Extra-Cardiac Echo
(tying things together)

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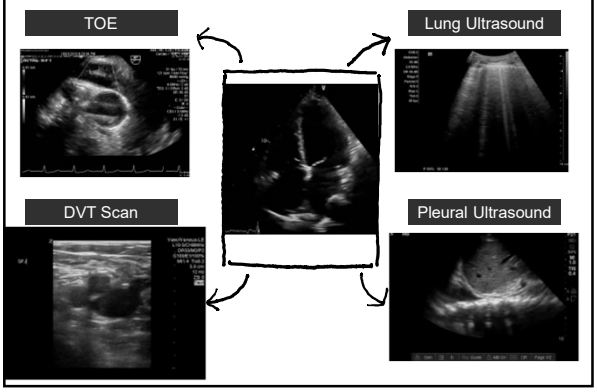
Disclosures

- None related to this presentation.

Agenda



Patient 1

History
60 / M
Ischaemic CMP, EF 35%
SOB x 3/7

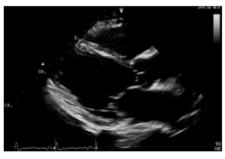
O/E
T 37.1, BP 160/90, HR 113
RR 32, SpO_2 88% (FiO_2 40%)
H - S_1S_2, L - basal creps

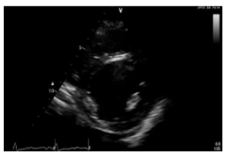
Inx
TW 12K, Hb 10, Plt 150
Urea 11, Cr 130, Na 128, K 4.5, hsTrop 100

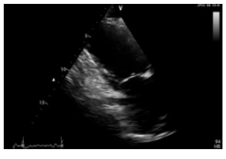
Immediate Management

Rx
1. IV Frusemide
2. IV GTN infusion
3. Oral Hydralazine

Echocardiography

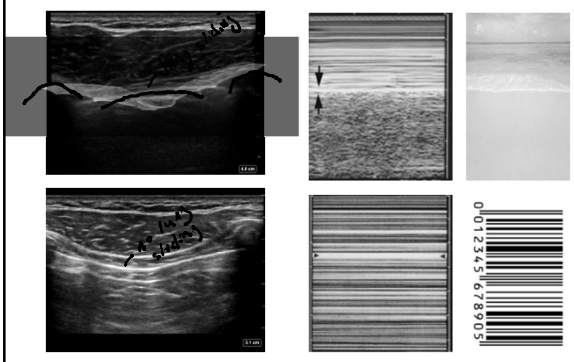




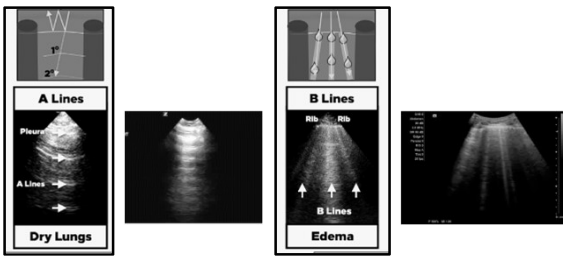


Lung Ultrasound in Acute Breathlessness

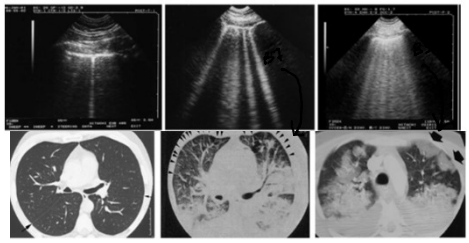
Lung Sliding



A lines vs B lines



B7 lines vs B3 lines



- Interlobular septal thickening/oedema
  - > 3 lung rockets spaced around 7mm apart (B7 lines)
- Alveolar filling/oedema
  - > 3 lung rockets spaced around 3mm apart (B3 lines)

Differentiating APO from ARDS

Cardiovascular Ultrasound

BioMed Central

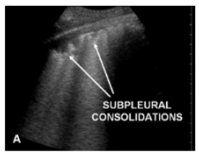
Research Open Access

Chest sonography: a useful tool to differentiate acute cardiogenic pulmonary edema from acute respiratory distress syndrome

