POCUS conference

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Case: Acute shortness of breath

59W with pulmonary sarcoidosis and severe pHTN on 4-5L home O2 who developed sudden shortness of breath while going to the bathroom.

EMS found patient tachycardic and hypoxic with O2 sats in 70s.

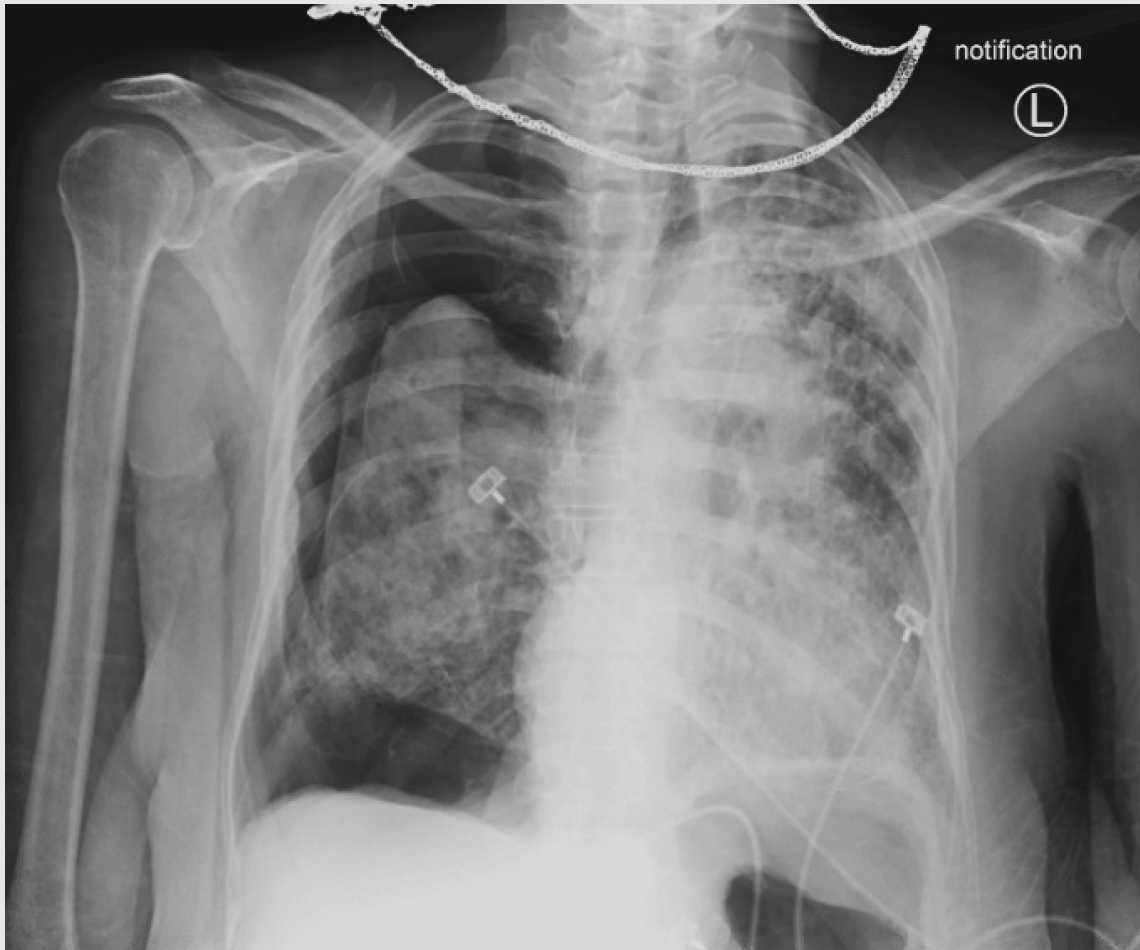# Case: Acute shortness of breath

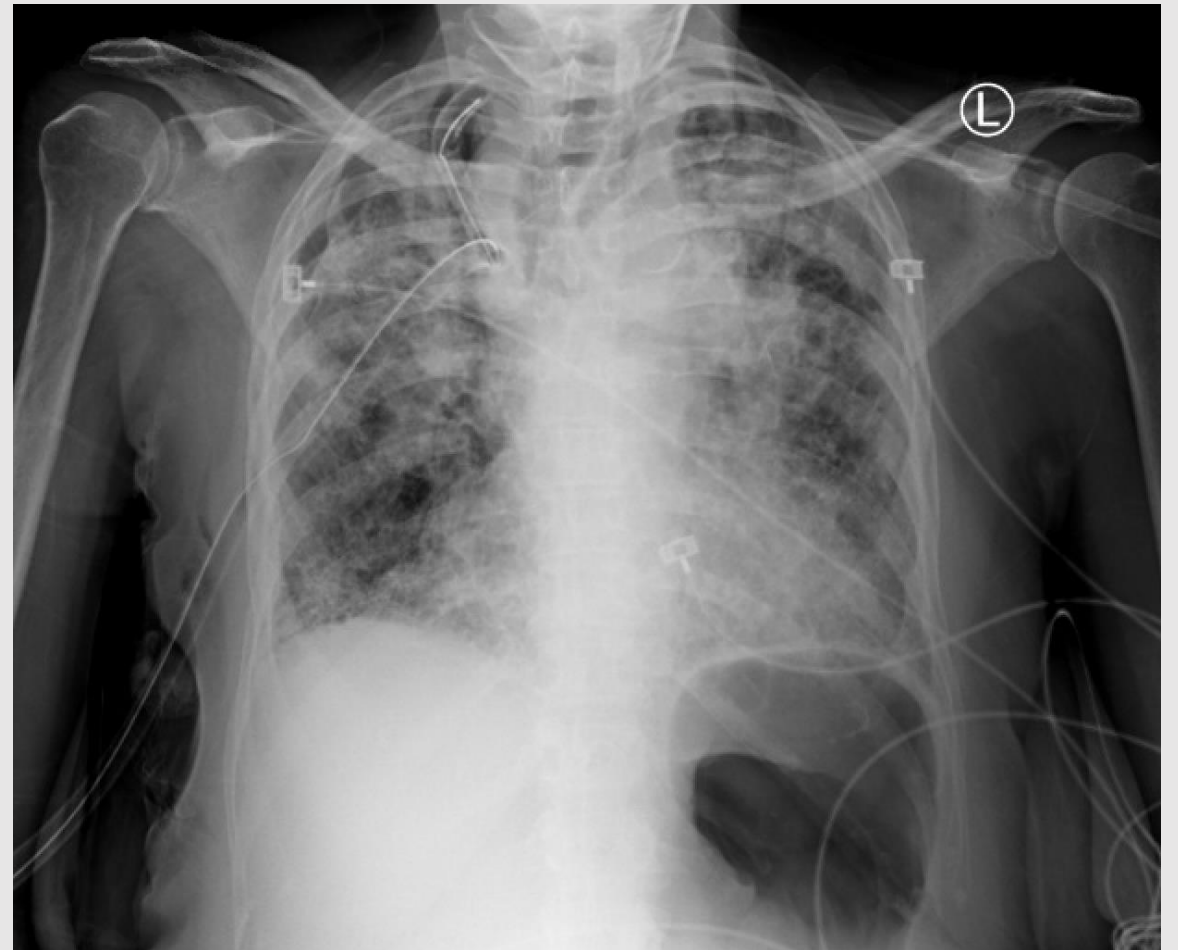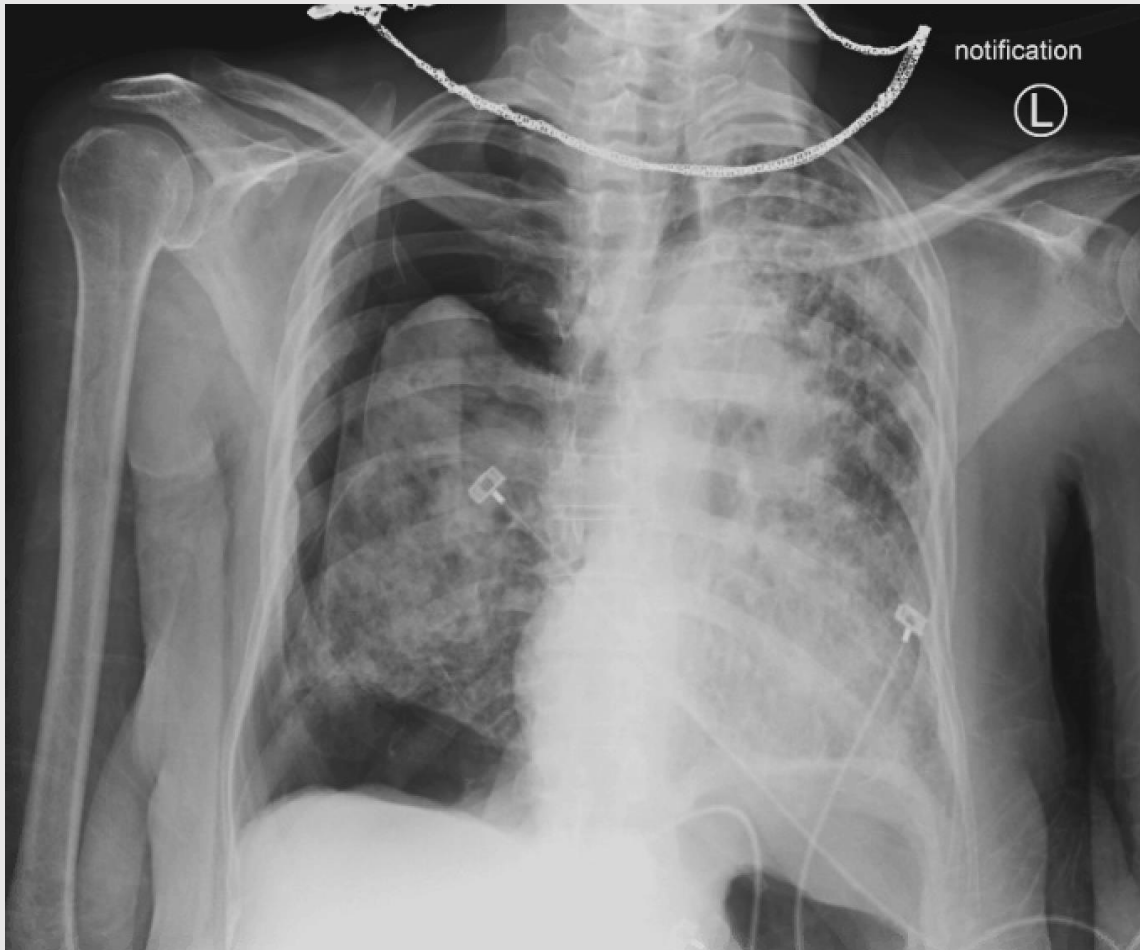On arrival to ED:

