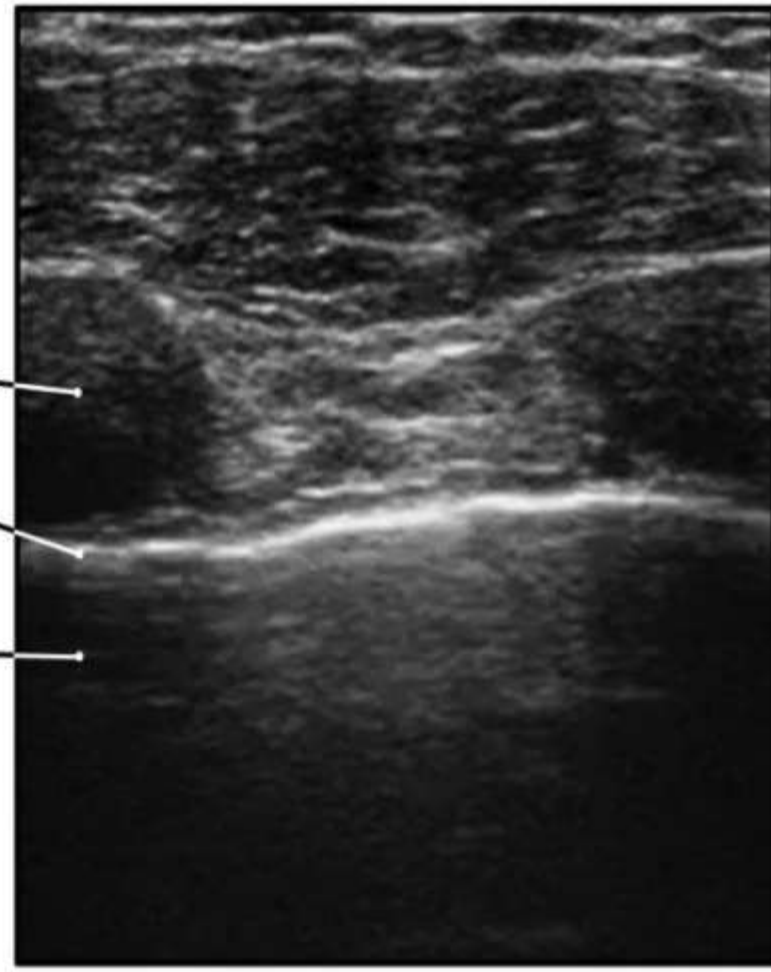
3 small arrows pleural, 2 large arrows rib



