



ΠΑΡΑΚΛΙΝΙΟΣ
ΥΠΕΡΗΧΟΣ

ΚΑΡΠΑ

Ηλέκτρα Παπαδοπούλου- Μάρκος Κούκος

POCUS



POINT-OF-CARE ULTRASOUND



ITS USE DURING CPR->INCREASING



NEED FOR SKILLED POCUS
OPERATORS



ILCOR REVIEW->NOT AS SOLE
CRITERION TO TERMINATE CPR

ΑΝΑΣΤΡΕΨΙΜΑ ΑΙΤΙΑ



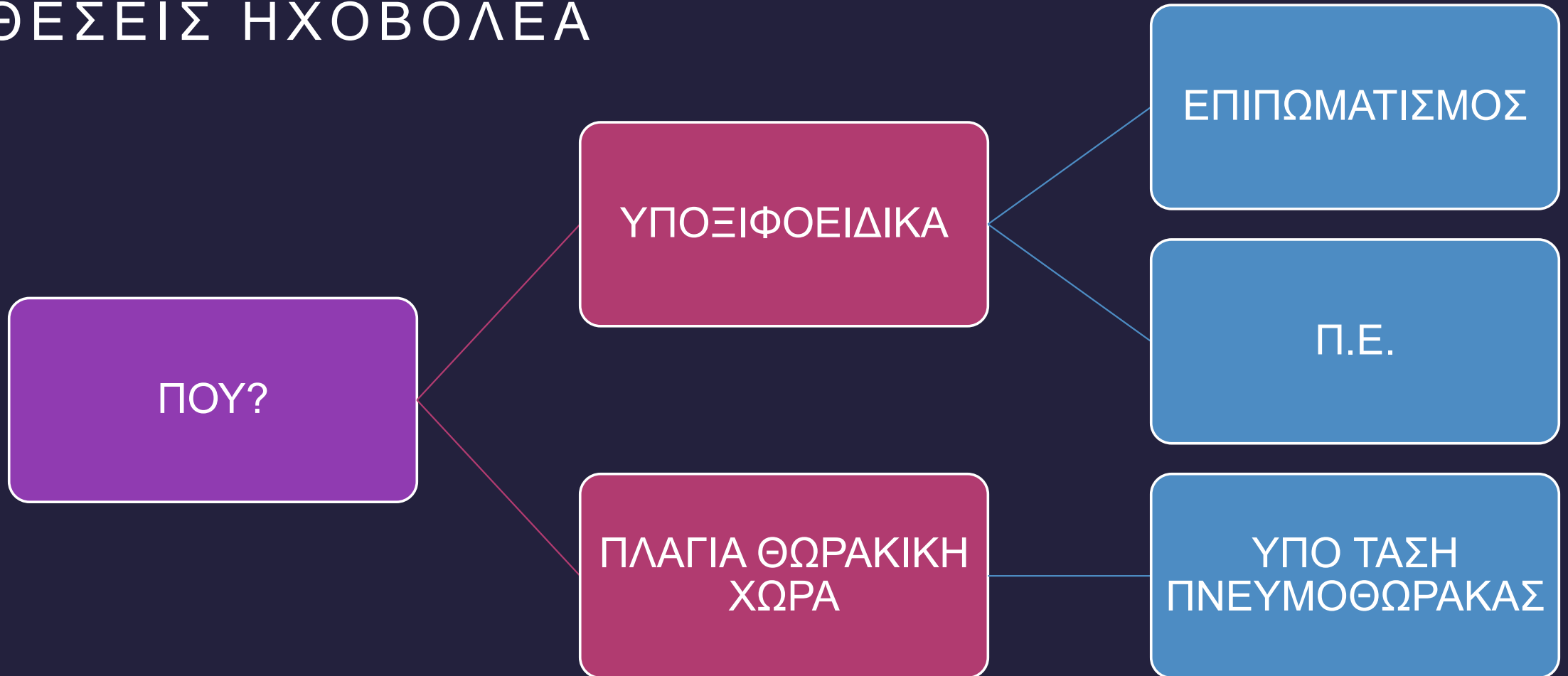
ΠΟΤΕ?

Α. ΑΜΕΣΑ ΜΕ ΤΟ ΠΟΥ
ΕΡΘΕΙ Ο ΥΠΕΡΗΧΟΣ

Β. ΉΤΑΝ ΔΙΑΚΟΠΟΥΝ
ΟΙ ΣΥΜΠΙΕΣΕΙΣ ΓΙΑ
ΕΛΕΓΧΟ ΡΥΘΜΟΥ

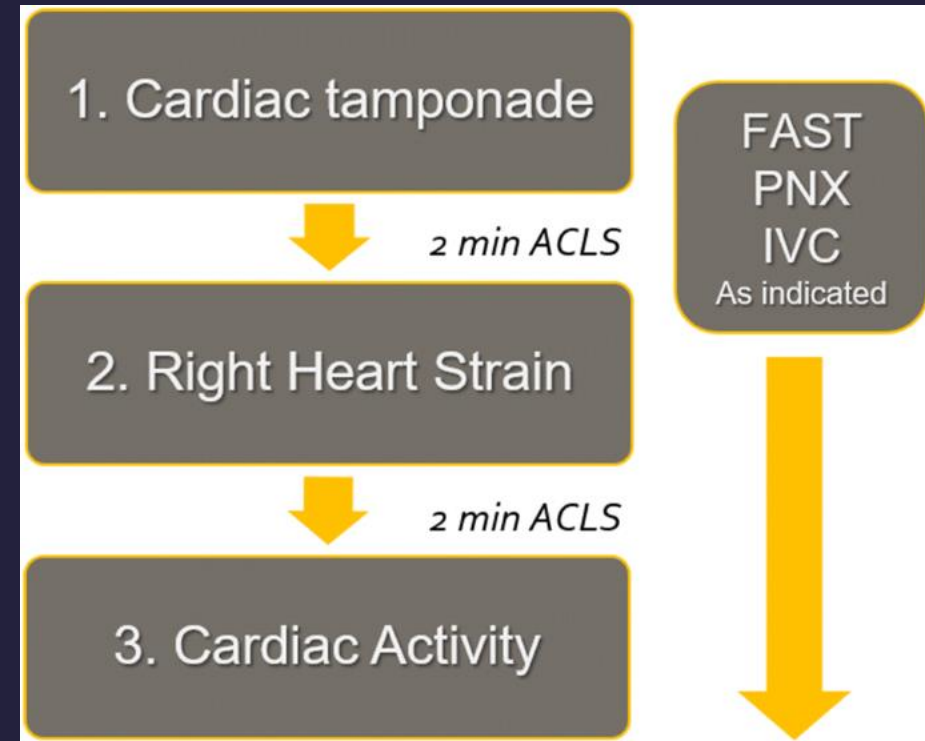
Γ. ΉΤΑΝ ΔΙΑΚΟΠΟΥΝ
ΟΙ ΣΥΜΠΙΕΣΕΙΣ ΓΙΑ ΝΑ
ΔΩΘΕΙ ΑΠΙΝΙΔΩΣΗ