HR 125

BP 159/73

RR 32

O2 sat 70s → 90s on NRB

Case: Acute shortness of breath

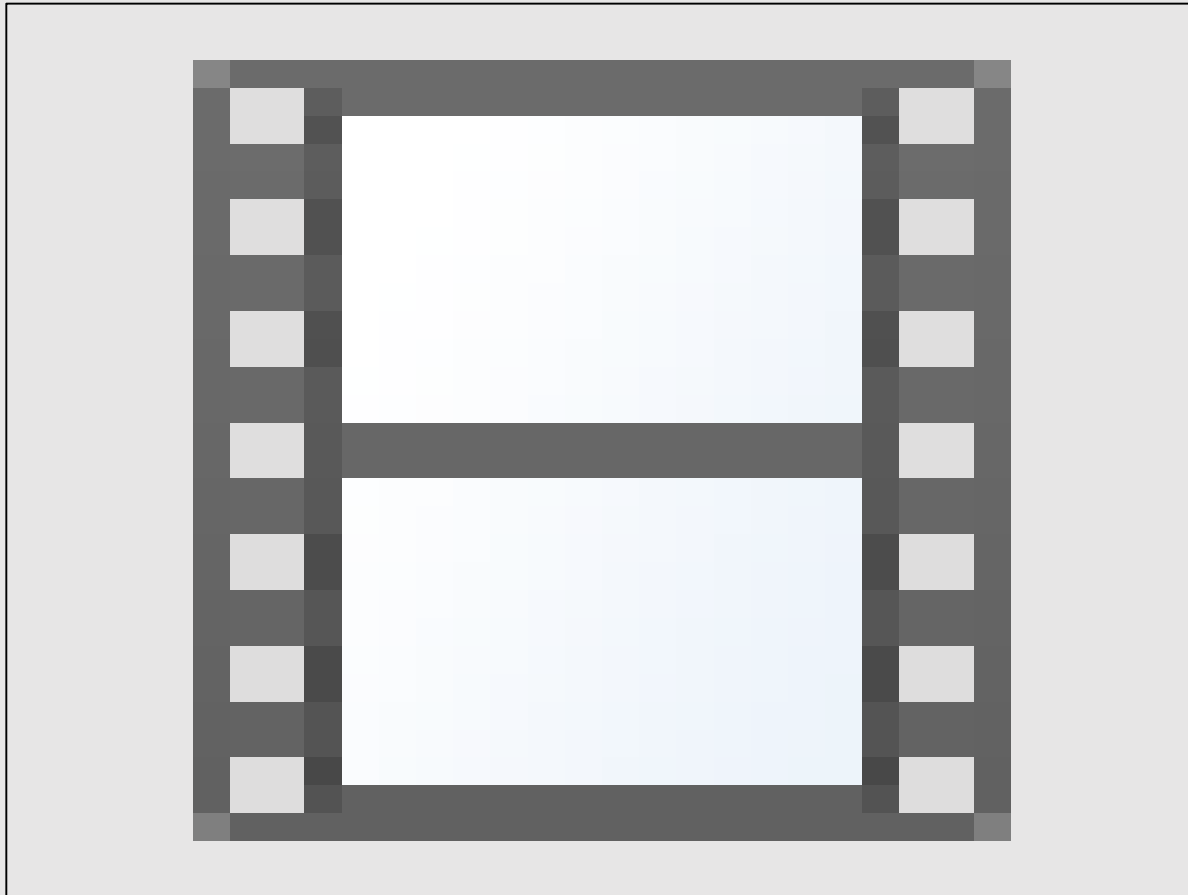# Case: Acute shortness of breath

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On CCU day 2:

acute SOB again

O2 sats 80s on home 4-5L O2

Case: Acute shortness of breath

R lung, mid-clavicular line, 3rd ICS

L lung, mid-clavicular line, 3rd ICS
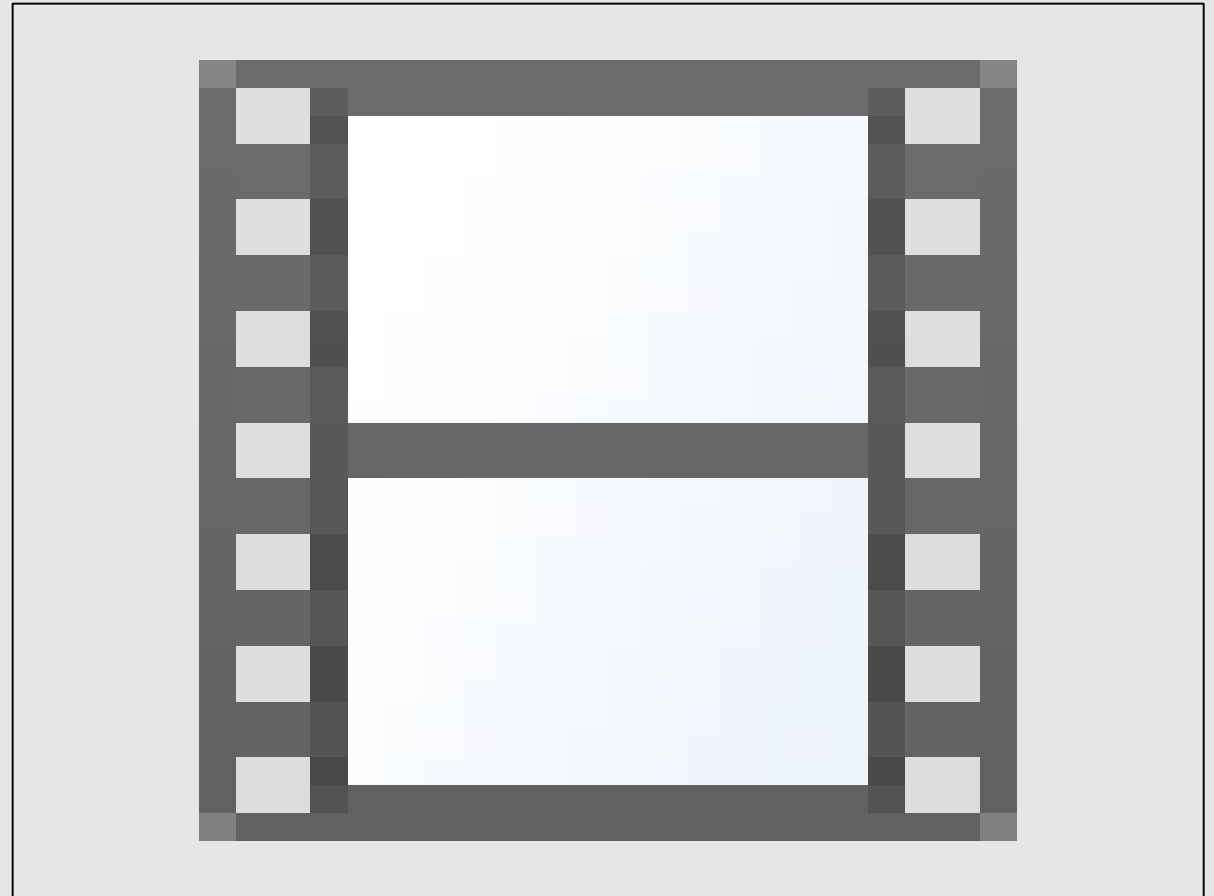
Case: Acute shortness of breath