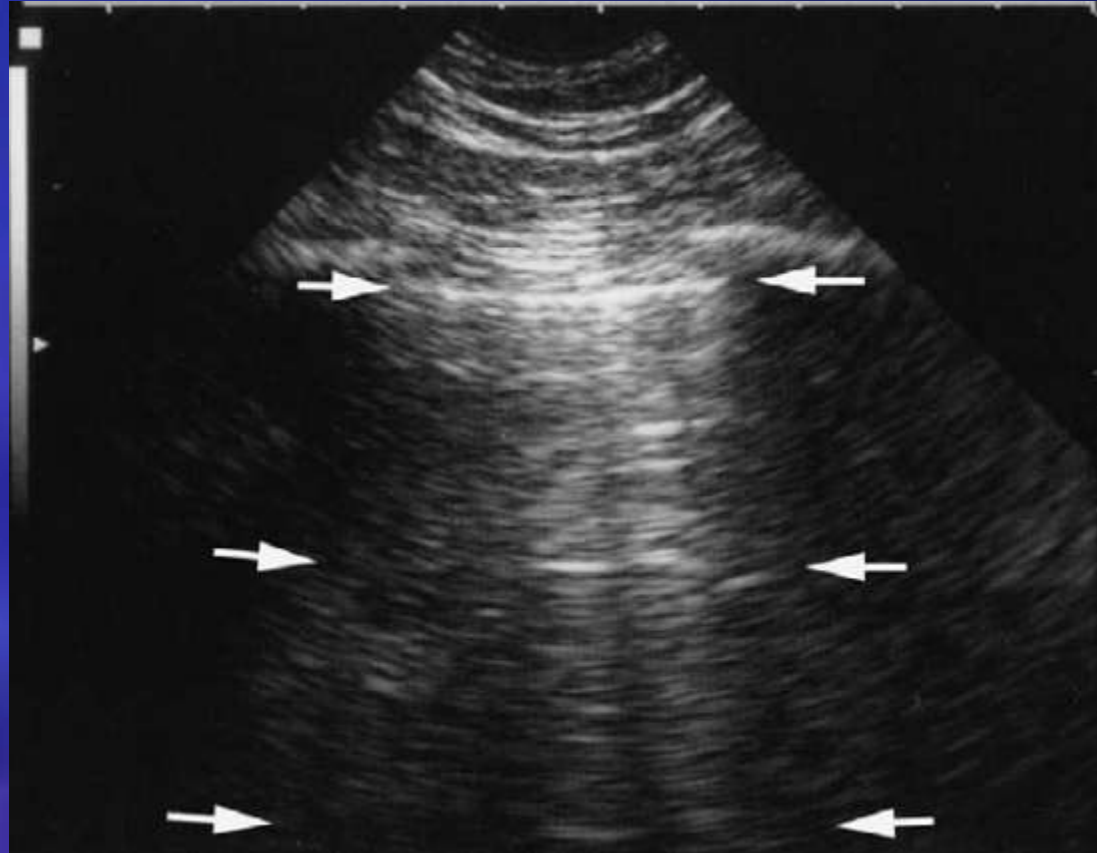
Rib

Parietal and visceral pleura

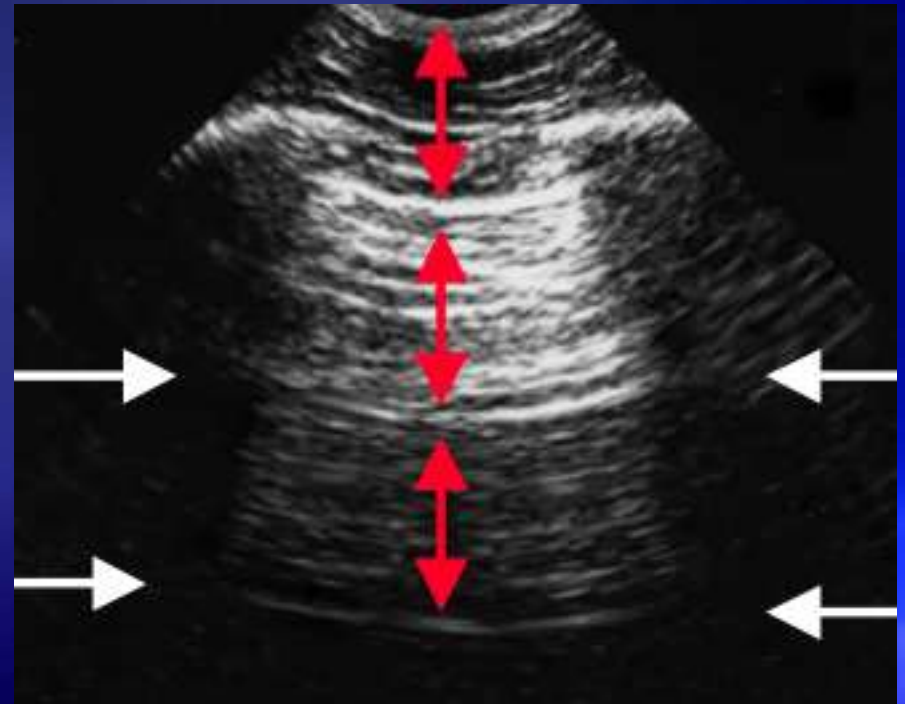
Lung parenchyma



Normal Lung



**A-lines (horizontal) indicate