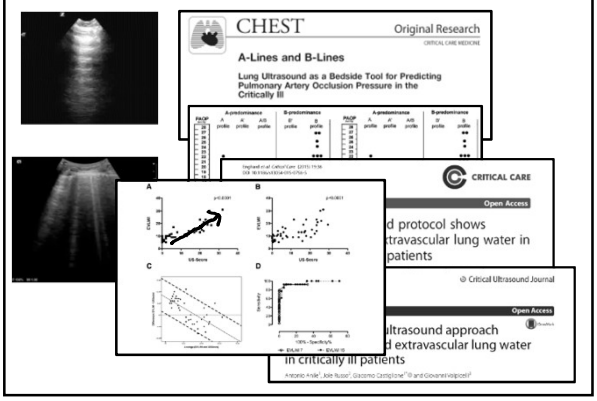
Roberto Copetti*[1], Gino Soldati[2] and Paolo Copetti[1]

↓APO

↘ ARDS



A/B lines correlate with Lung Water



CHEST Original Research

CRITICAL CARE MEDICINE

A-Lines and B-Lines

Lung Ultrasound as a Bedside Tool for Predicting Pulmonary Artery Occlusion Pressure in the Critically Ill

CRITICAL CARE

Open Access

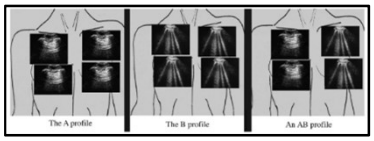
d protocol shows
travascular lung water in
patients

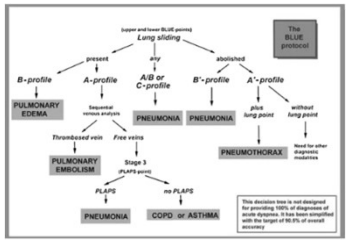
Critical Ultrasound Journal

Open Access

ltrasound approach
d extravascular lung water
in critically ill patients

The BLUE Protocol



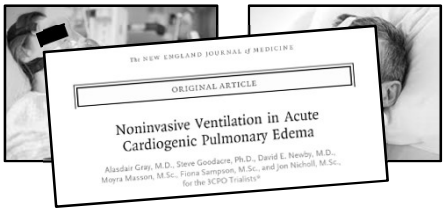


90.5% Accuracy

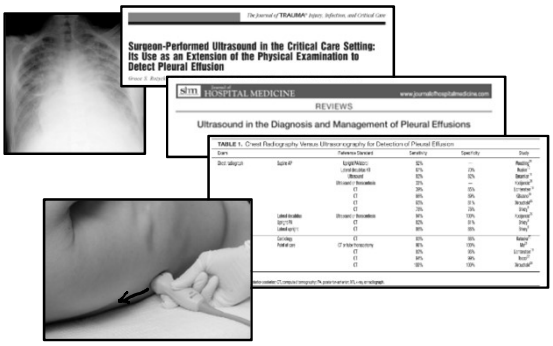
Immediate Management (2)

