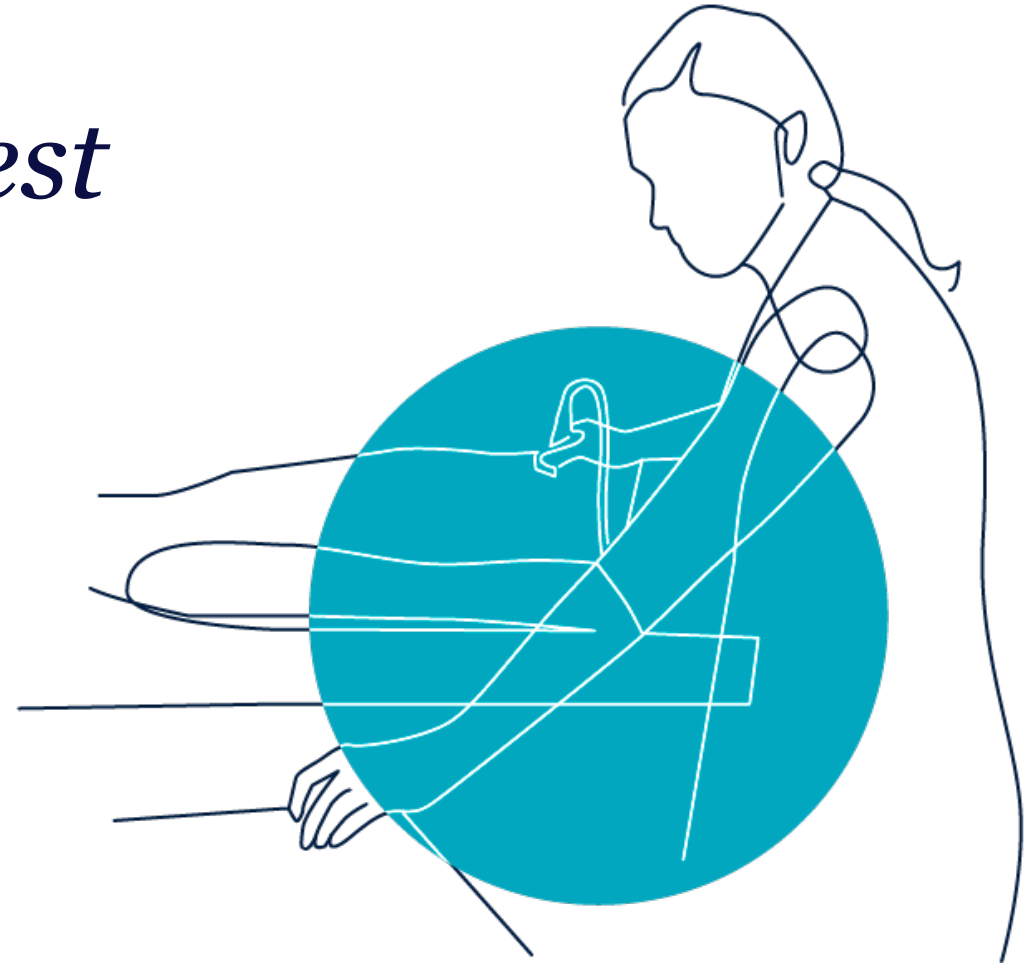


PoCUS in *Cardiac Arrest*

Kevin Fairbairn

January 31st, 2025 | 12:00

Intended for
intermediate PoCUS users



THE UNIVERSITY OF BRITISH COLUMBIA

Continuing Professional Development

Faculty of Medicine

LAND ACKNOWLEDGMENT

We acknowledge that we work on the traditional, ancestral and unceded territory of the Ktunaxa, Syilx, and Sinixt Nations.



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PRESENTER DISCLOSURES

Relationships with commercial interests:

- Medical Lead HOUSE program UBC CPD



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MITIGATION OF BIAS

- All content developed as part of this program was reviewed for potential bias by the members of the program planning committee.
- Relationships do not affect my choices in developing content.
- Financial relationships are unrelated to presentation.
- Not speaking about any products or medications.



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LEARNING OBJECTIVES

- Develop an approach to using PoCUS in cardiac arrest
- Identify what makes PoCUS in cardiac arrest dangerous
- Describe what a PoCUS pulse is and recognize 2 anatomic locations where this can be assessed



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NOT COVERING

- Procedures - pericardiocentesis, central lines, art lines:

<https://ubccpd.ca/oct-28-2022-pocus-assisted-procedures-shock-and-hypotension>



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CASE #1

59 yo male

Collapses with sudden chest pain
after...



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CASE #1

59 yo male

Collapses with sudden chest pain
after... mowing the lawn



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CASE #1

59 yo male

Collapses with sudden chest pain
after... or shovelling snow...



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A POCUS APPROACH TO CARDIAC ARREST

- 1) Reversible Cases
- 2) PoCUS Pulse / Rhythm check
 - 3) Cardiac Standstill / when to terminate a code
 - 4) Future Directions: TEE and ECMO



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CARDIAC ARREST PROTOCOLS

- CASA (Cardiac Arrest Sonographic Assessment)
- CAUSE (Cardiac Arrest Ultra-Sound Exam)
- CURE (Core Ultrasound in Resuscitation)
- PEA (Pulmonary, Epigastric, and Abdominal scans)
- US-CAB (Ultra-Sound Circulation, Airway, Breathing)
- FEER/FEEL (Focused Echocardiographic Evaluation in Life support)
- SESAME (Sequential Echographic Scanning Assessing Mechanism)



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A POCUS APPROACH TO CARDIAC ARREST

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A POCUS APPROACH TO CARDIAC ARREST

- 1) Reversible Cases - **Look at the heart**
- 2) PoCUS Pulse - **Look at the pulse (carotid/femoral artery)**

DO NOT DELAY YOUR PULSE CHECK * <10 sec*



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PHASED ARRAY PROBE



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CURVILINEAR PROBE

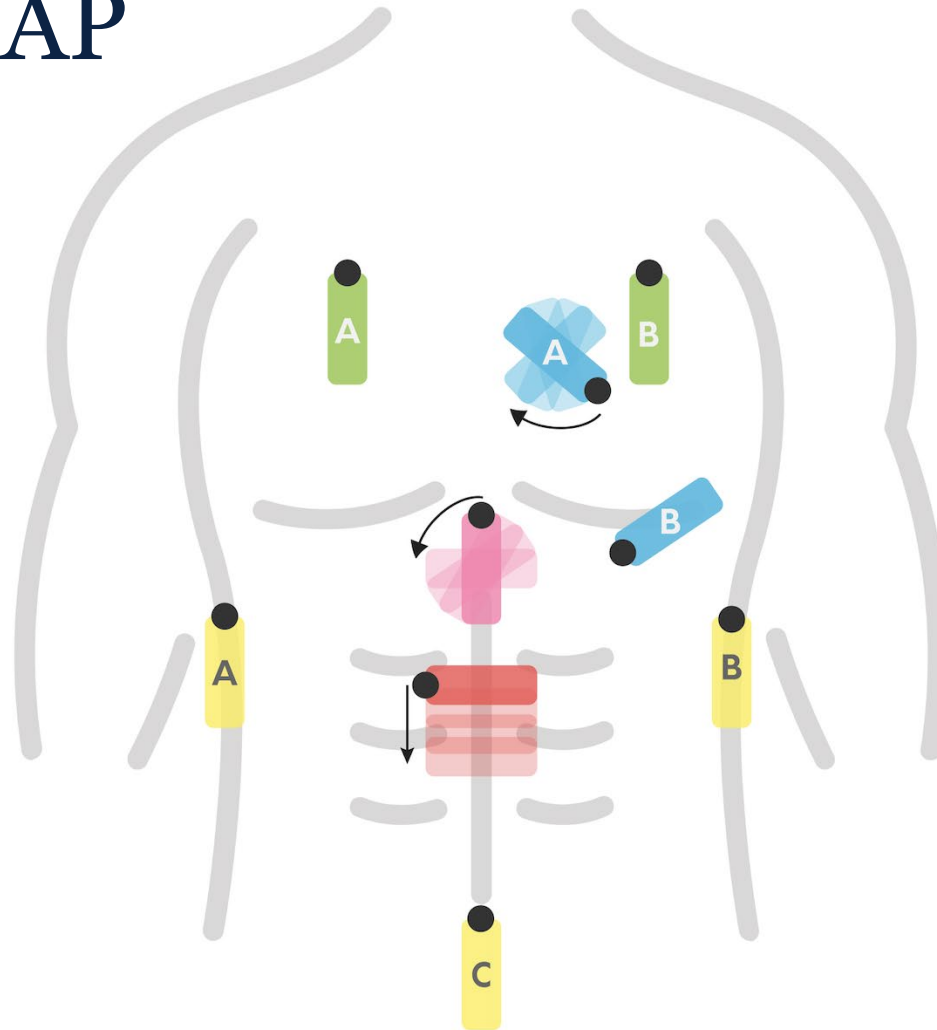


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SHOCK - HIMAP

The RUSH Protocol Scan Locations



- Heart**
 - A** PSLA/PSSA
 - B** Apical 4 Chamber
- IVC**
 - IVC/Subcostal
- Morison's**
 - A** Right Upper Quadrant
 - B** Left Upper Quadrant
 - C** Suprapubic
- Aorta**
 - Aortic Slide View
- Pulmonary**
 - A** Right Anterior Chest
 - B** Left Anterior Chest

*Probe orientation is based on a single dot location set to the left-upper screen. For this reason, for cardiac imaging probe orientation is based on emergency medicine preference.