air*,
whether physiologic or pathologic**



PHILIPS

MI 1.2

TIS 0.2

CENTRAL LI

L12-3

33Hz

5cm

2D

HGen

Gn 92

C 41

3/3/2

P

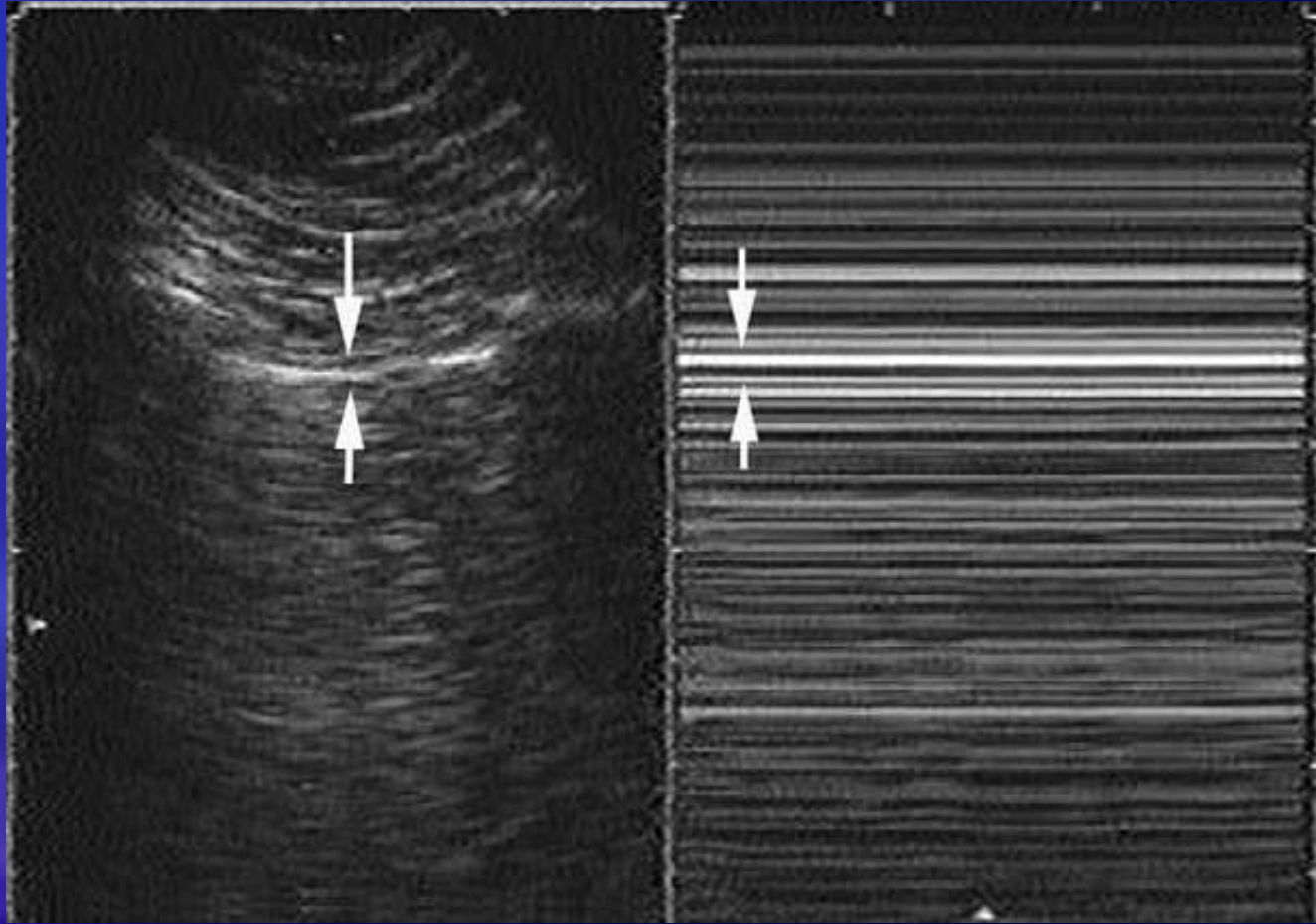


G