1. IV Frusemide
2. IV GTN infusion
3. Oral Hydralazine

4. NIV

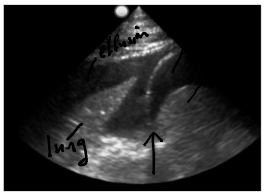


Pleural Ultrasound



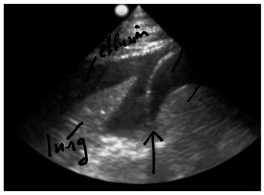
Pleural Effusion



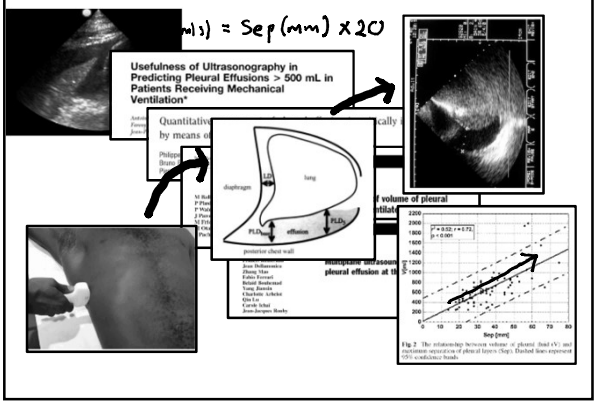


Pleural Effusion

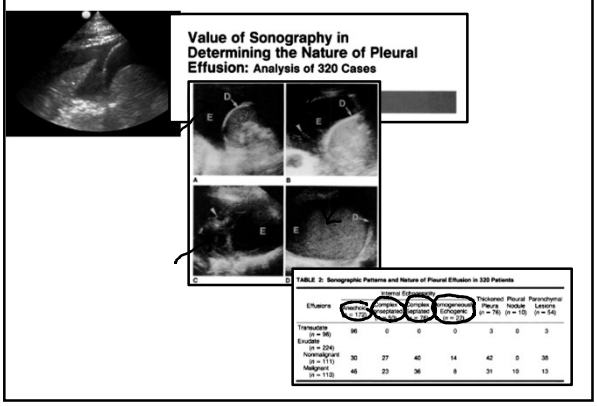




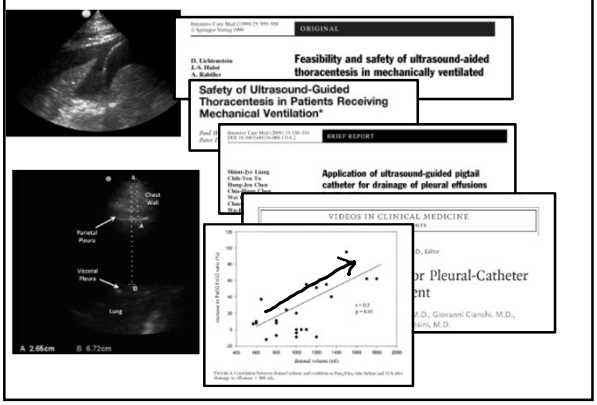
Quantifying Pleural Effusion



Nature of Pleural Effusion



Pleural Drainage



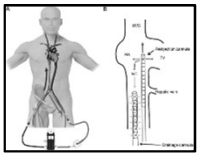
Patient 1 - Summary

- Patient had acute decompensated heart failure
- Despite IV diuresis, GTN and oral vasodilators, patient remained dyspnoeic
- Lung ultrasound revealed significant pulmonary congestion (bilateral B profile) with estimated ELWI > 10 mls/kg and pleural ultrasound revealed a moderate pleural effusion causing adjacent compressive atelectasis
- Patient symptomatically better after institution of both non-invasive positive pressure ventilation and pleural drainage (under ultrasound guidance)

Patient 2

History

33 / M
Severe ARDS after smoking “ice”
D11 VV ECMO



O/E

T 37.9, BP 86/60, HR 130 *(NorA, Vaso)*
RR 28, SpO_2 88% *(FiO_2 80%, PEEP 10)*
H - S_1S_2, L – bronchial breathing

Inx

TW 18K Hb 11, Plt 180
Urea 13, Cr 120, Na 135, K 4.0

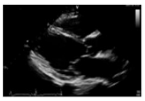
Hemodynamic Compromise in ICU

EF 20% with severe CAP

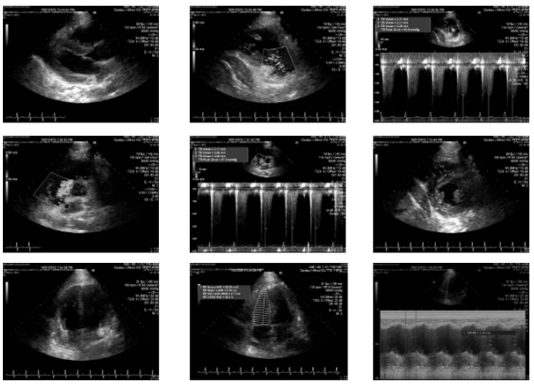
Undifferentiated Shock

Sepsis with septic CMP

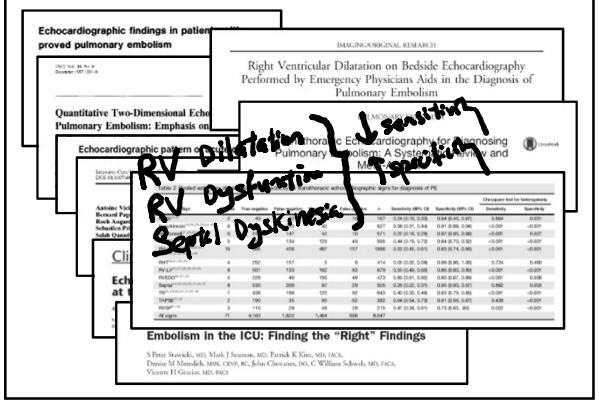
Hypovolaemic | Cardiogenic | Obstructive | Distributive