R lung, mid-clavicular line, 3rd ICS
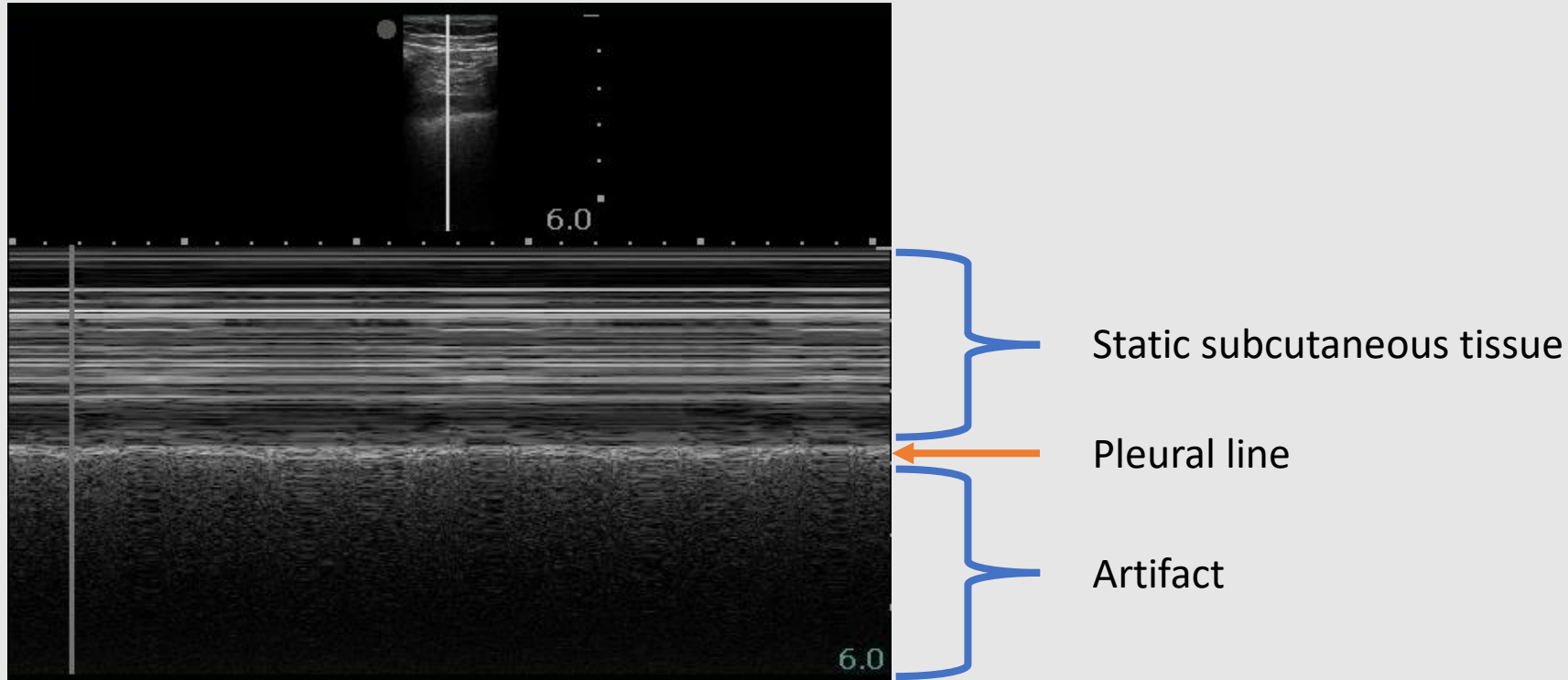
R lung, mid-clavicular line, 3rd ICS

M-mode: display of motion

(lung US relies on artifact)

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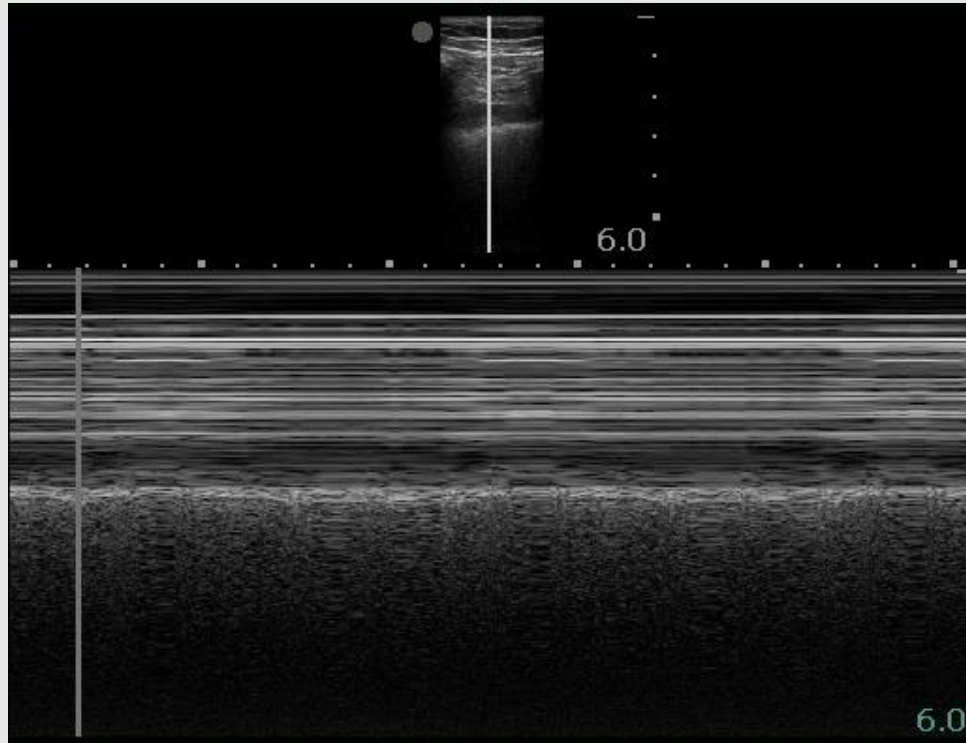
Seashore sign: normal pattern
2/2 artifact from sliding pleura