P R
4.4 8.8

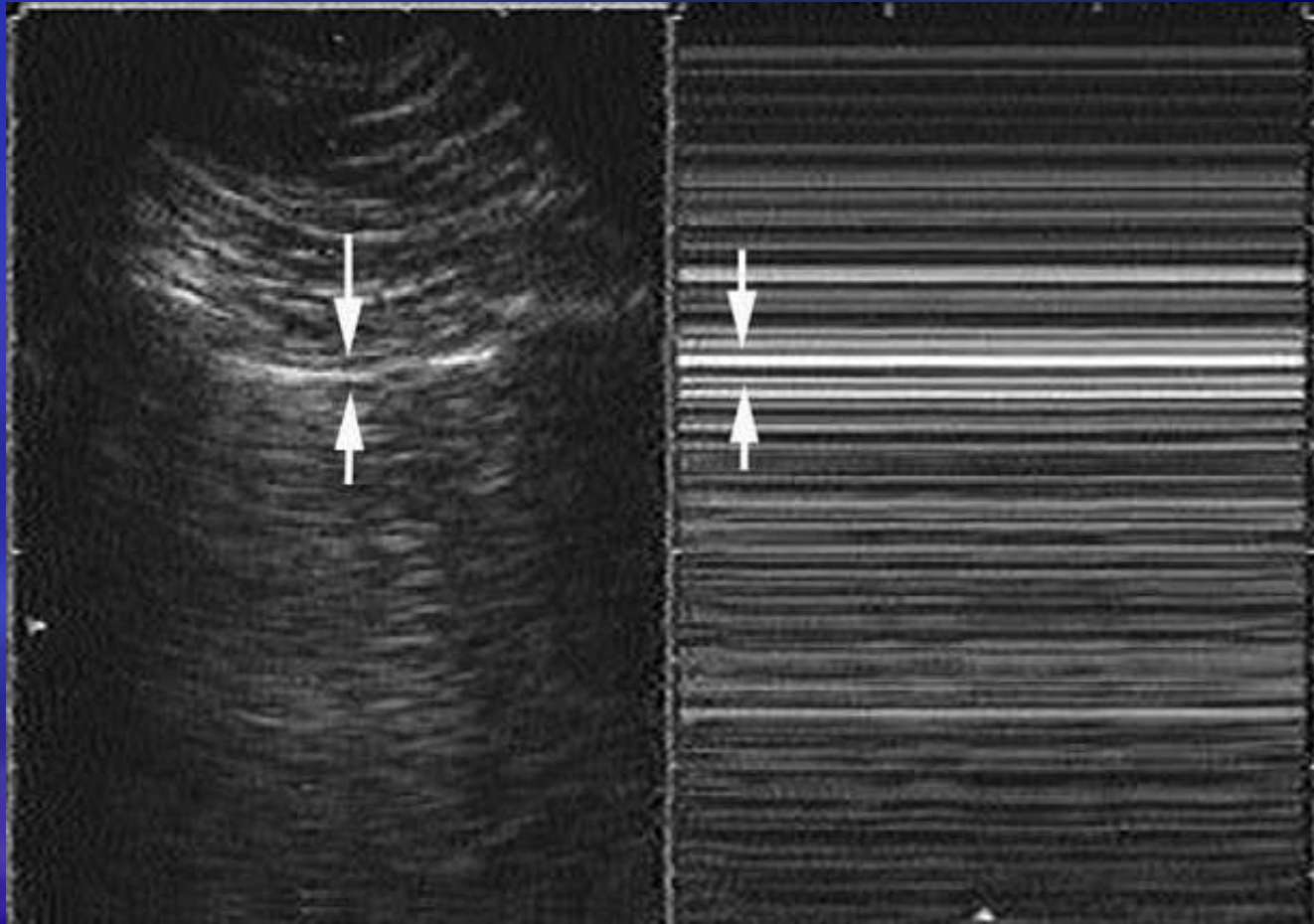


MAYO CLINIC

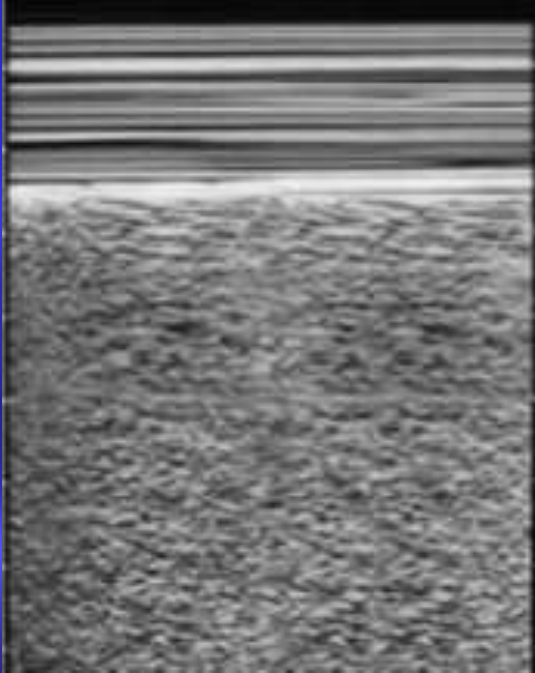
The pleural line normally separates two distinct patterns (in M-mode).