ΘΕΣΕΙΣ ΗΧΟΒΟΛΕΑ



CASA: CARDIAC ARREST SONOGRAPHIC ASSESSMENT

- 3-STEP APPROACH
- SHORTER PULSE CHECK INTERVALS
- PROBE PLACED PRIOR TO STOPPING CPR



Gardner K, Clattenburg E, Wroe P et al (2018) The Cardiac Arrest Sonographic Assessment (CASA) exam—a standardized approach to the use of ultrasound in PEA. *Am J Emerg Med* 36:729–731.

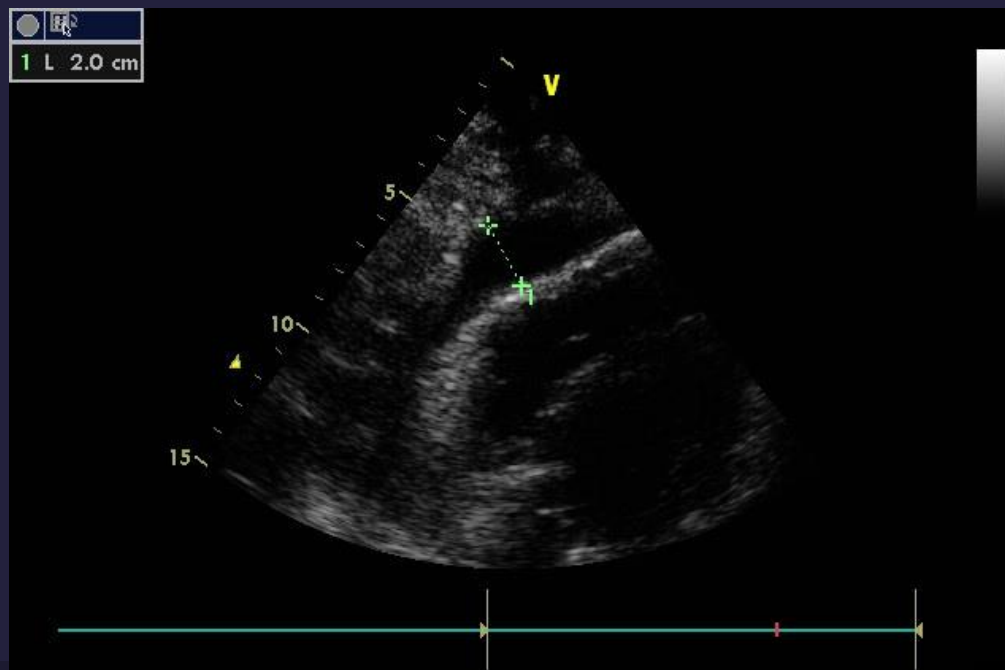
Clattenburg E, Wroe P, Gardner K et al (2018) Implementation of the Cardiac Arrest Sonographic Assessment (CASA) protocol for patients with cardiac arrest is associated with shorter CPR pulse checks. *Resuscitation* 131:69–73.

ΚΑΡΔΙΑΚΟΣ ΕΠΙΠΩΜΑΤΙΣΜΟΣ

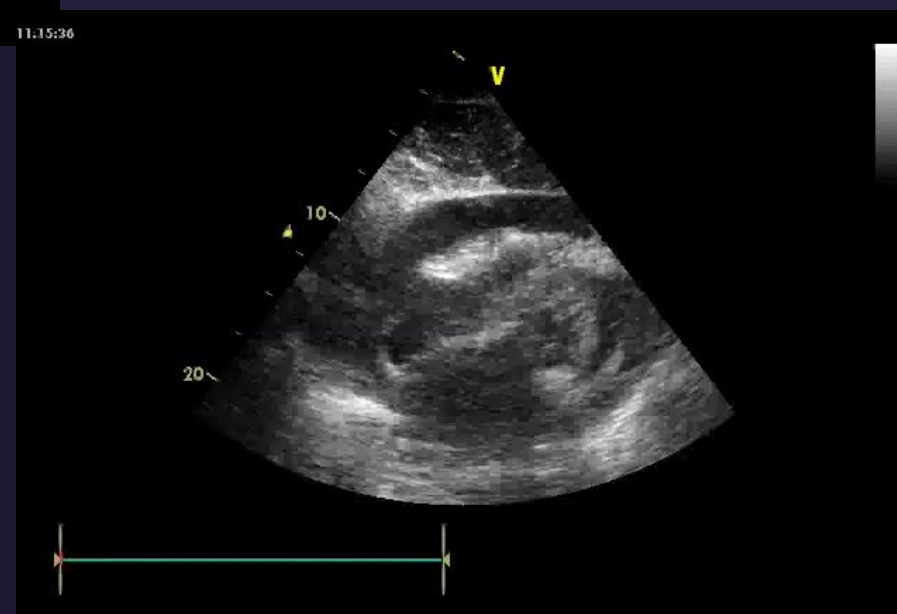
- Απειλητική για τη ζωή κατάσταση
- Ταχεία ή αργή συλλογή υγρού (η αίματος η αέρα) στην περικαρδιακή κοιλότητα
- ΑΙΤΙΑ:
 - ΣΥΝΗΘΗ- ΠΕΡΙΚΑΡΔΙΤΙΔΑ, ΤΒ, ΙΑΤΡΟΓΕΝΗΣ, ΤΡΑΥΜΑ, ΚΑΚΟΗΘΕΙΕΣ
 - ΑΣΥΝΗΘΗ – ΚΟΛΛΑΓΟΝΩΣΕΙΣ, ΟΥΡΑΙΜΙΑ, ΑΚΘ, ΔΙΑΧΩΡΙΣΜΟΣ, ΒΑΚΤΗΡΙΑΚΗ ΛΟΙΜΩΞΗ, ΜΕΤΕΜΦΡΑΓΜΑΤΙΚΑ

ΚΛΙΝΙΚΗ ΥΠΟΨΙΑ???