M-mode: display of motion

(lung US relies on artifact)
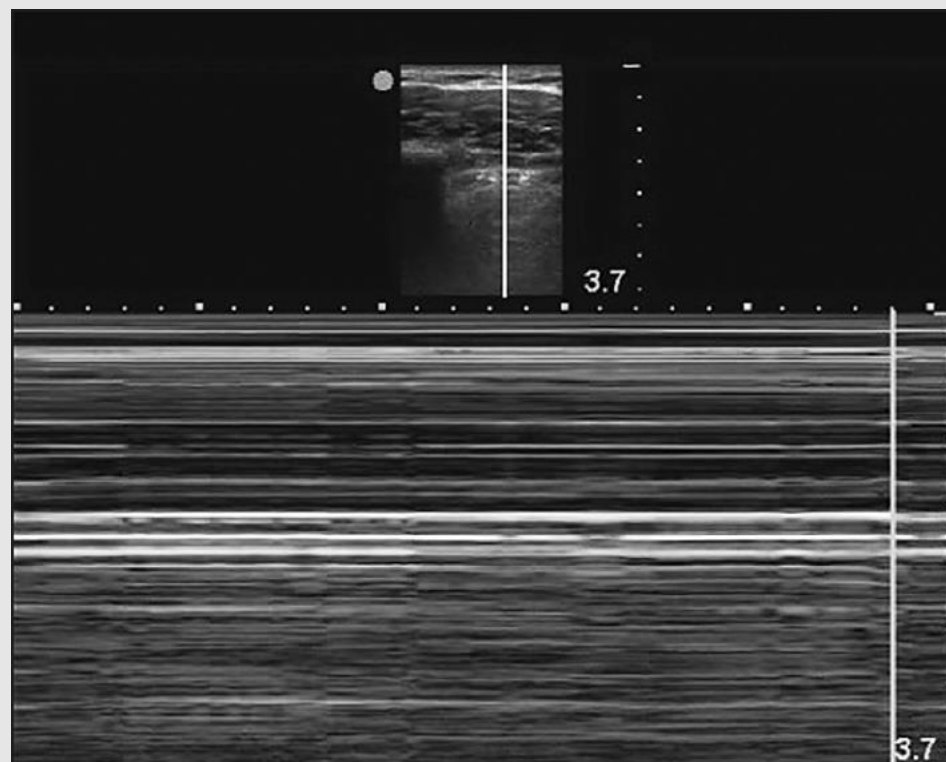
Barcode sign:
no pleural sliding
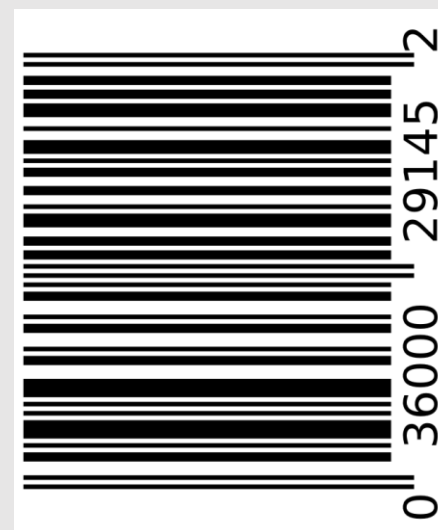
M-mode: display of motion

NORMAL
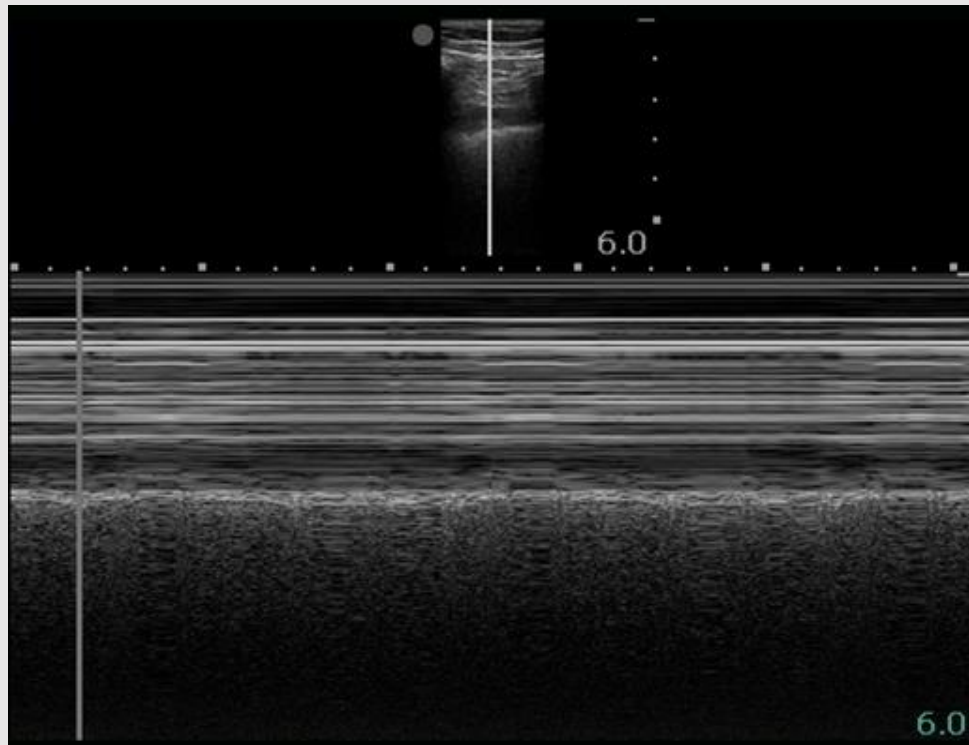
ABNORMAL
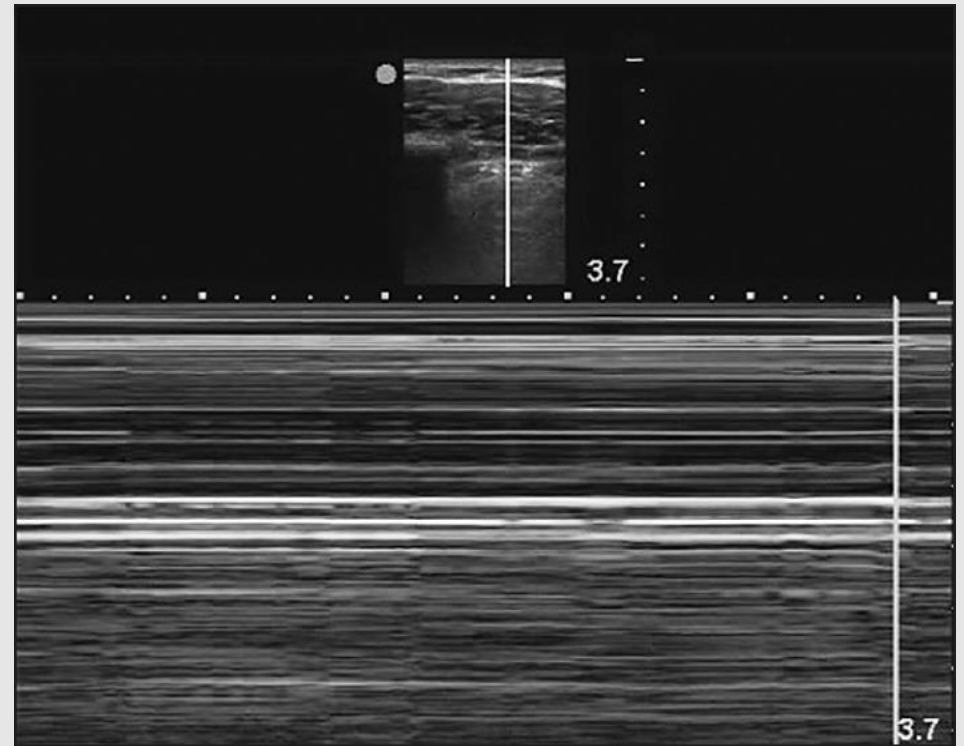
M-mode: display of motion