Real-time US vs. M-Mode



Normal Lung and Seashore Sign



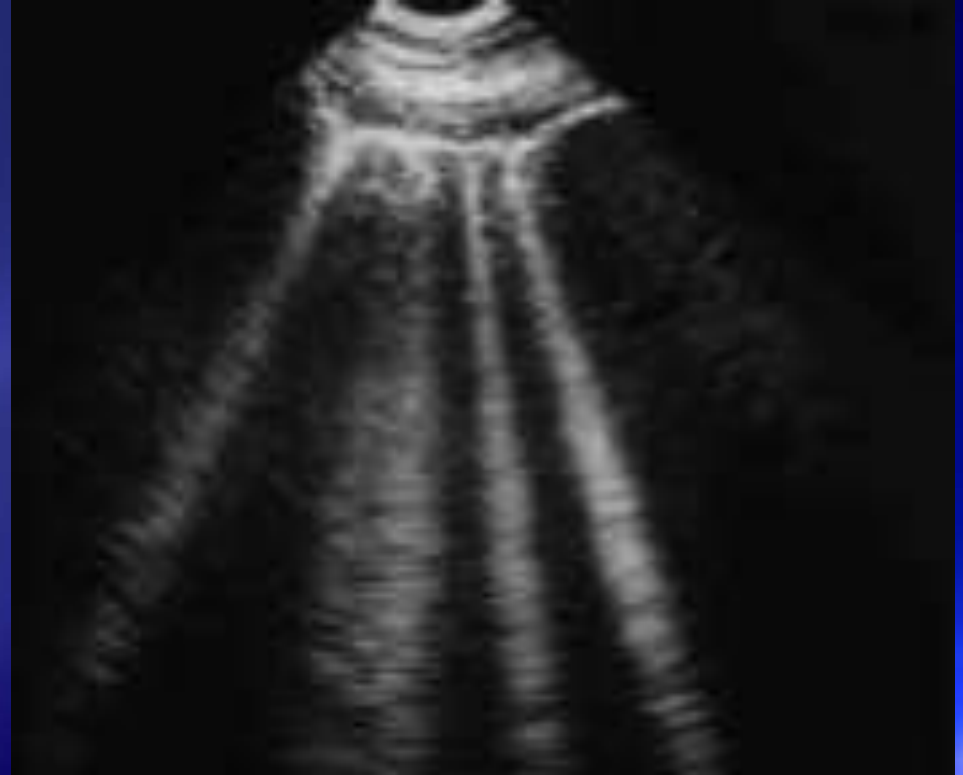
**M-
Mode**



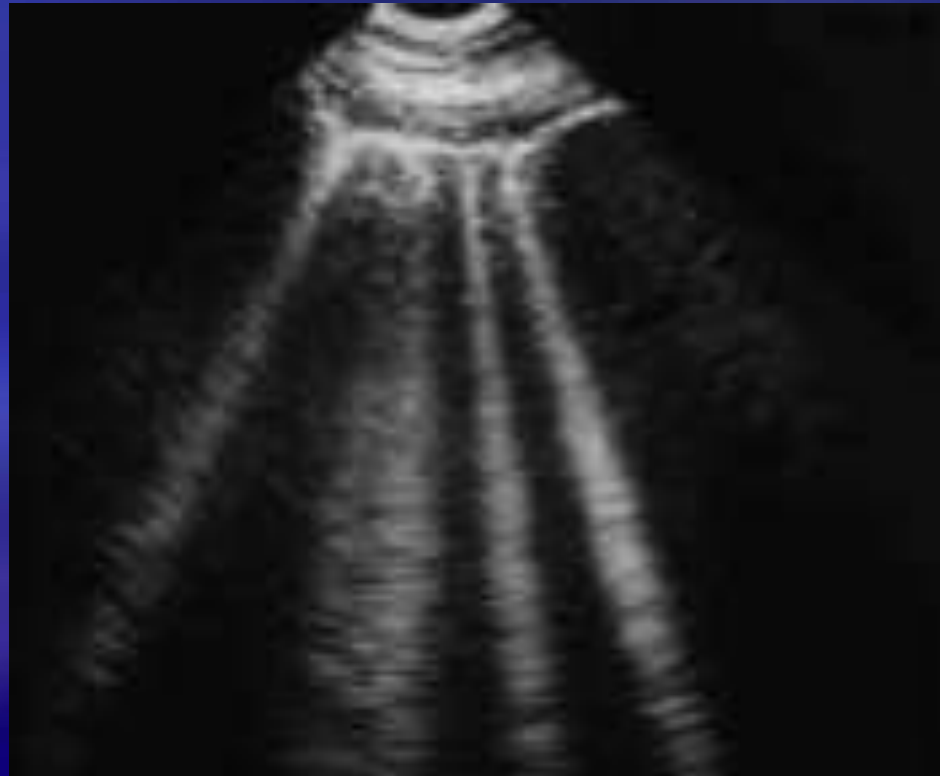
Marea Neagră

The B-line

- 1- a comet-tail artifact
- 2 - arising from the pleural line
- 3 - well-defined - laser-ray like
- 4 - hyperechoic
- 5 - long (does not fade)
- 6 - erases A lines
- 7 - moves with lung slid



Lung Rockets : three or more B-lines between 2 ribs and can indicate interstitial syndrome