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HS AND TS

- Hypoxia
 - Hypokalemia/hyperkalemia
 - Hypothermia/hyperthermia
 - Hypovolemia
 - Hydrogen ions
-
- Tension pneumothorax
 - Tamponade
 - Thrombosis x2
 - Toxins



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HS AND TS

- Hypoxia ***POCUS**
- Hypokalemia/hyperkalemia
- Hypothermia/hyperthermia
- Hypovolemia ***POCUS**
- Hydrogen ions

- Tension pneumothorax ***POCUS**
- Tamponade ***POCUS**
- Thrombosis x2 ***POCUS** (RWMA & PE)
- Toxins



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A POCUS APPROACH TO CARDIAC ARREST

- 1) Reversible Cases - **Look at the heart**
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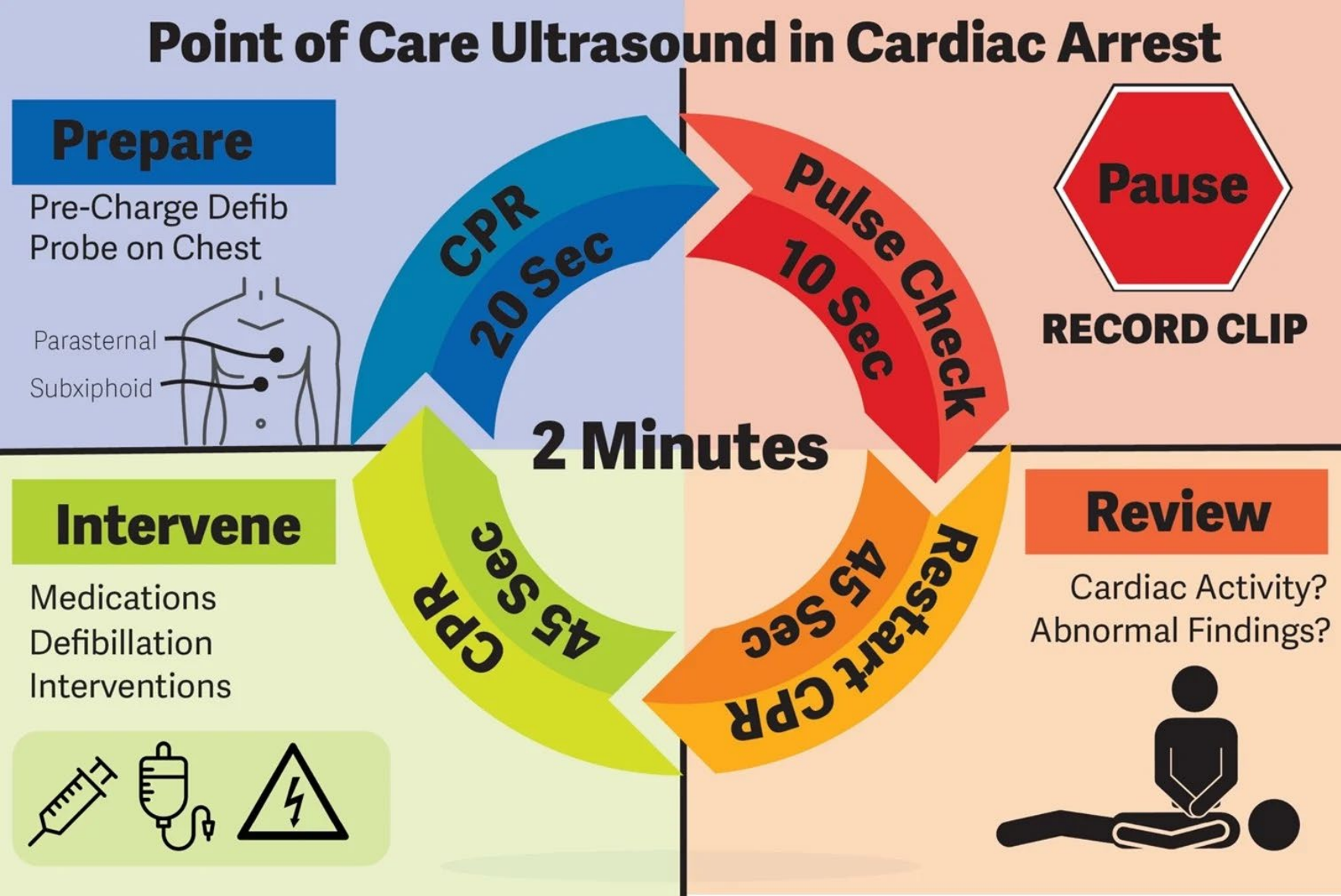
DO NOT DELAY YOUR PULSE CHECK * <10 sec*



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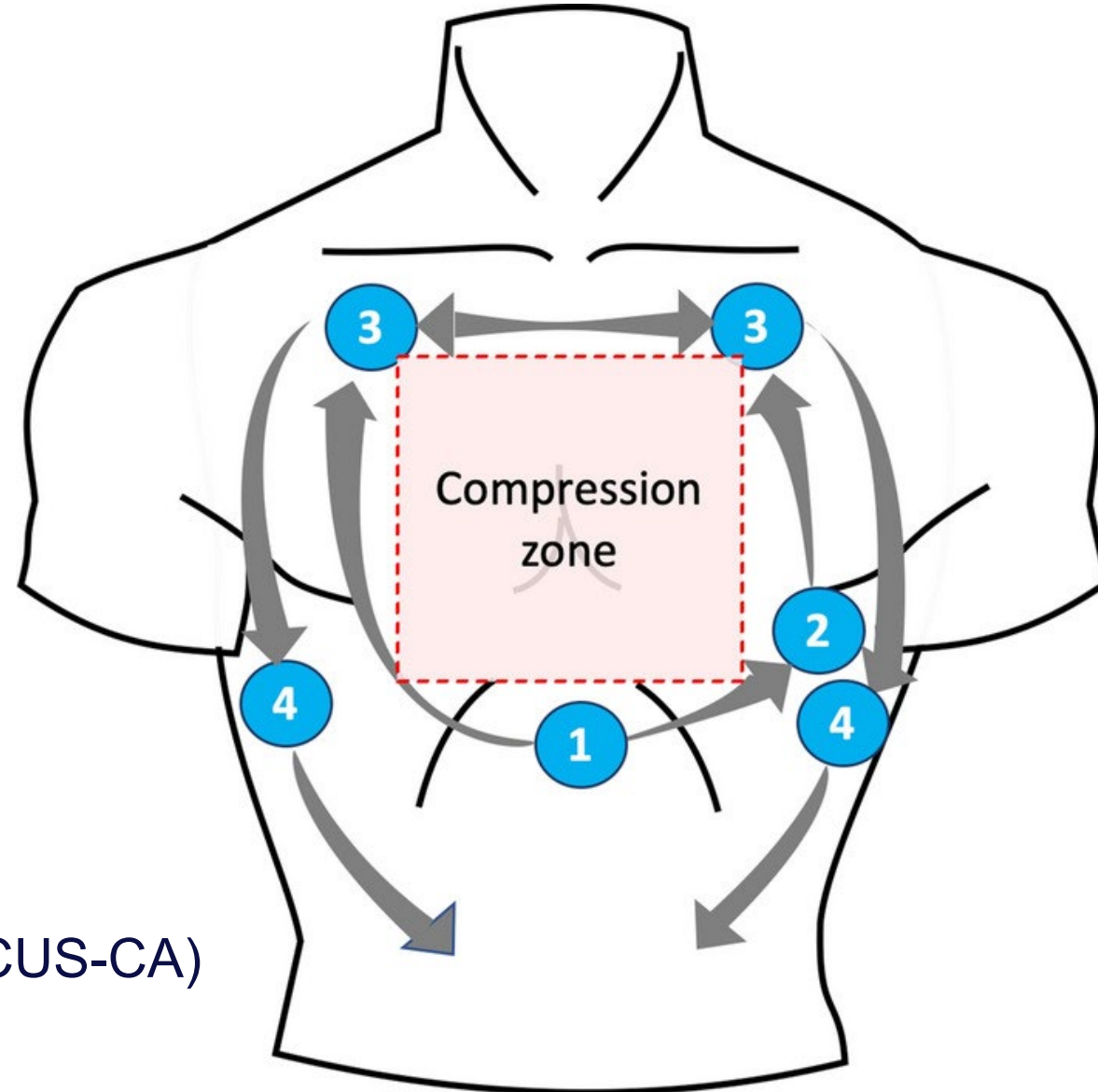
CARDIAC ARREST PROTOCOLS