LUNG POINT

NORMAL
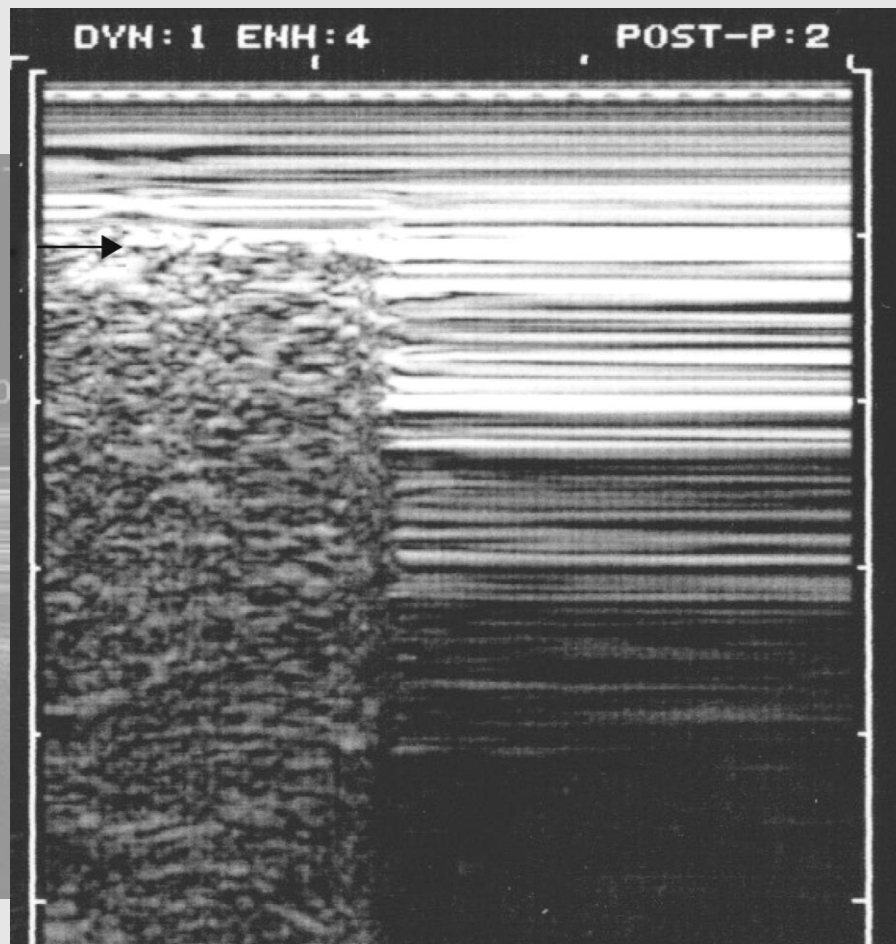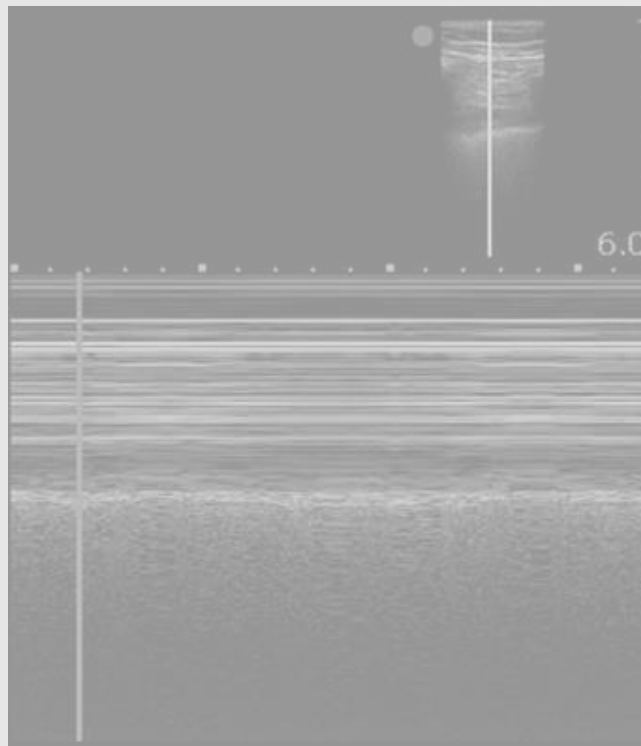
ABNORMAL
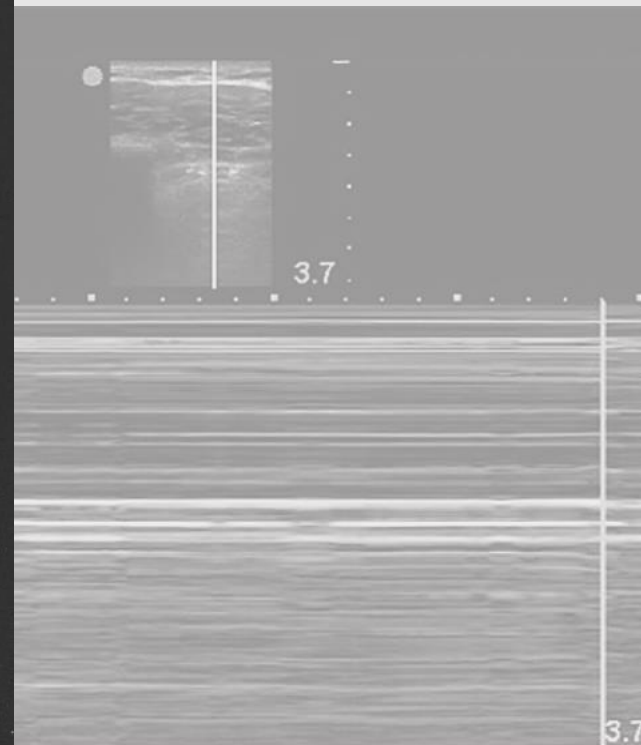
M-mode: display of motion