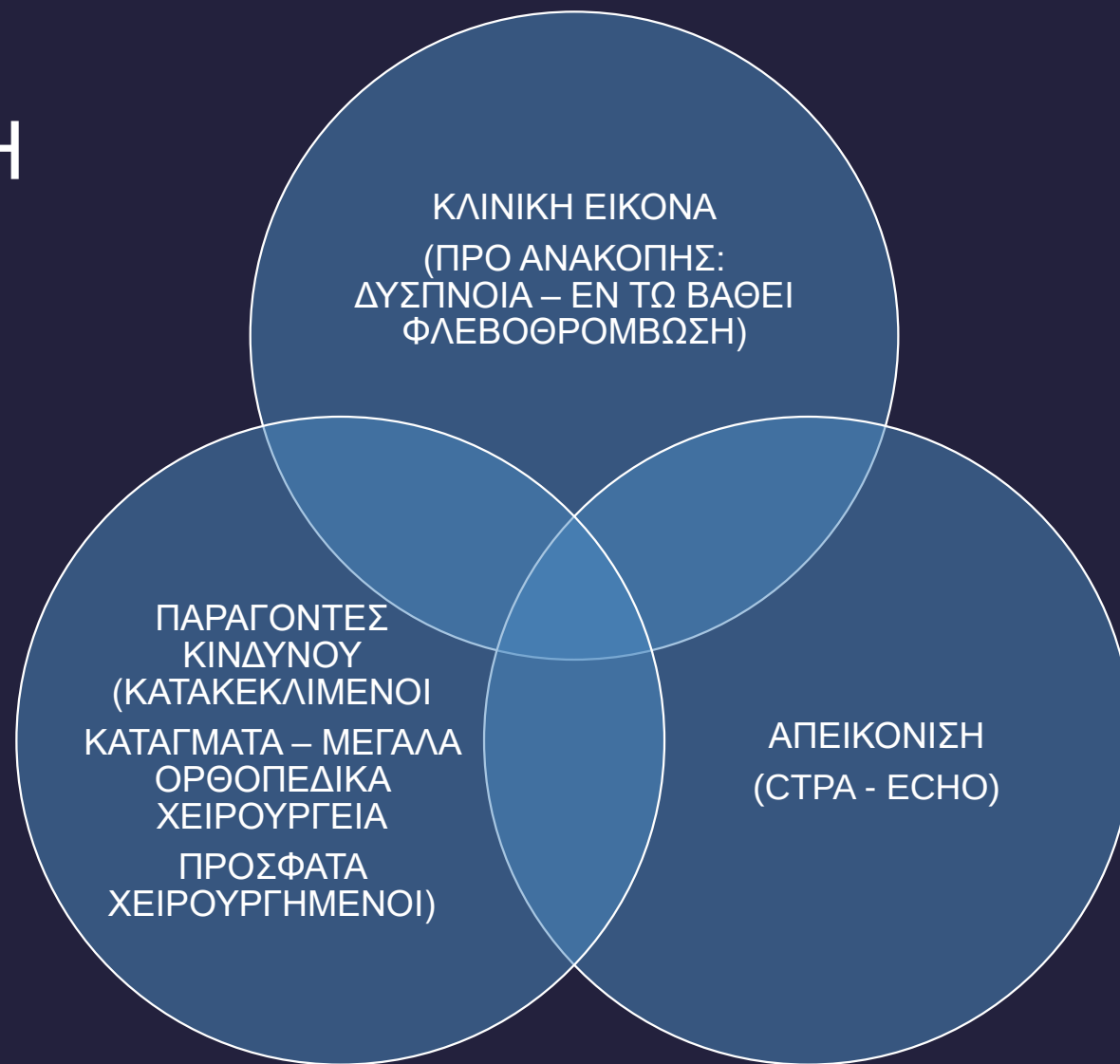


11.15:36



ΜΑΖΙΚΗ ΠΝΕΥΜΟΝΙΚΗ ΕΜΒΟΛΗ

ΚΛΙΝΙΚΗ
ΥΠΟΨΙΑ???