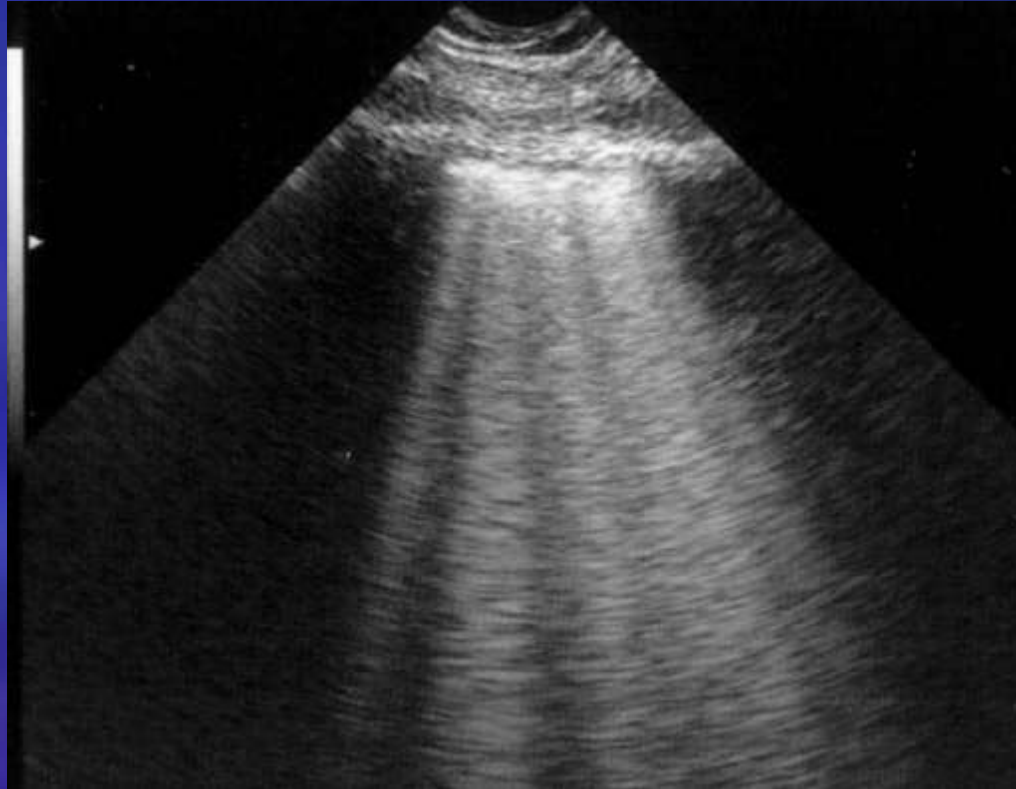


Scoring of B-lines

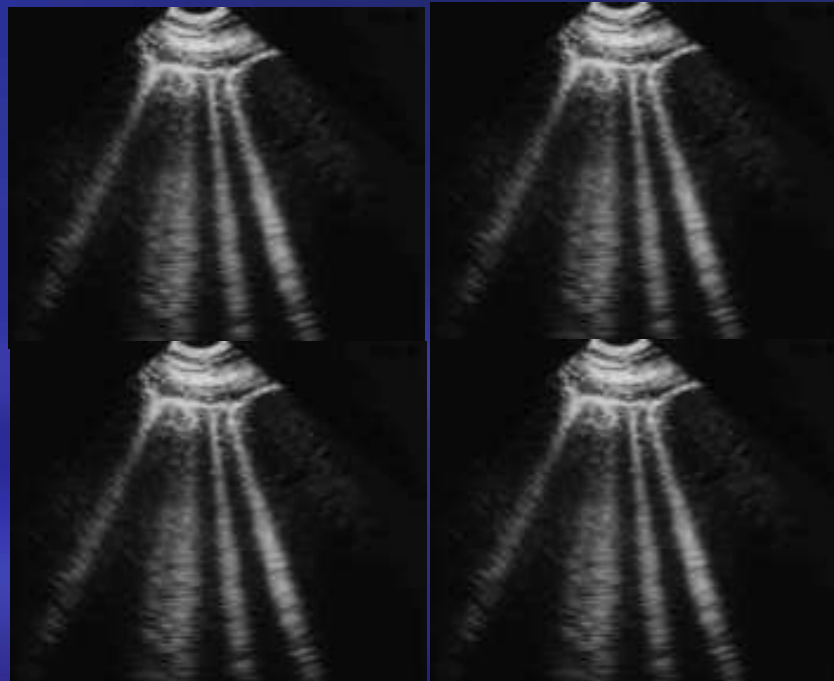
Score	Number of B-lines	Extravascular lung water
0	≤ 5	No sign
1	6-15	Mild degree
2	16-30	Moderate degree
3	> 30	Severe degree

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Interstitial Syndrome and Lung Rockets



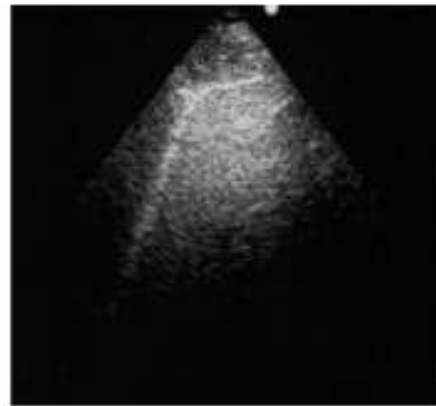
. Inflammatory or hemodynamic pulmonary edema



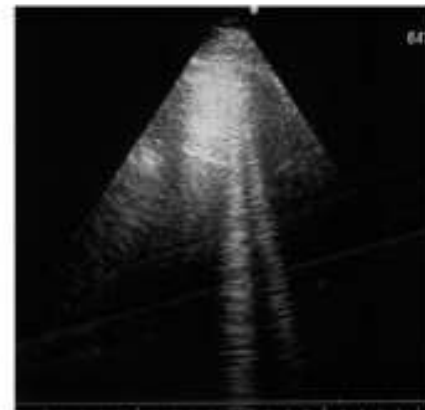
Four or more points on the anterior chest wall