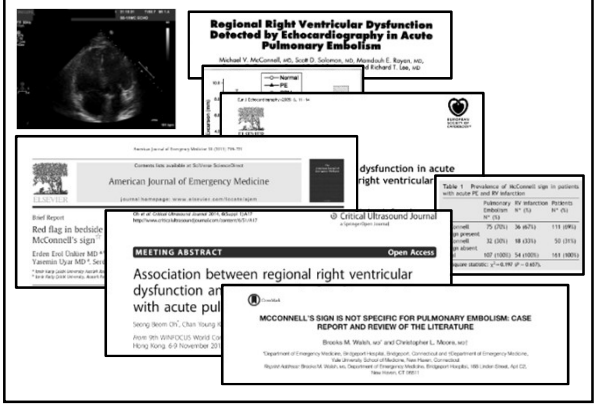
TTE



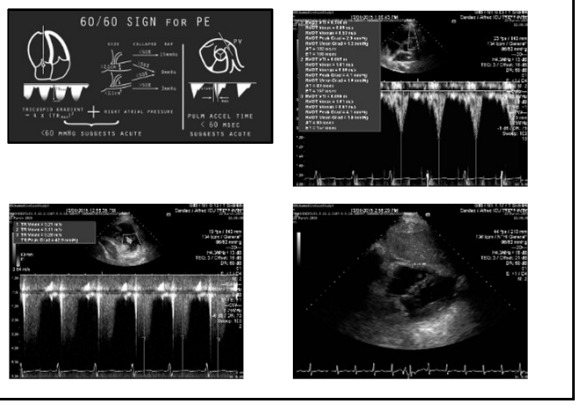
Echo Findings in PE



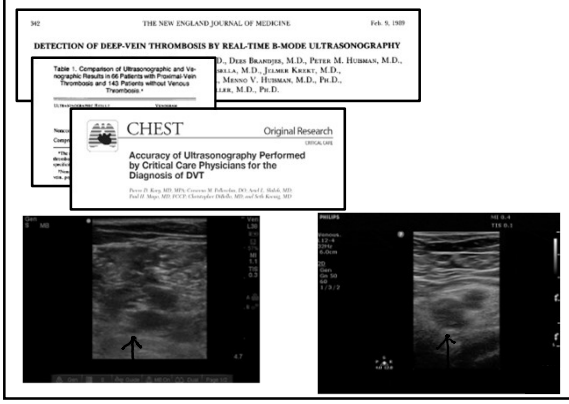
Echo Findings in PE – "McConnell Sign"



Echo Findings in PE – "60/60 Sign"



Venous Ultrasound for DVT


342 THE NEW ENGLAND JOURNAL OF MEDICINE Feb. 9, 1989

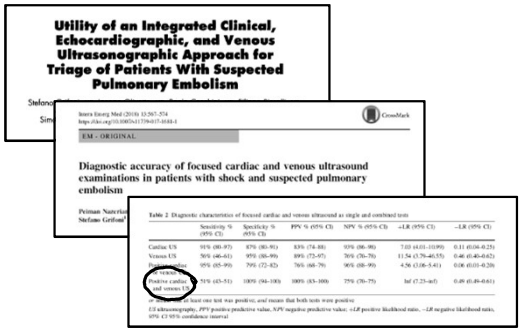
DETECTION OF DEEP-VEIN THROMBOSIS BY REAL-TIME B-MODE ULTRASONOGRAPHY

Table 1. Comparison of Ultrasonographic and Venographic Results in 66 Patients with Proximal-Vein Thrombosis and 143 Patients without Venous Thrombosis.*

CHEST Original Research

Accuracy of Ultrasonography Performed by Critical Care Physicians for the Diagnosis of DVT

Venous Ultrasound for DVT


Utility of an Integrated Clinical, Echocardiographic, and Venous Ultrasonographic Approach for Triage of Patients With Suspected Pulmonary Embolism

EM - ORIGINAL

Diagnostic accuracy of focused cardiac and venous ultrasound examinations in patients with shock and suspected pulmonary embolism