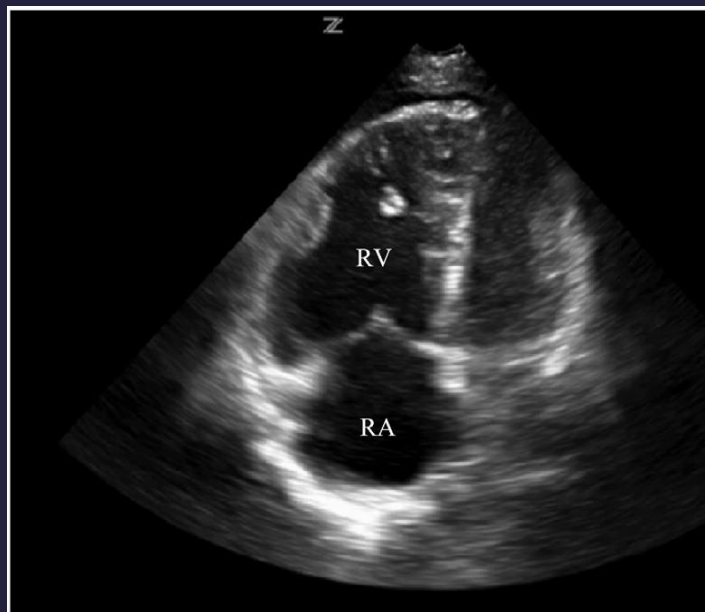


ΥΠΕΡΗΧΟΓΡΑΦΙΚΑ
ΕΥΡΗΜΑΤΑ

ΔΙΑΤΑΣΗ ΔΕΞΙΩΝ
ΚΟΙΛΟΤΗΤΩΝ

ΕΜΦΑΝΗΣ ΘΡΟΜΒΟΣ
ΕΝΤΟΣ ΤΩΝ ΔΕΞΙΩΝ
ΚΟΙΛΟΤΗΤΩΝ

ΜΑΖΙΚΗ ΠΝΕΥΜΟΝΙΚΗ ΕΜΒΟΛΗ



Card/General
P4-1c/H3.5MHz
- DR65/M3/P1
- G92/E2/100%
- MI1.5 TIs0.3
18.0 cm
32 Hz
ZSI 0

DEFAULT
EVAGGELISMOS HOSPITAL

ID:

*Cardiac
3S

DEFAULT
EVAGGELISMOS HOSPITAL

ID:

*Cardiac
3S

3:33:24 am
01-Mar-21



2D 19 cm
51 f/s
f: 1.7 MHz H
DR: 60 dB
R: 10.0 G: 58

P:0dB
TIs:1.0
MI:1.1

P:0dB
TIs:1.0
MI:1.1

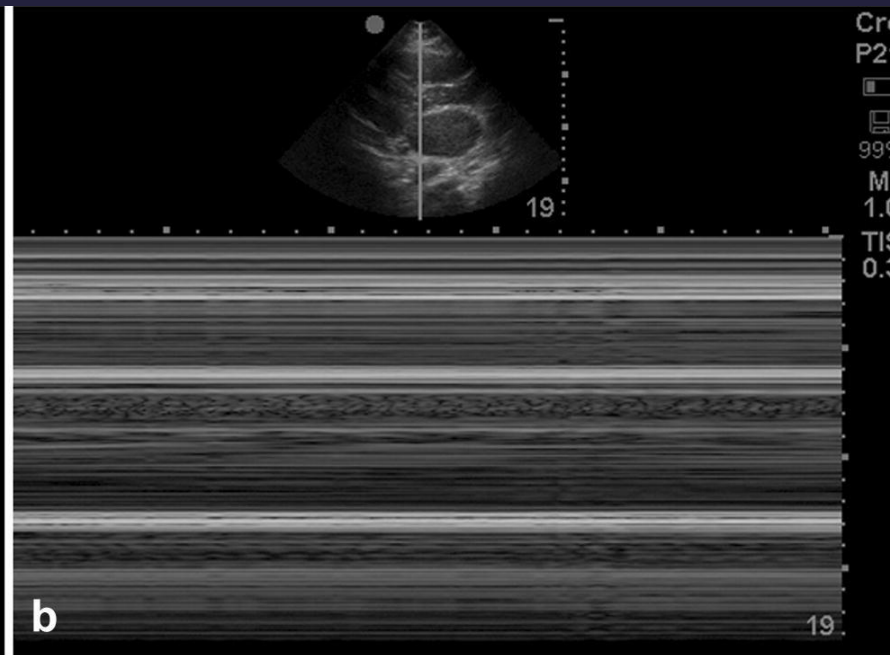
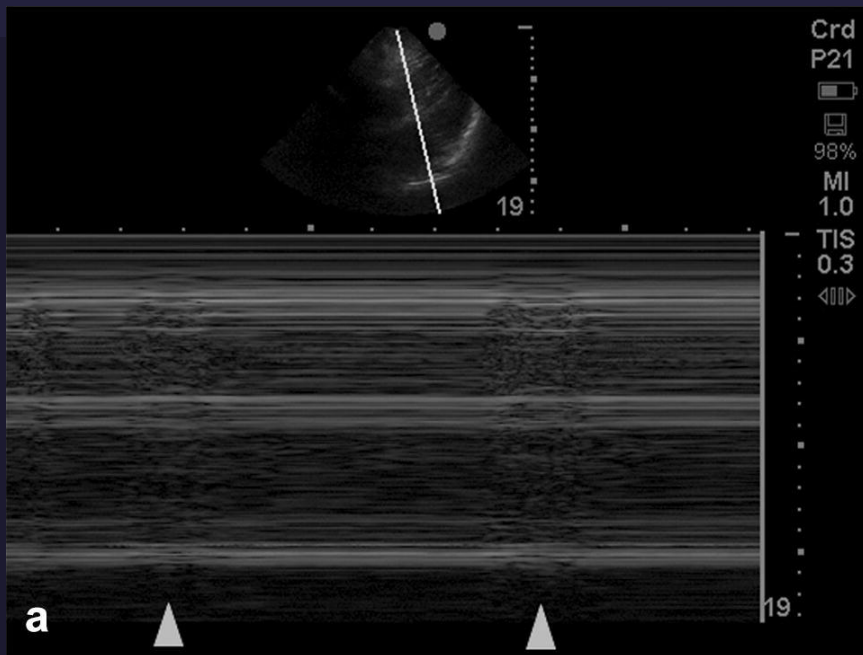
BUT...

DO NOT OVER-INTERPRET RV
DILATATION AS THE ONLY
CRITERION FOR PE!!!

RV DILATATION
BEGINS A FEW
MIN AFTER
CARDIAC ARREST

CARDIAC STANDSTILL

- Cardiac standstill, also known as *true asystole*, is defined as the complete absence of any cardiac motion including the ventricles, atria and valves. Patients recognized to have standstill with concomitant electrical activity on the monitor are often described to have *true PEA*.
- *Pseudo-PEA* is the presence of ventricular contractility visualized by ultrasound with electrical activity but no palpable pulse
- The M-mode option on ultrasound detects any motion along a given line against time. If any movement is identified, that part of the heart will look hazy like “sand on a beach”
- When there is a complete absence of cardiac contractility, the image will resemble a “barcode” appearance
- Identifying true PEA or cardiac standstill on ultrasound carries an important prognostic value.