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CARDIAC ARREST PROTOCOLS



- Protocol (POCUS-CA)



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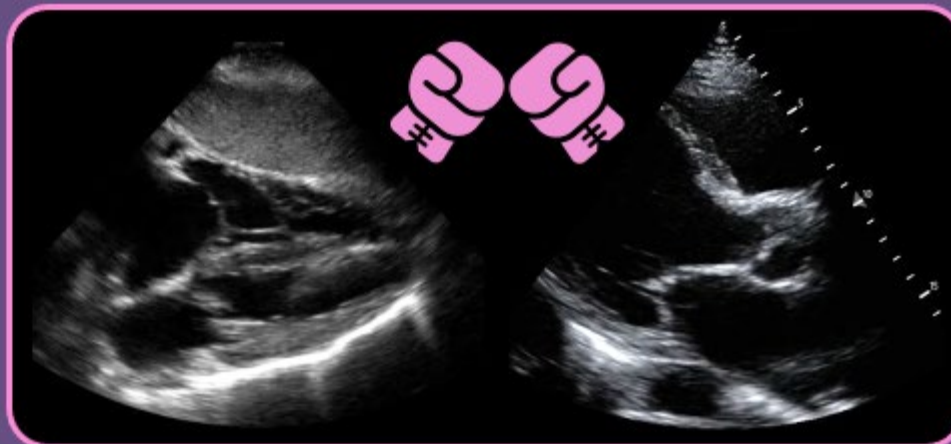
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BRIEF ECHO: SUBX vs PLAX



Question:

Which window provides the quickest *and* most accurate brief echo view during cardiac arrest?

Methods:

Multi-center, prospective, convenience RCT of ED patients not in cardiac arrest from 29 adult ED's in North America. Compared parasternal long axis (PLAX) and subxiphoid (SubX): 1° outcome image acquisition time, 2° outcome image quality and visible anatomy.

**N = 6,247
images**

RESULTS

	SUBX	PLAX
Acquisition Time	9.3s	8.8s
Image Quality $\geq 4/5$	58%	66%



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CARDIAC ARREST - TIPS (EMCRIT)

- Ultrasound is not the primary focus
- Prioritize good care
- Only one piece of information during the arrest
- Do not need every rhythm check!



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CARDIAC ARREST - TIPS (EMCRIT)

- **Pre-pause imaging** (in a pre/post protocol implementation it saved about 15 seconds)
- Adjust clip time to **6 seconds** or less, save only 1 clip
- Do not interpret in real time, **get back on chest**
- Person leading should not be doing ultrasound
- Use a real timer
- Most experienced sonographer if possible
- Protocol (such as CASA)



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‘CHANGES IN PHSYIOLOGY’

*****The heart may not be moving*****

*****The lung may not be sliding*****



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A POCUS APPROACH TO CARDIAC ARREST

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DO NOT DELAY YOUR PULSE CHECK *<10 sec*



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HS AND TS

- Hypoxia ***POCUS**
- Hypokalemia/hyperkalemia
- Hypothermia/hyperthermia
- Hypovolemia ***POCUS**
- Hydrogen ions

- Tension pneumothorax ***POCUS**
- Tamponade ***POCUS**
- Thrombosis x2 ***POCUS** (RWMA & PE)
- Toxins



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CARDIAC ARREST PROTOCOLS

- History
- DDX



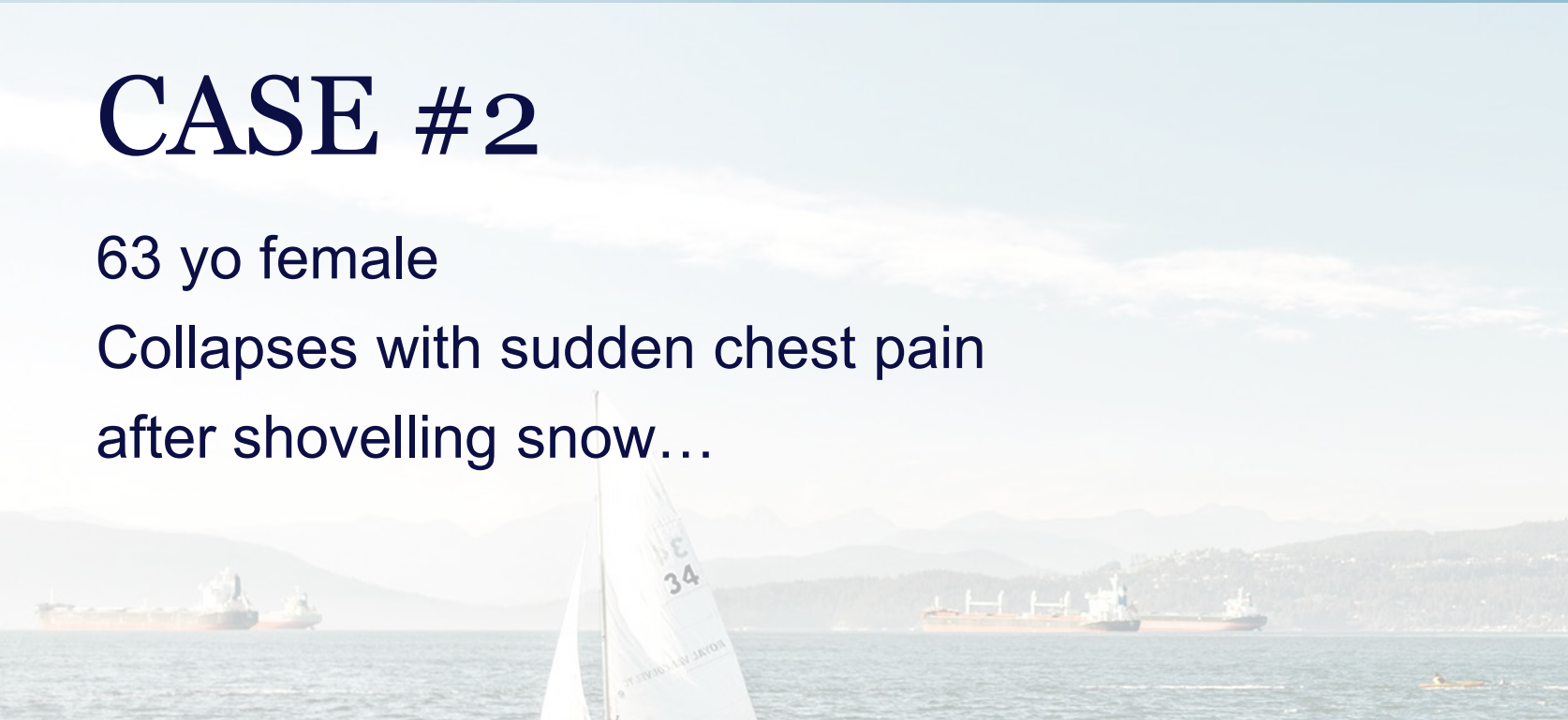
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CASE #2

63 yo female

Collapses with sudden chest pain
after shovelling snow...



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CASE #2

63 yo female

Collapses with sudden chest pain
after shovelling snow...

3 day hx increasing SOB

Remote hx DVT x2



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CASE #3

61 yo female

Collapses

after using the snowblower...