(cardiac US relies less on artifact, more on anatomy)

Case: Acute shortness of breath

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Chest tube not set to suction appropriately...

Once we increase the suction, patient experiences sudden pleuritic pain and the US shows this...

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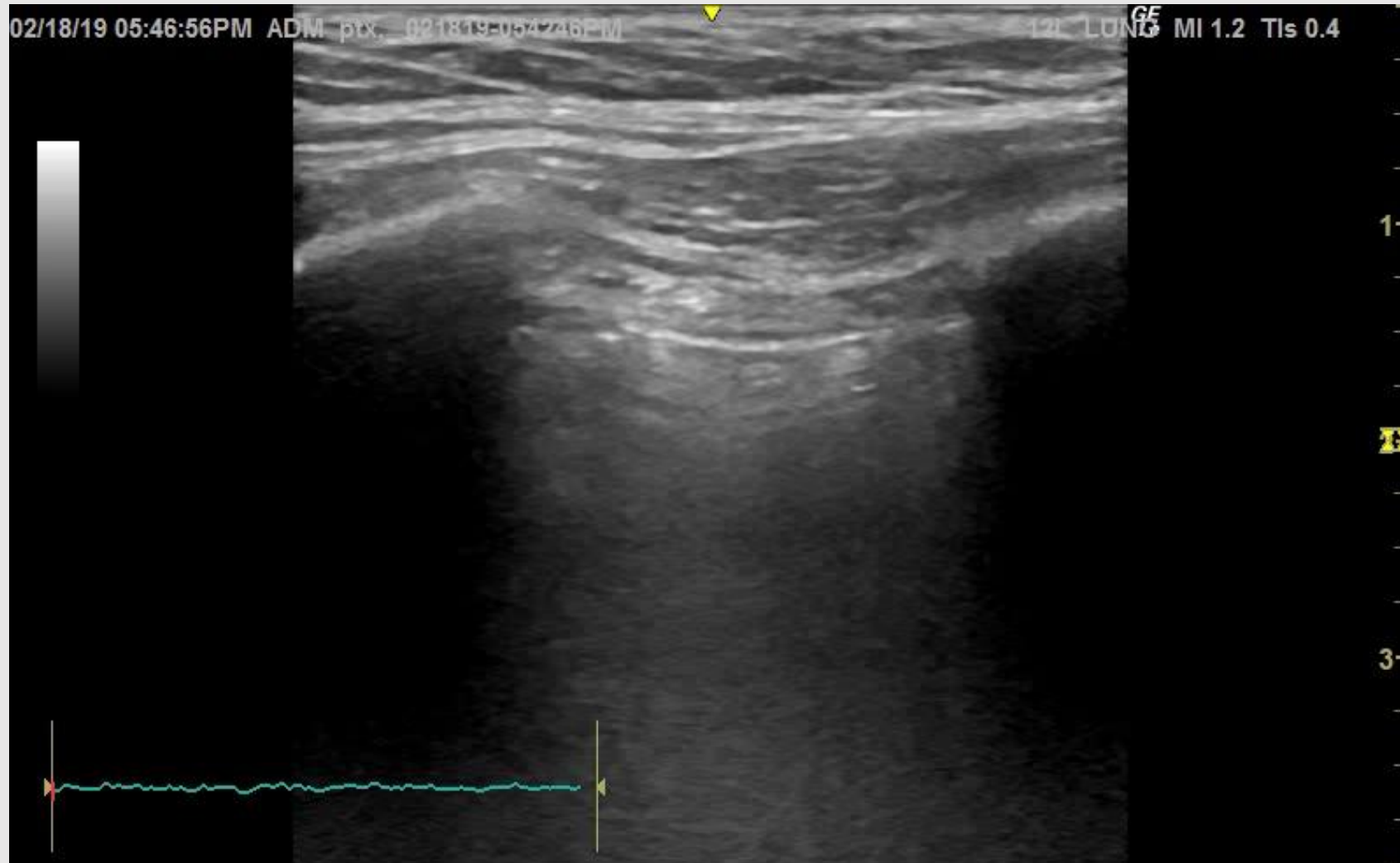
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Test Characteristics of Ultrasonography for the Detection of Pneumothorax