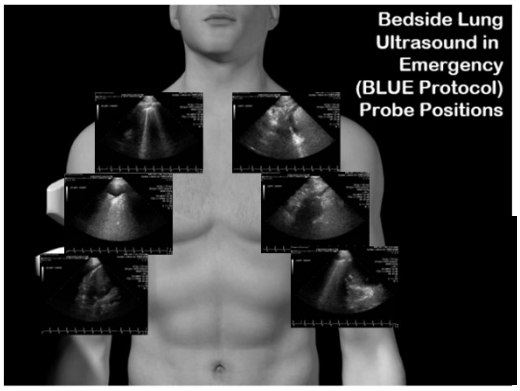
Table 2 Diagnostic characteristics of focused cardiac and venous ultrasound as single and combined tests

	Sensitivity % (95% CI)	Specificity % (95% CI)	PPV % (95% CI)	NPV % (95% CI)	+LR (95% CI)	−LR (95% CI)
Cardiac US	91% (80–97)	87% (80–91)	83% (74–88)	93% (86–98)	7.03 (4.01–10.99)	0.11 (0.04–0.25)
Venous US	56% (46–61)	95% (86–99)	89% (72–97)	76% (70–76)	11.54 (3.79–46.55)	0.46 (0.40–0.62)
[illegible]	95% (85–99)	79% (72–82)	76% (68–79)	96% (88–99)	4.56 (3.06–5.41)	0.06 (0.01–0.20)
Positive cardiac and venous US	51% (43–51)	100% (94–100)	100% (83–100)	75% (70–75)	Inf (7.23–inf)	0.49 (0.49–0.61)

[illegible] at least one test was positive), and means that both tests were positive

US ultrasonography, *PPV* positive predictive value, *NPV* negative predictive value; *+LR* positive likelihood ratio, *−LR* negative likelihood ratio, *95% CI* 95% confidence interval

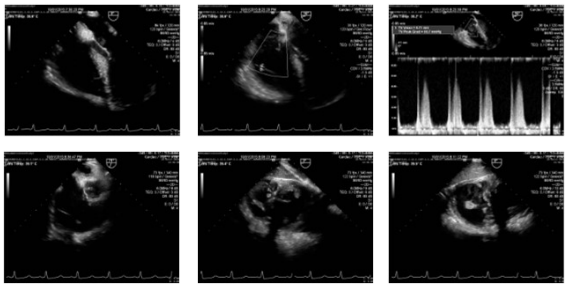
Lung Ultrasound



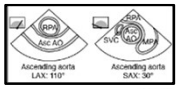
TOE

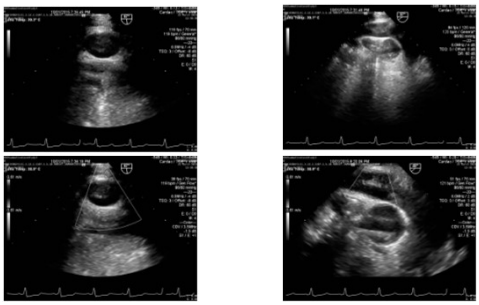
Diagnostic value of transoesophageal echocardiography in suspected haemodynamically significant pulmonary embolism
P Pruszczyk, A Torbicki, A Kuch-Wocial, M Szulc and R Pacho
Heart. 85.6 (June 2001): p628.

sensitivity 80.5%
specificity 97.2%

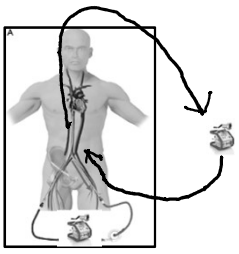


TOE





Immediate Management

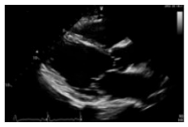


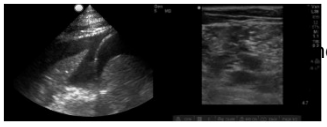
+ rTPA

Patient 2 - Summary

- Patient has severe ARDS on VV ECMO
- Developed worsening hypotension requiring increasing dose of vasopressors
- TTE showed RV dilatation with RV dysfunction compared with TTE done 1 week ago
- Venous ultrasound of lower limbs revealed extensive bilateral DVT
- TOE performed demonstrated embolus in right pulmonary artery
- VA ECMO was initiated followed by thrombolytic therapy
- Hemodynamics improved and VA ECMO weaned off the following day

Summary

After  done,  ,

 nd/or 

may provide incremental information for the diagnosis of breathlessness and shock, contributing to the management of our critically ill patients.

The End