Hx metastatic breast Ca



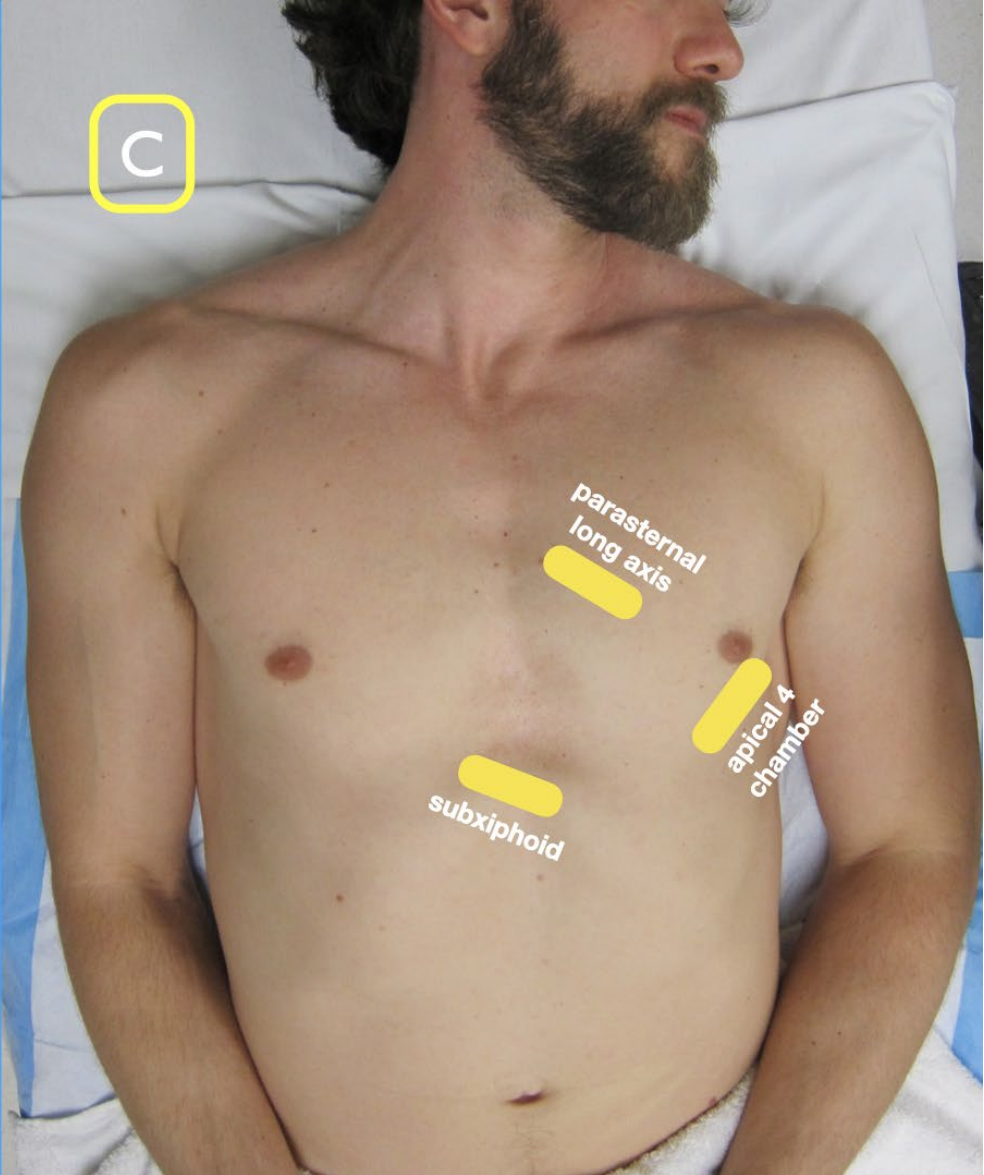
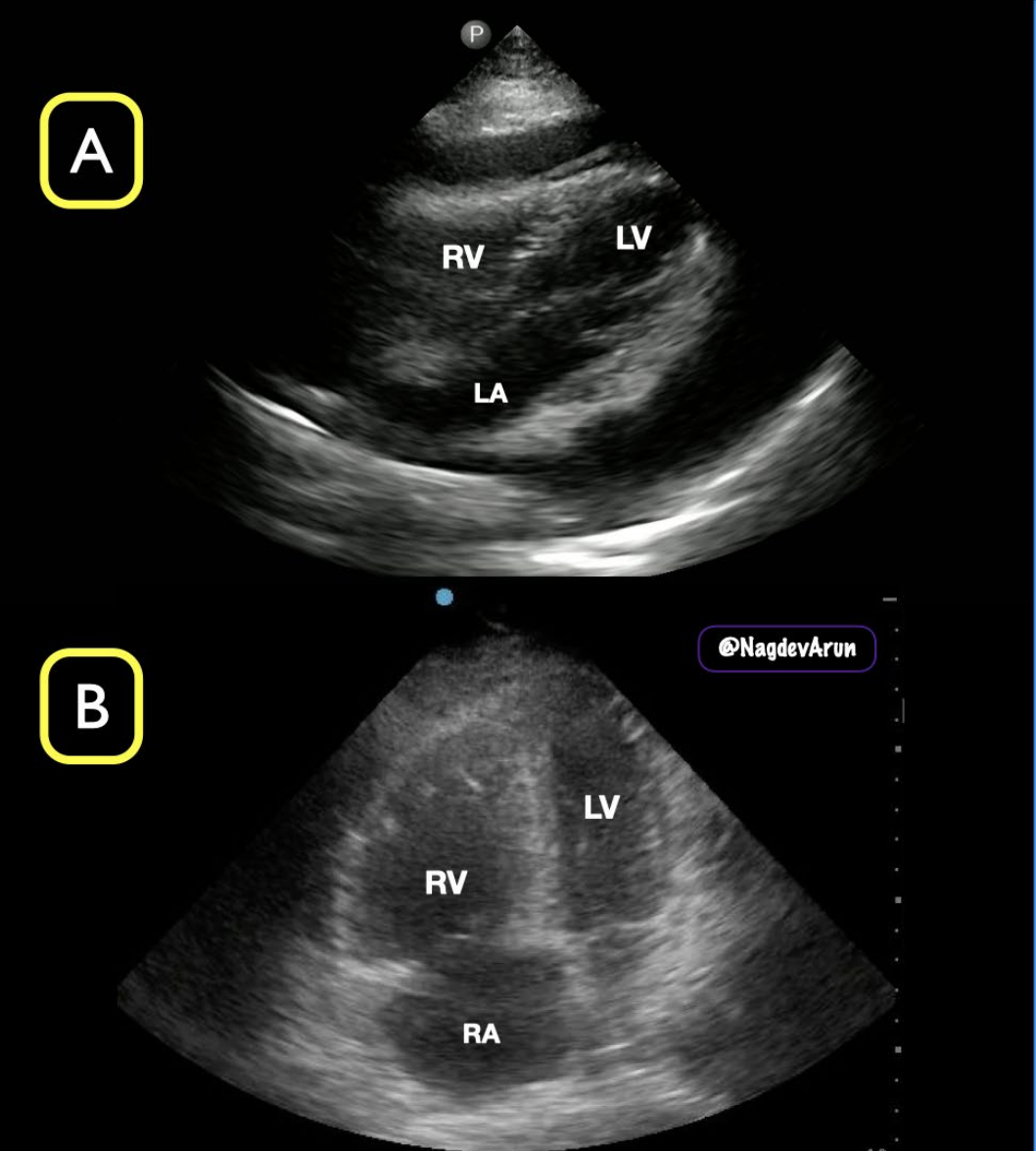
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CARDIAC ARREST PROTOCOLS



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CASE #2

63 yo female

Collapses with sudden chest pain
after shovelling snow...

3 day hx increasing SOB

Remote hx DVT x2



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?PE



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?PE



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DILATED RV

- Pulmonary Embolism
- Pulmonary Hypertension
- Tricuspid Regurg
- Dilated Cardiomyopathy
- ASD
- Hypovolemia
- Hyperkalemia
- Cardiac arrest...



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CASE #3

61 yo female

Collapses

after using the snowblower...

Hx metastatic breast Ca



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CASE #4

69 yo female

Collapses with sudden chest pain
after using the snowblower...

Hx CAD/PVD, 30 pack year



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CARDIAC ARREST PROTOCOLS

- History
- DDX



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A POCUS APPROACH TO CARDIAC ARREST

- 1) Reversible Cases - **Look at the heart**
- 2) PoCUS Pulse - **Look at the pulse (carotid/femoral artery)**

DO NOT DELAY YOUR PULSE CHECK * <10 sec*



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PULSE CHECK



**American
Heart
Association®**



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PULSE CHECK

- We suggest against routine use of POCUS during CPR to diagnose reversible causes of cardiac arrest (weak recommendation, very low–certainty evidence)
- We suggest that if POCUS can be performed by experienced personnel without interrupting CPR, it may be considered as an additional diagnostic tool when clinical suspicion for a specific reversible cause is present (weak recommendation, very low–certainty evidence)
- Any deployment of diagnostic POCUS during CPR should be carefully considered and weighed against the risks of interrupting chest compressions and misinterpreting the sonographic findings (good practice statement)



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PULSE CHECK

Ultrasound during Advanced Life Support—Help or Harm?

by Adrian Goudie ¹  , Michael Blaivas ²  , Rudolf Horn ³ , Wan-Ching Lien ^{4,5} , Guido Michels ⁶ , Daniel Wastl ⁷   and Christoph Frank Dietrich ^{8,*}  

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² Department of Medicine, University of South Carolina School of Medicine, Columbia, SC 29209, USA

³ Center da sandà Val Müstair, Santa Maria, 7537 Val Müstair, Switzerland

⁴ Department of Emergency Medicine, College of Medicine, National Taiwan University, Taipei 10617, Taiwan

⁵ Department of Emergency Medicine, National Taiwan University Hospital, Taipei 10617, Taiwan

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⁷ Krankenhaus Nordwest, 60488 Frankfurt, Germany

⁸ Department Allgemeine Innere Medizin (DAIM), Kliniken Hirslanden Beau Site, Salem und Permanence, 3013 Bern, Switzerland