Bedside ultrasound in cardiac standstill: a clinical review

[Laila Hussein](#), [Mohammad Anzal Rehman](#), [Ruhina Sajid](#), [Firas Annajjar](#), [Tarik Al-Janabi](#)

ΥΠΟ ΤΑΣΗ ΠΝΕΥΜΟΘΩΡΑΚΑΣ

ΑΠΕΙΛΗΤΙΚΗ
ΓΙΑ ΤΗ ΖΩΗ
ΚΑΤΑΣΤΑΣΗ

ΠΑΓΙΔΕΥΣΗ
ΑΕΡΑ ΣΤΟΝ
ΥΠΕΖΩΚΟΤΙΚΟ
ΧΩΡΟ

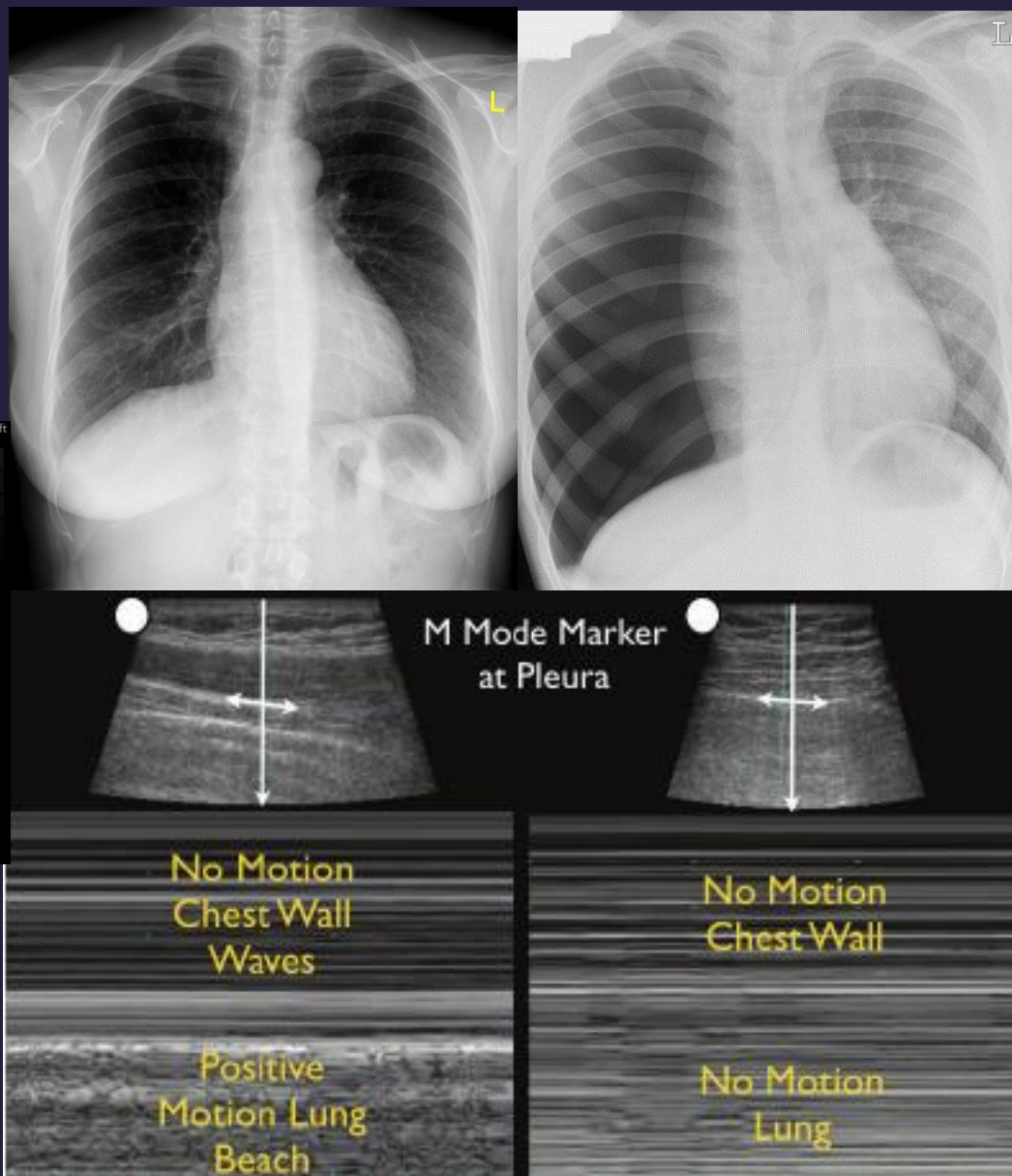
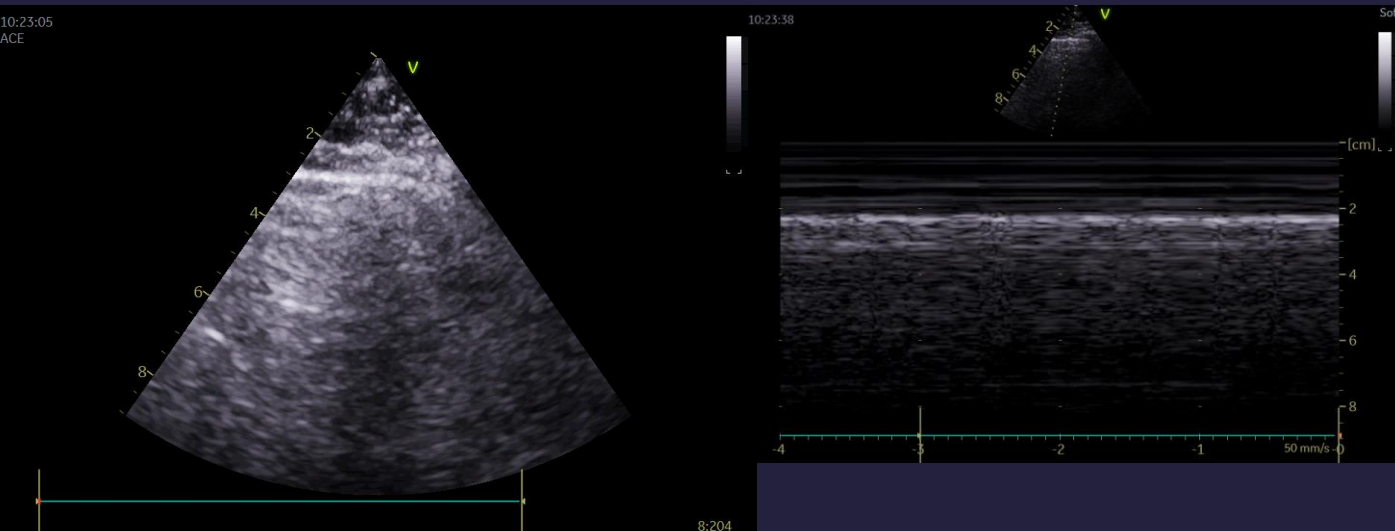
ΚΛΙΝΙΚΗ ΥΠΟΨΙΑ???