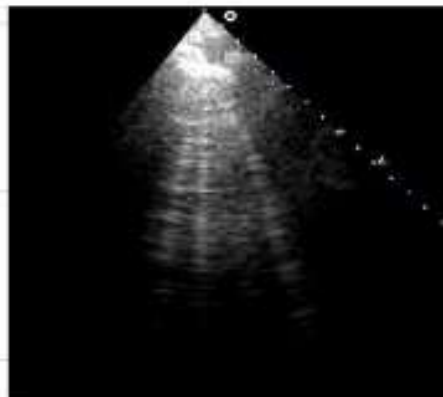
No B-lines



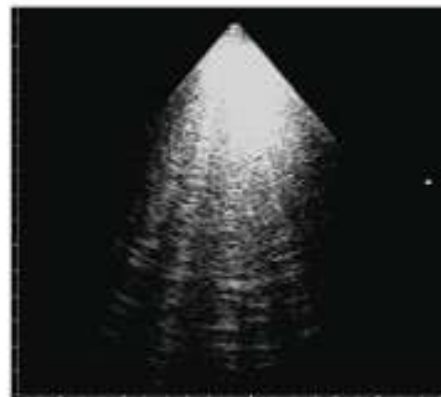
One B-line



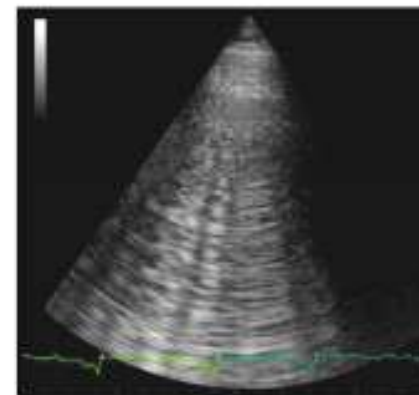
Two B-lines



Three B-lines



Five B-lines



Full white screen = 10 B-lines

Pleural Effusion and atelectasis



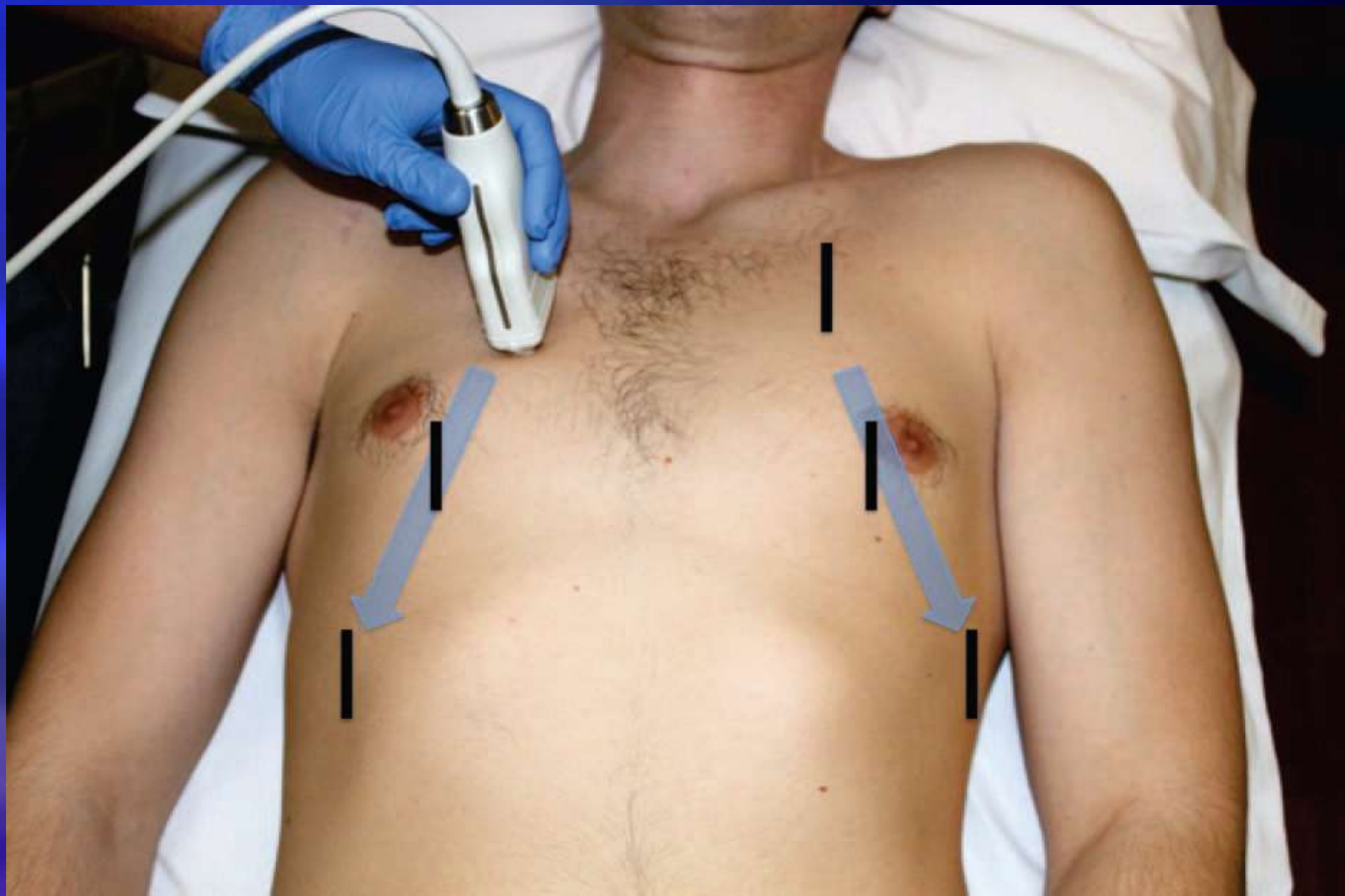
Consolidation of the Middle Lobe