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Published: 11 March 2024



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RHYTHM CHECK



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RHYTHM CHECK

The Black Page #1

Frank Zappa



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PULSE CHECK



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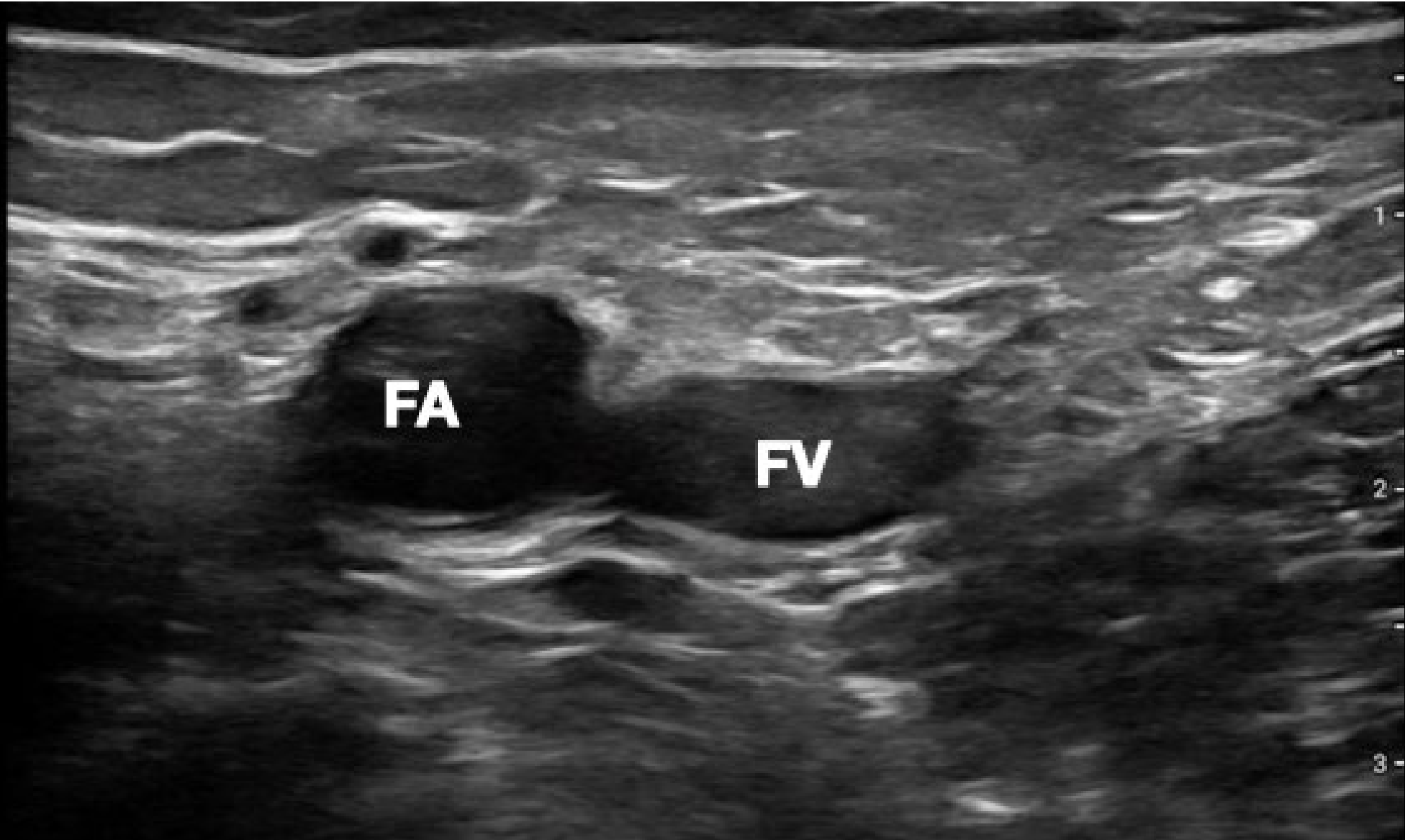




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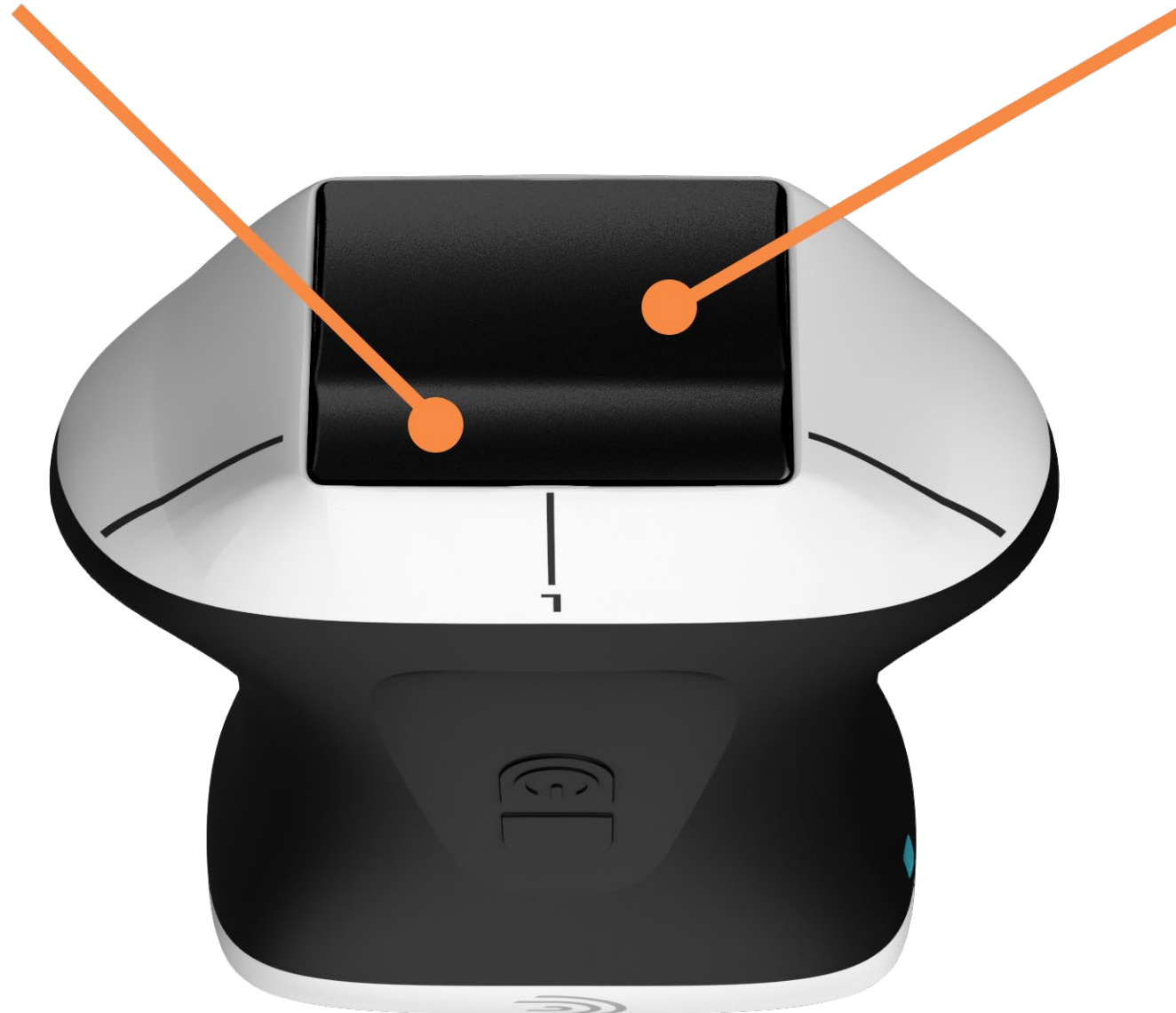
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Linear Array