ΙΣΤΟΡΙΚΟ (ΤΡΑΥΜΑ, ΑΣΘΜΑ)

ΚΛΙΝΙΚΑ ΣΗΜΕΙΑ
(ΜΕΤΑΤΟΠΙΣΗ ΤΡΑΧΕΙΑΣ,
ΑΠΟΥΣΙΑ ΨΙΘΥΡΙΣΜΑΤΟΣ,
ΔΥΣΧΕΡΕΙΑ ΣΤΟΝ ΑΕΡΙΣΜΟ)

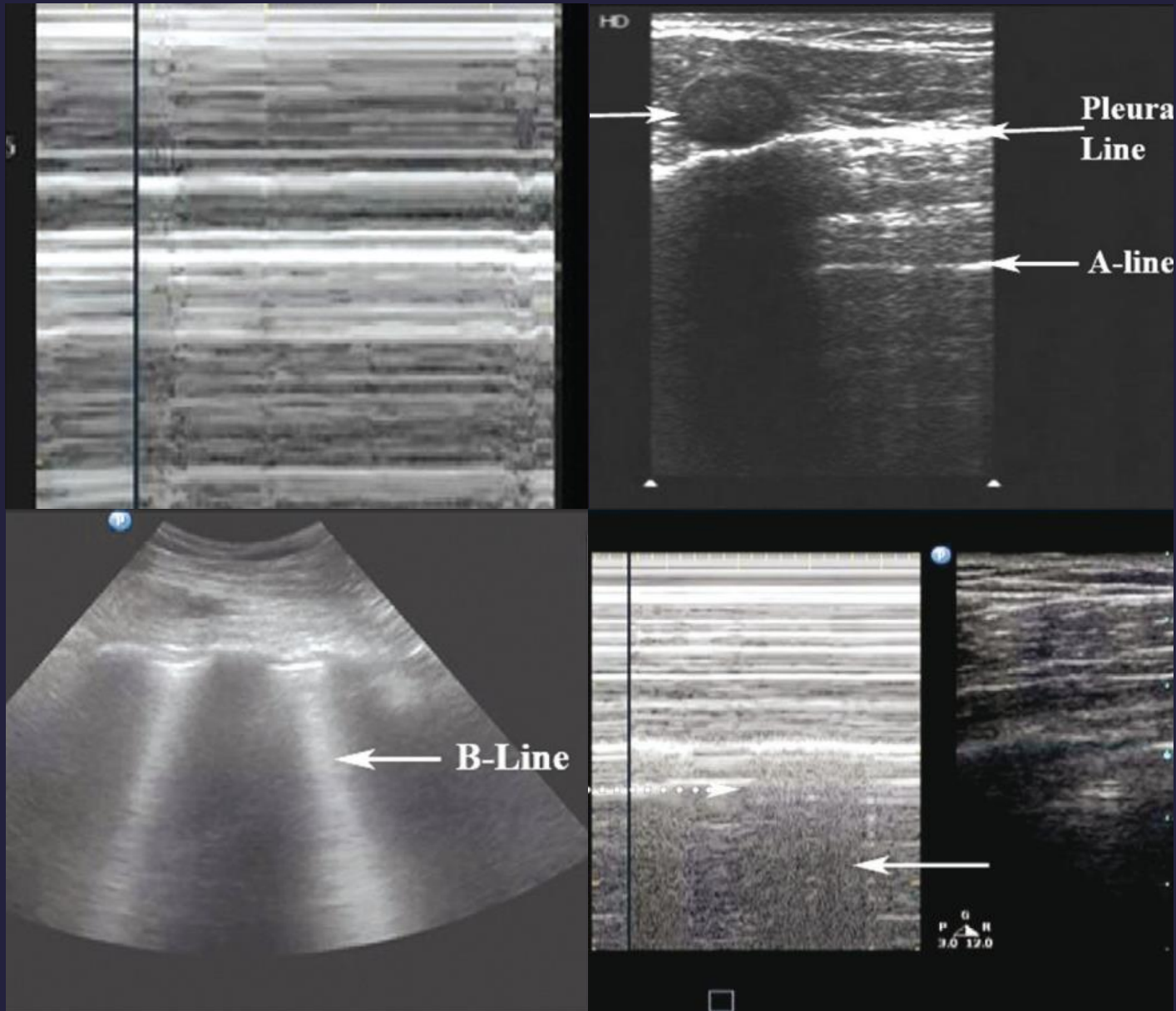
ΑΠΕΙΚΟΝΙΣΗ (Ultrasound)

ΥΠΟ ΤΑΣΗ ΠΝΕΥΜΟΘΩΡΑΚΑΣ



Dina Seif, Phillips Perera, Thomas Mailhot, David Riley, and Diku Mandavia. *Bedside Ultrasound in Resuscitation and the Rapid Ultrasound in Shock Protocol*

ΥΠΕΡΗΧΟΓΡΑΦΙΚΑ ΕΥΡΗΜΑΤΑ



- Barcode sign –absence of lung sliding (Stratosphere sign)
- Loss of B-lines or comet tail artifacts
- Presence of A-lines
- Lung point sign (100% specific)