A Systematic Review and Meta-analysis

- 8 studies including 1048 patients (only adults)
- Setting: trauma patients & iatrogenic (eg, thoracentesis)
- Compared US vs supine CXR
- Gold standard: CT chest or air released during chest tube placement
- US findings: lung sliding, M-mode, power slide, comet tail

Table 1—Summary of Methodology Used in the Included Studies

Study	Operator	Setting	Probe	Signs Used	No.
Blaivas et al[14]	EP	Trauma	Microconvex	LS, PS	176
Chung et al[15]	Radiologist	Iatrogenic	Linear	LS, CmT	97
Garofalo et al[13]	Unknown	Iatrogenic	Curved	LS, CmT	184
Kirkpatrick et al[11]	Surgeon	Trauma	Linear	LS, CmT, PS	133
Rowan et al[16]	Radiologist	Trauma	Linear	LS, CmT	27
Soldati et al[17]	EP	Trauma	Curved	LS, CmT	186
Soldati et al[18]	EP	Trauma	Curved	LS, CmT, M	109
Zhang et al[19]	EP	Trauma	Curved + linear	LS, CmT	135

CmT = comet tail; EP = emergency physician; LS = lung sliding; M = M-mode; PS = power slide.

Pooled Statistics	US	CXR
Sensitivity	91%	50% *
Specificity	98%	99.4%
Positive LR	50.5	83
Negative LR	0.09	0.50

A **Sensitivity**

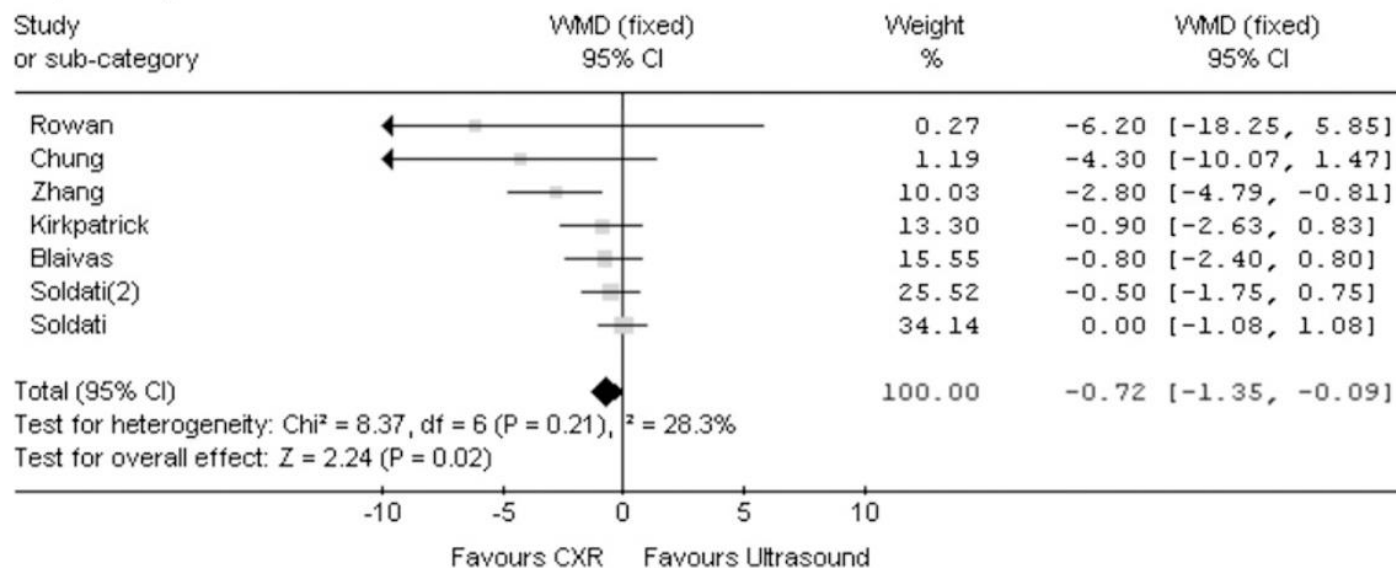| Study or sub-category	WMD (random) 95% CI	Weight %	WMD (random) 95% CI
Blaivas		15.76	22.60 [15.26, 29.94]
Kirkpatrick		14.30	27.90 [16.63, 39.17]
Soldati(2)		14.41	40.00 [29.00, 51.00]
Chung		14.57	41.00 [30.40, 51.60]
Soldati		15.57	44.60 [36.67, 52.53]
Zhang		14.74	58.60 [48.42, 68.78]
Rowan		10.64	63.60 [43.64, 83.56]
Total (95% CI)		100.00	41.64 [31.02, 52.26]

Test for heterogeneity: Chi² = 45.06, df = 6 (P < 0.00001), I² = 86.7%
Test for overall effect: Z = 7.69 (P < 0.00001)

-100   -50   0   50   100

Favours CXR   Favours Ultrasound

B **Specificity**

Study or sub-category	WMD (fixed) 95% CI	Weight %	WMD (fixed) 95% CI
Rowan		0.27	-6.20 [-18.25, 5.85]
Chung		1.19	-4.30 [-10.07, 1.47]
Zhang		10.03	-2.80 [-4.79, -0.81]
Kirkpatrick		13.30	-0.90 [-2.63, 0.83]
Blaivas		15.55	-0.80 [-2.40, 0.80]
Soldati(2)		25.52	-0.50 [-1.75, 0.75]
Soldati		34.14	0.00 [-1.08, 1.08]
Total (95% CI)		100.00	-0.72 [-1.35, -0.09]

Test for heterogeneity: Chi² = 8.37, df = 6 (P = 0.21), I² = 28.3%
Test for overall effect: Z = 2.24 (P = 0.02)

-10   -5   0   5   10

Favours CXR   Favours Ultrasound

WMD = weighted mean difference; CI = confidence interval