Phased Array



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POCUS PULSE

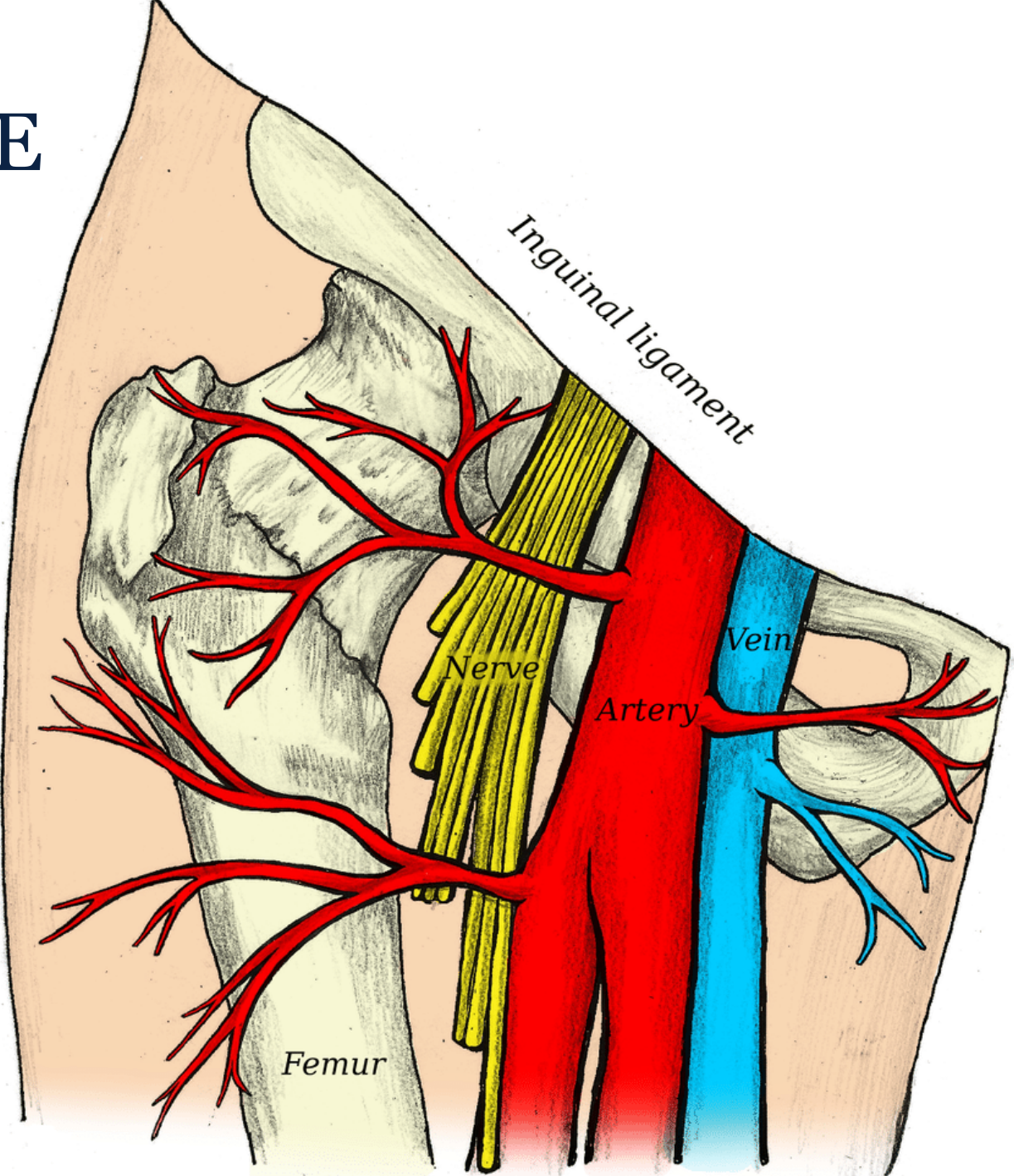


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POCUS PULSE



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POCUS PULSE

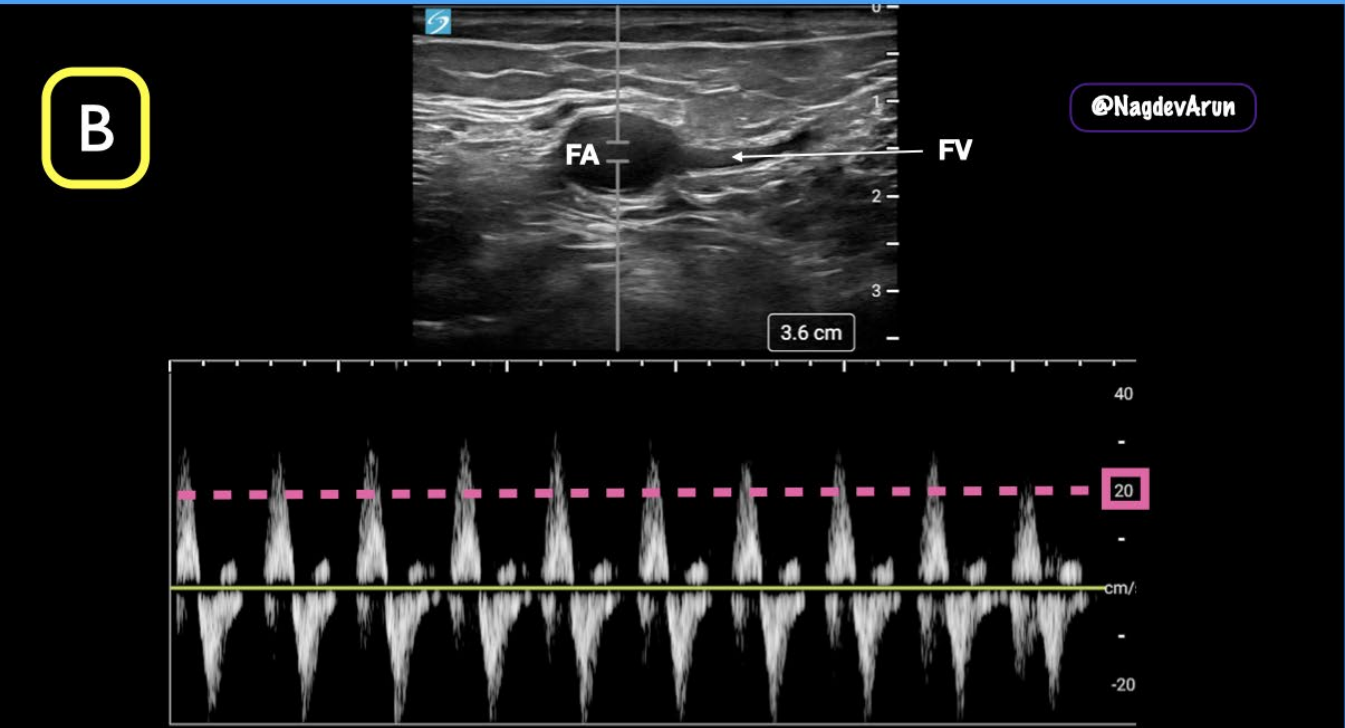
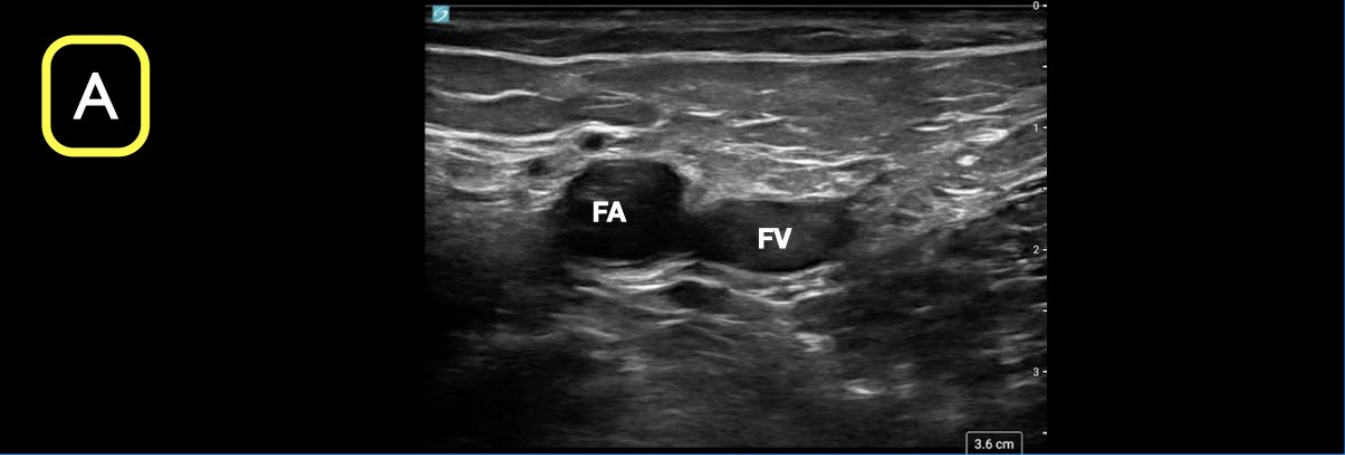
- A pediatric study showed that rescuer pulse palpation was only 78% accurate
- Even if a pulse is felt, this does not guarantee adequate perfusion to vital organs



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POCUS PULSE - FEMORAL



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POCUS PULSE - FEMORAL

- Femoral artery doppler:
 - More accurate than manual palpation (95.3% vs. 54.0%; $p < 0.001$)
 - More accurate at detection SBP >60 mmHg (ROSC) (91.4% vs. 66.2%; $p < 0.001$)
- Femoral artery doppler:
 - Peak Systolic Volume (PSV) >20 cm/s