LIMITED KNOWLEDGE ON POCUS DURING CPR

- FAST FOR ABDOMEN AND AORTA
- DVT
- PLEURAL EFFUSION

POST- CARDIAC
ARREST SYNDROME

MYOCARDIAL
DAMAGE

ECHOCARDIOGRAPHY

POST RESCUSCITATION CARE



Available online at www.sciencedirect.com

Resuscitation

journal homepage: www.elsevier.com/locate/resuscitation



European Resuscitation Council Guidelines 2021: Adult advanced life support



Jasmeet Soar^{a,}, Bernd W. Böttiger^b, Pierre Carli^c, Keith Couper^d,
Charles D. Deakin^e, Therese Djärv^f, Carsten Lott^g, Theresa Olasveengen^h,
Peter Paalⁱ, Tommaso Pellis^j, Gavin D. Perkins^k, Claudio Sandroni^{l,m}, Jerry P. Nolanⁿ*

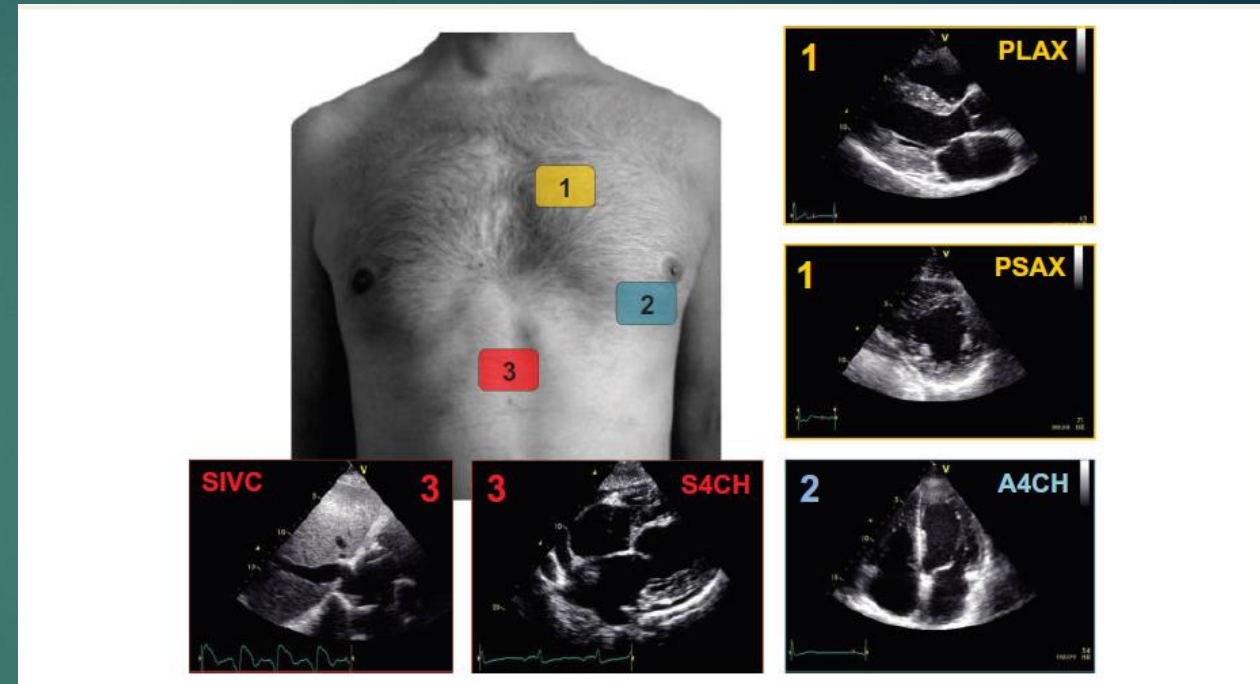


ΕΥΧΑΡΙΣΤΩ ΠΟΛΥ



FoCUS

- ▶ Focus cardiac ultrasound (FoCUS) is defined as a point-of-care cardiac ultrasound examination, performed according to a standardized, but restricted, scanning protocol, as an extension of the clinical examination.
- ▶ It is undertaken by an operator not necessarily trained in comprehensive echocardiography, but appropriately trained in FoCUS, who is usually responsible for immediate decision-making and/or treatment



FoCUS-Can detect a limited number of critical cardiac conditions

Focus cardiac ultrasound core curriculum and core syllabus of the European Association of Cardiovascular Imaging[†]

Targets

- Global LV systolic function and size
- Global RV systolic function and size
- Pericardial effusion, tamponade physiology^a
- Intravascular volume assessment
- Gross signs of chronic cardiac disease^b
- Gross valvular abnormalities^c
- Large intracardiac masses^d

Scenarios

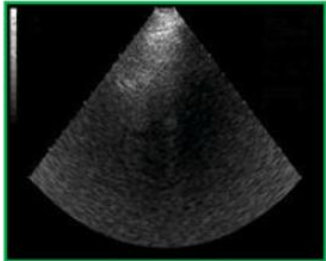
- Circulatory compromise/shock
- Cardiac arrest
- Chest pain/dyspnoea^e
- Chest/Cardiac trauma
- Respiratory compromise
- Syncope/presyncope

Conditions

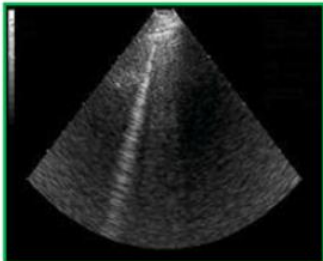
- Ischaemic LV/RV dysfunction
- Mechanical post-MI complications
- Cardiomyopathies (i.e. DCM, HCM, Takotsubo)
- Myocarditis
- Cardiac tamponade
- Pulmonary embolism
- Hypovolaemia/shock

LUS

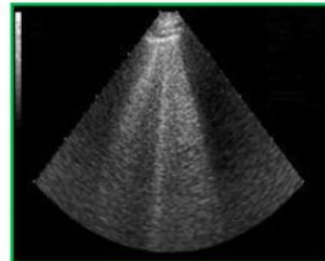
Right side	Mid-axillary	Anterior axillary	Mid-clavicular	Para-sternal	Inter-costal space	Para-sternal	Mid-clavicular	Anterior axillary	Mid-axillary	Left side
					2					
					3					
					4					
					5					