Daniel A. Lichtenstein
J Med Ultrasound 2009

Pneumothorax



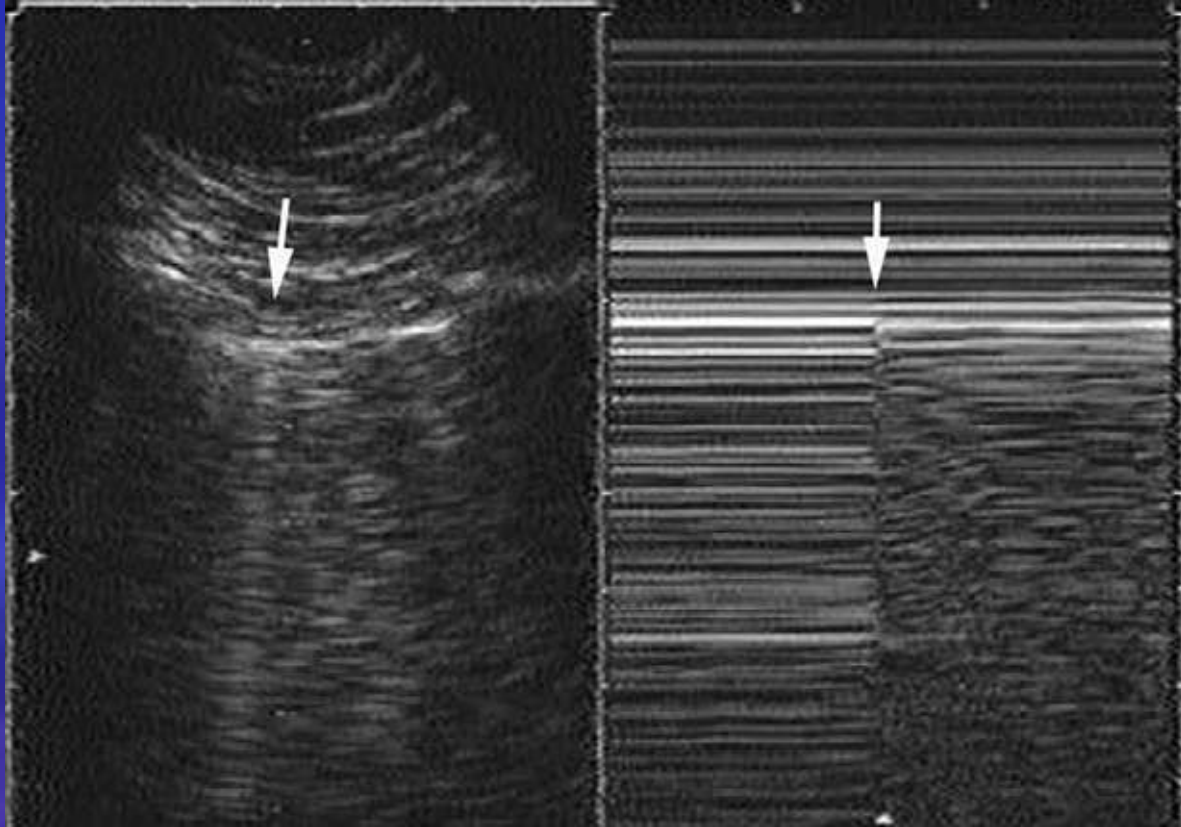


Ultrasound Exam Rules Out Pneumothorax

B-Line

**Lung
Sliding**

Pneumothorax



Lung Sliding



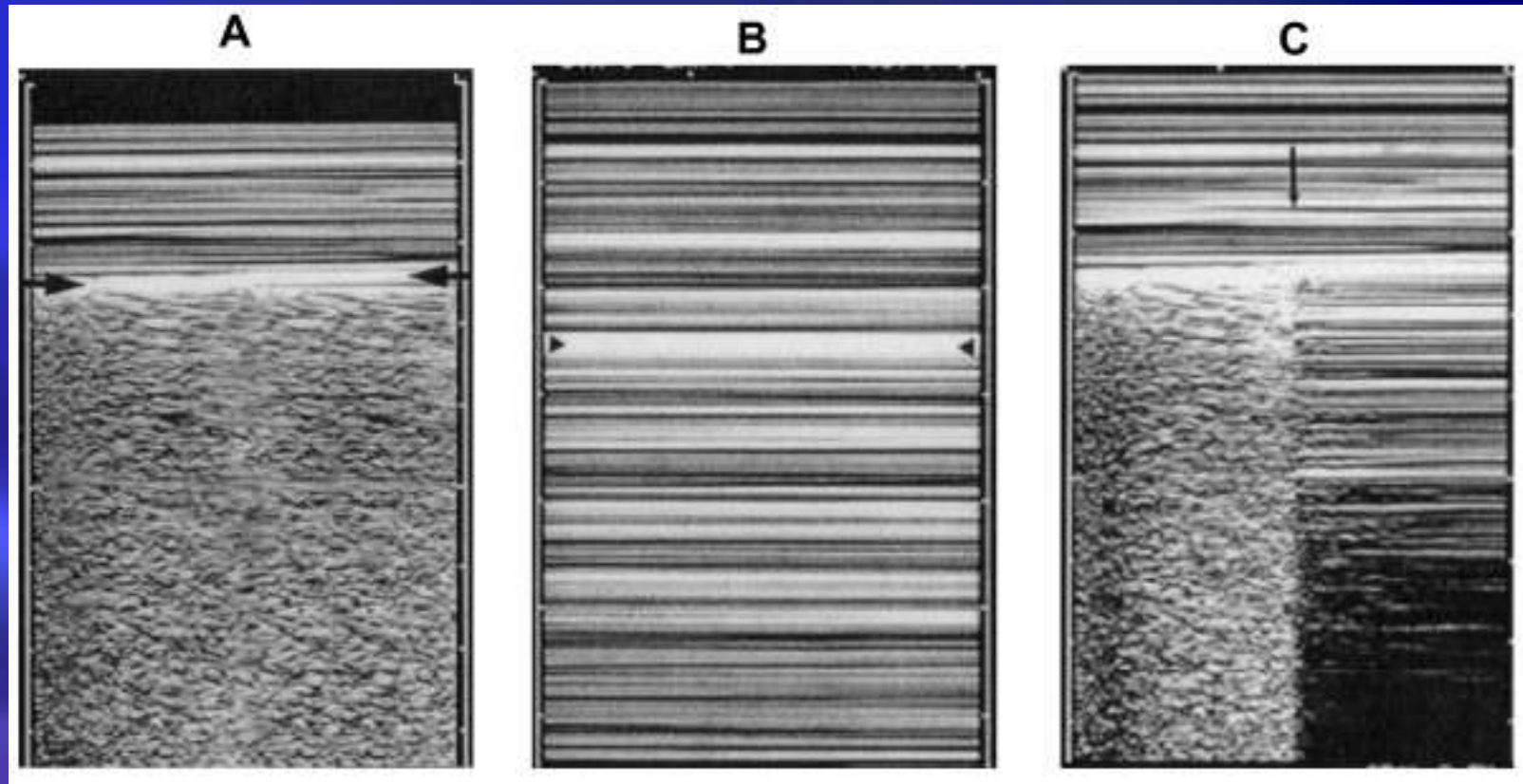
No Lung Sliding



Lung Sliding



M-Mode Ultrasound





Practice

Thank You



Rated for Category V Hurricane