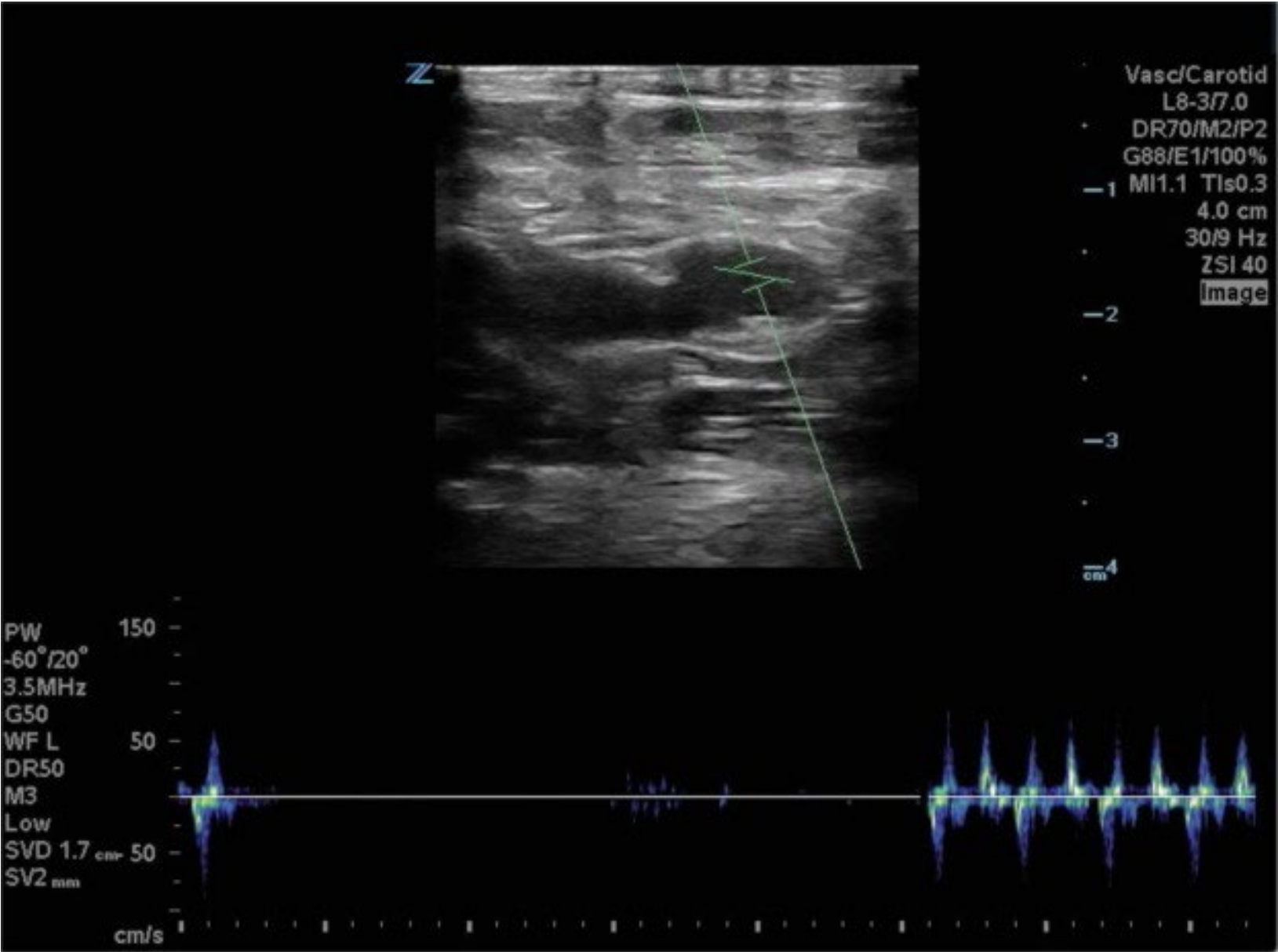


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Cohen AL, Li T, Becker LB, Owens C, Singh N, Gold A, Nelson MJ, Jafari D, Haddad G, Nello AV, Rolston DM; Northwell Health Biostatistics Unit. Femoral artery Doppler ultrasound is more accurate than manual palpation for pulse detection in cardiac arrest. *Resuscitation*. 2022 Apr;173:156-165. doi: 10.1016/j.resuscitation.2022.01.030. Epub 2022 Feb 4. PMID: 35131404.

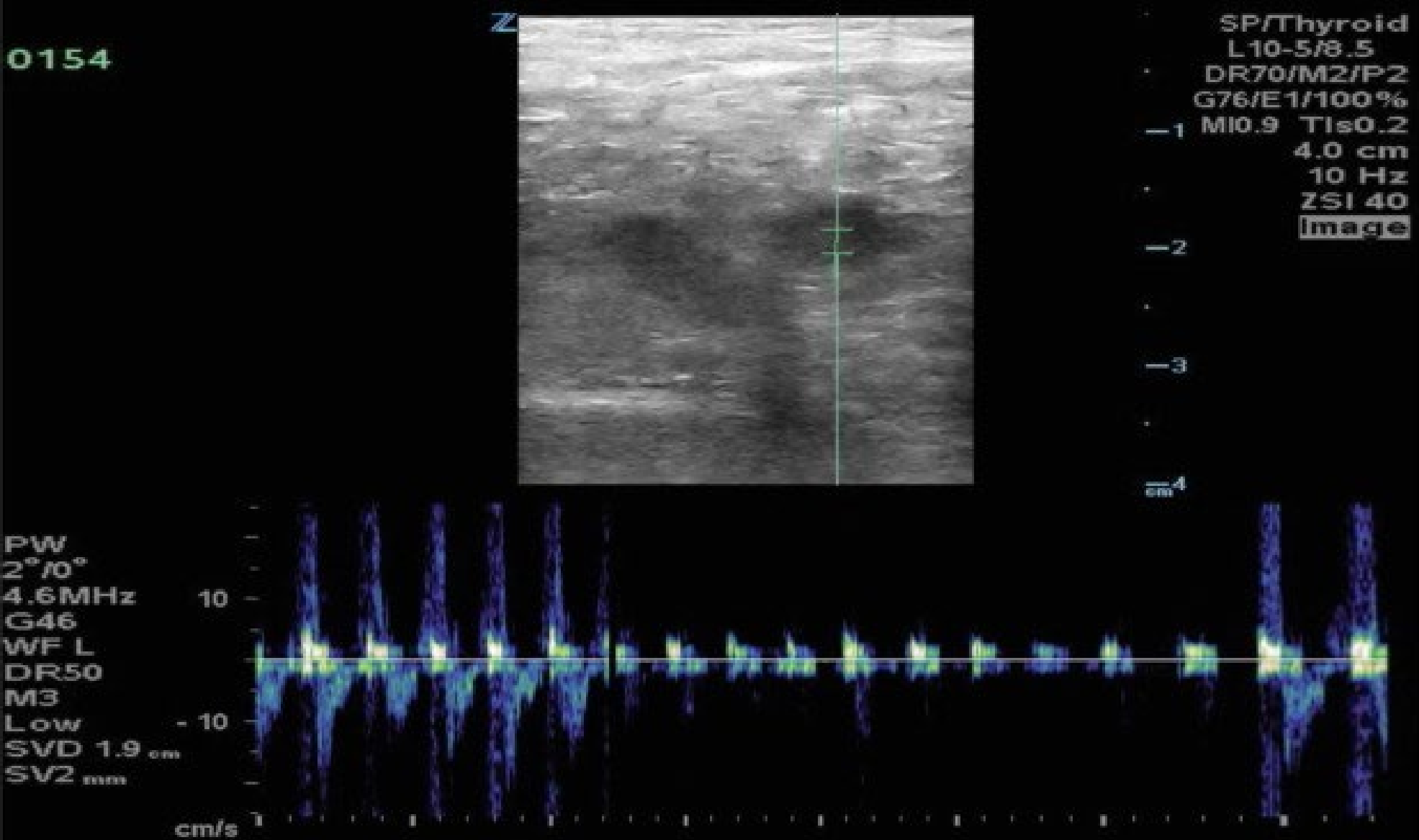
POCUS PULSE - FEMORAL



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POCUS PULSE - FEMORAL



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POCUS PULSE - FEMORAL



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POCUS CAROTID ARTERY COMPRESSION

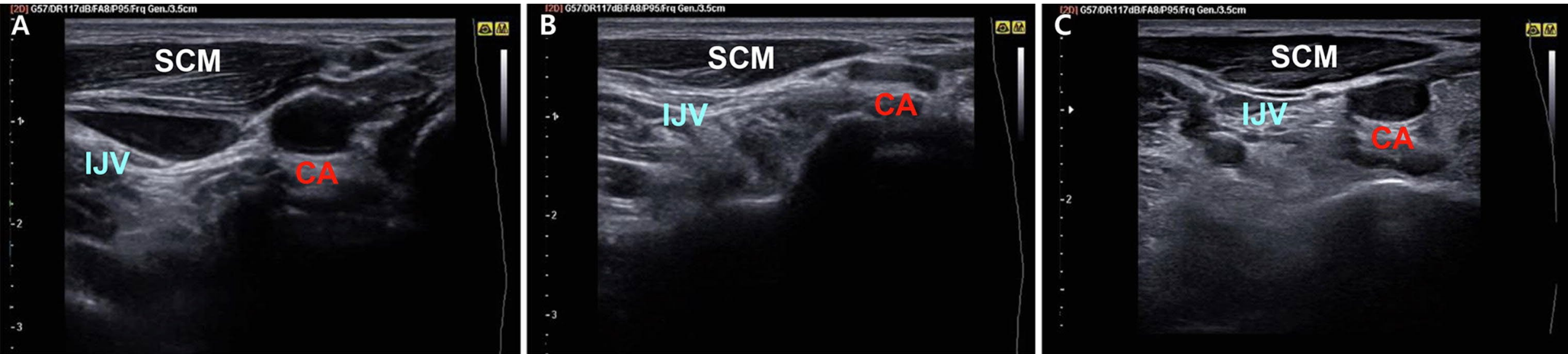
- PoCUS carotid artery compression (PoCUS CAC) was faster compared to manual palpation (1.62 seconds vs 3.5 seconds respectively)
 - time to determine ROSC was significantly shortened to 0.44 times vs the manual palpation ($P < 0.001$)
- PoCUS CAC: fewer attempts, less variability, NOT slower
- ?ROSC during CPR