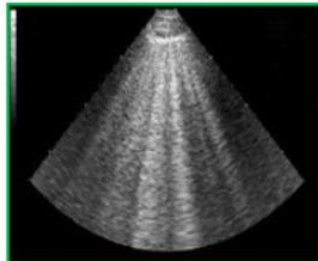
Normal Lung



B-lines -Mild



Moderate



Severe

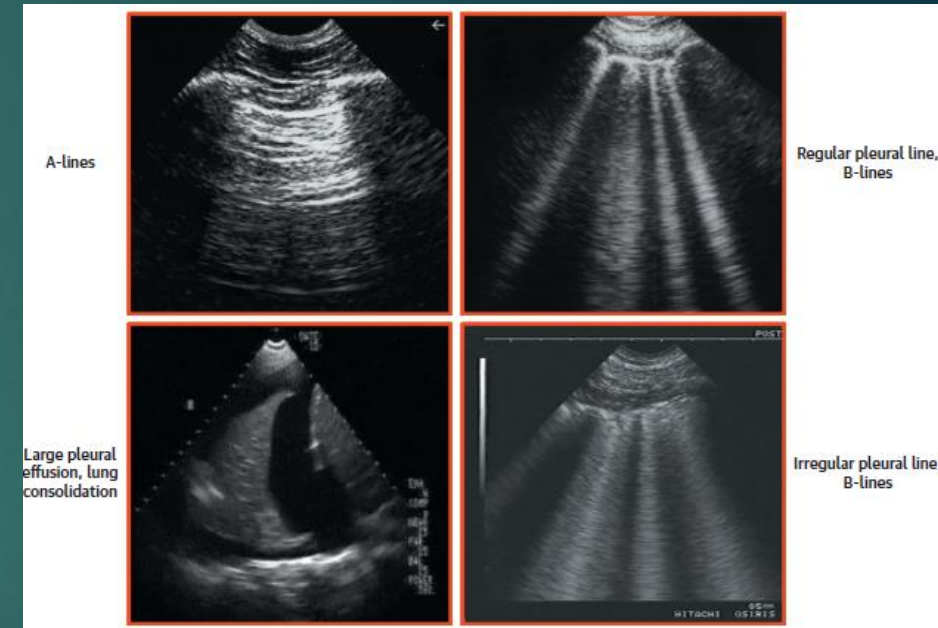
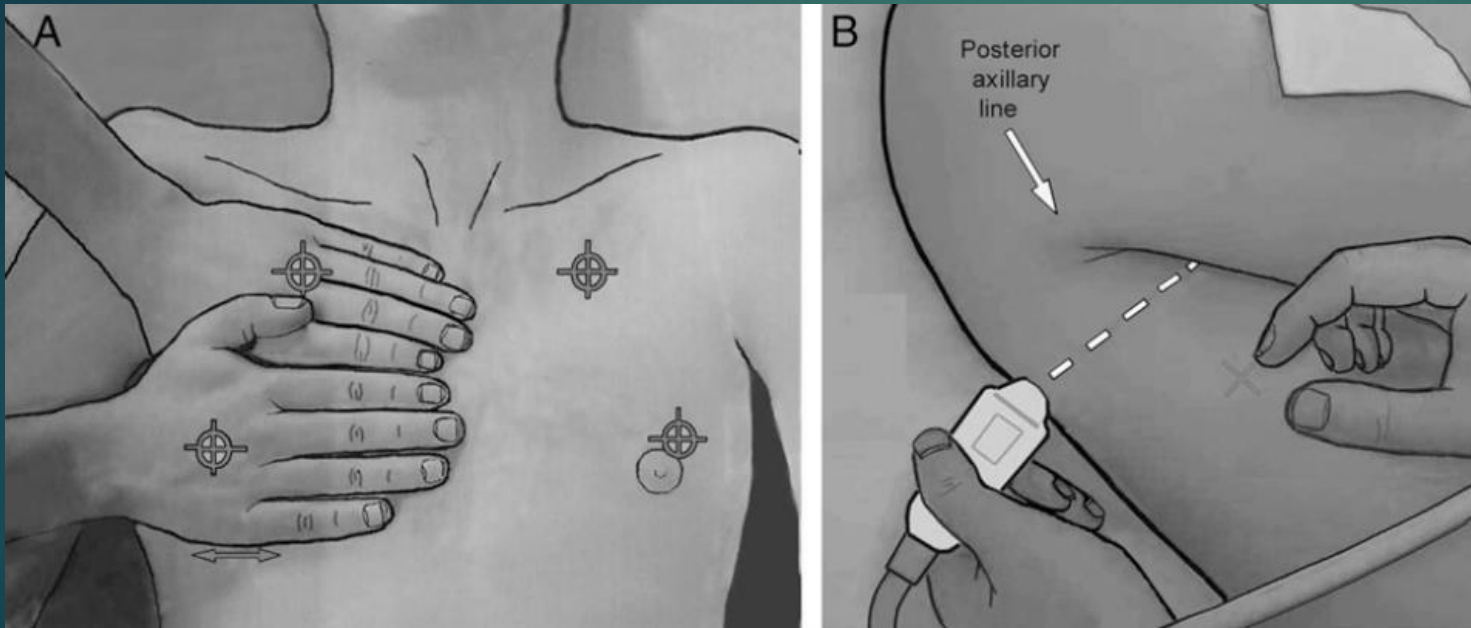
Score	Number of B-lines	EVLW
0	≤ 5	Absent
1	6–15	Mild degree
2	16–30	Moderate degree
3	> 30	Severe degree

**Ultrasound of extravascular lung water:
a new standard for pulmonary congestion**

Eugenio Picano^{1*} and Patricia A. Pellikka²

BLUE PROTOCOL

the bedside lung ultrasound in emergency -protocol for the immediate diagnosis of acute respiratory failure



WET lungs:
MULTIPLE (>3), DIFFUSE (>1 SPOT), BILATERAL B-lines