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POCUS PULSE - POCUS CAC



- A: Before PoCUS CAC
- B: PoCUS CAC
- C: PoCUS CAC with ROSC

A POCUS APPROACH TO CARDIAC ARREST

- 1) Reversible Cases - **Look at the heart**
- 2) PoCUS Pulse - **Look at the pulse (carotid/femoral artery)**

Standard of practice remains pulse by palpation

DO NOT DELAY YOUR PULSE CHECK * <10 sec*



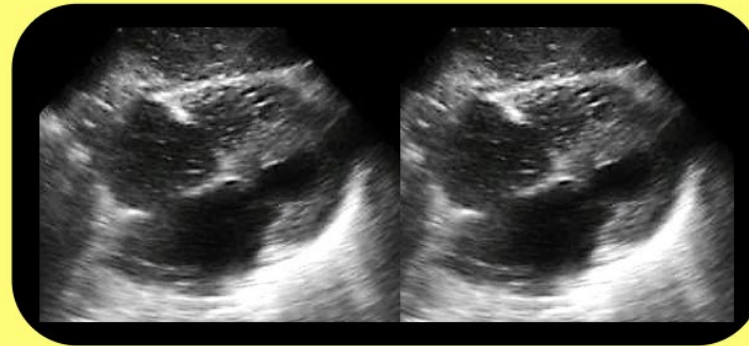
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CARDIAC STANDSTILL



PEA ARREST



Questions: Do patients with *organized* cardiac activity on US have change in survival with standard ACLS vs non-ACLS interventions?

Study: 2° analysis of prospective, multi-center trial. Included only PEA arrest with cardiac activity on POCUS. Compared organized vs disorganized activity & ACLS vs continuous adrenergic agents. Primary outcome: survival to admission.

n = 225

Results

Survival	Organized		Disorganized	
	ACLS	Continuous Adrenergics	ACLS	Continuous Adrenergics
ROSC	54.7% (41.5-67.4)	90.9% (71-98.7)	37.2% (27.3-48.3)	47.1% (26.2-69)
Admission	37.7% (25.9-51.2)	45.5% (26.9-65.4)	17.9% (10.9-28)	0% (0-21.6)
Discharge	1.9% (0-10.9)	4.5% (0.1-23.5)	1.3% (0-7.6)	0% (0-21.6)

Gaspari R, Weekes A, Adhikari S. A retrospective study of pulseless electrical activity, bedside ultrasound identifies interventions during resuscitation associated with improved survival to hospital admission. A REASON Study. Resuscitation. 2017; 120:103-107.



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CARDIAC STANDSTILL

Observational Study > Resuscitation. 2017 Nov:120:103-107.

doi: 10.1016/j.resuscitation.2017.09.008. Epub 2017 Sep 13.

A retrospective study of pulseless electrical activity, bedside ultrasound identifies interventions during resuscitation associated with improved survival to hospital admission. A REASON Study

Romolo Gaspari¹, Anthony Weekes², Srikar Adhikari³, Vicki Noble⁴, Jason T Nomura⁵, Daniel Theodoro⁶, Michael Woo⁷, Paul Atkinson⁸, David Blehar⁹, Samuel Brown¹⁰, Terrell Caffery¹¹, Emily Douglass⁴, Jacqueline Fraser¹², Christine Haines¹³, Samuel Lam¹⁴, Michael Lanspa¹⁰, Margaret Lewis², Otto Liebmann¹⁵, Alexander Limkakeng¹⁶, Fernando Lopez¹⁶, Elke Platz¹⁷, Michelle Mendoza⁹, Hal Minnigan¹⁸, Christopher Moore¹⁹, Joseph Novik²⁰, Louise Rang²¹, Will Scruggs²², Christopher Raio¹³

Affiliations + expand

PMID: 28916478 DOI: [10.1016/j.resuscitation.2017.09.008](https://doi.org/10.1016/j.resuscitation.2017.09.008)



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CARDIAC STANDSTILL

Survival	Organized		Disorganized	
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Admission	37.7% (25.9-51.2)	45.5% (26.9-65.4)	17.9% (10.9-28)	0% (0-21.6)
Discharge	1.9% (0-10.9)	4.5% (0.1-23.5)	1.3% (0-7.6)	0% (0-21.6)



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CARDIAC STANDSTILL

Organized Cardiac Activity:

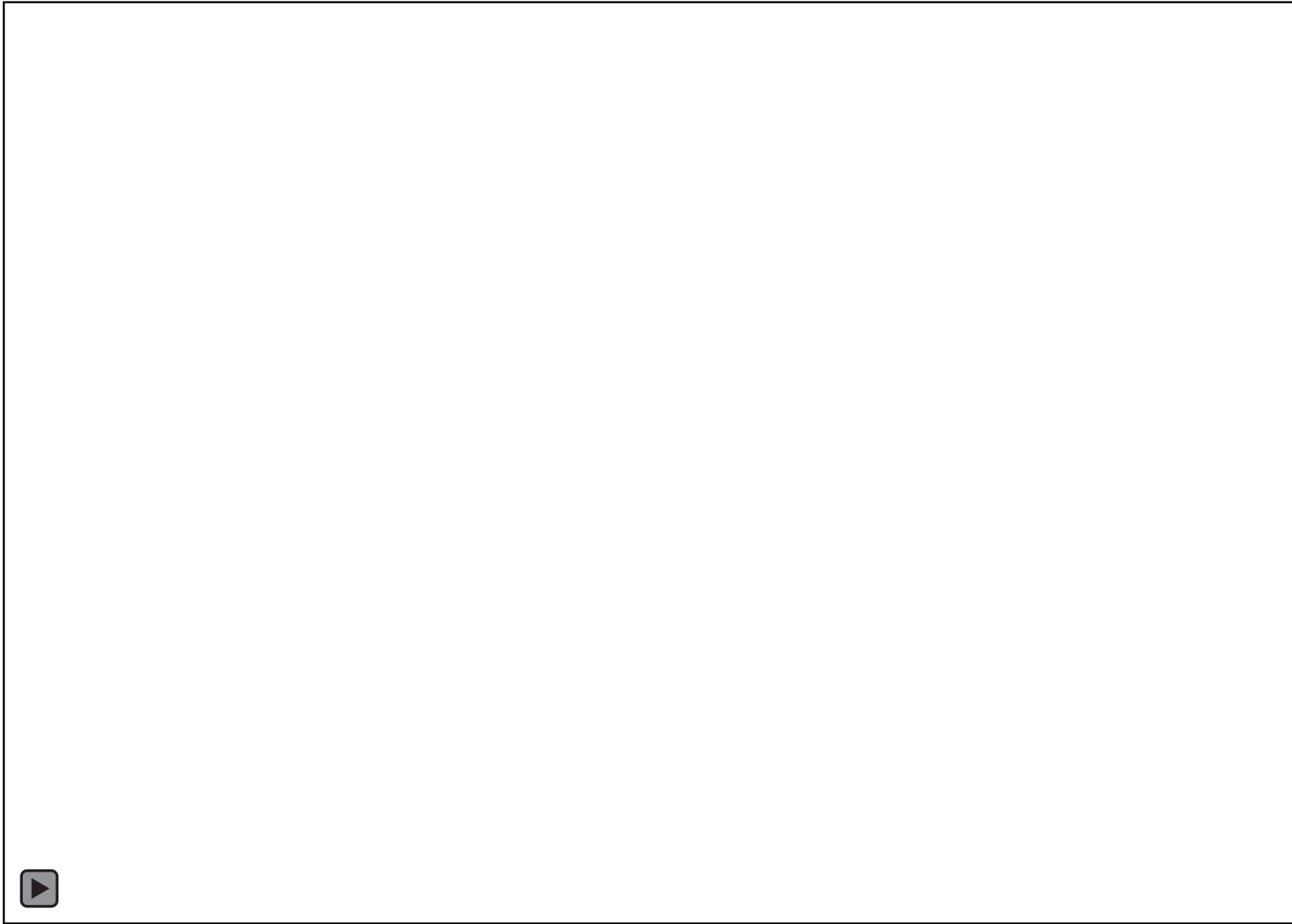
- movement of the myocardium with change in size of the ventricular cavity and synchronized movement of the ventricular wall
- ???pseudo PEA...



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ARREST CLIP



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CARDIAC STANDSTILL

Organized Cardiac Activity:

- movement of the myocardium with change in size of the ventricular cavity and synchronized movement of the ventricular wall
- pseudo-PEA: the presence of electrical activity and myocardial contractions without a palpable pulse



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CALLING THE CODE

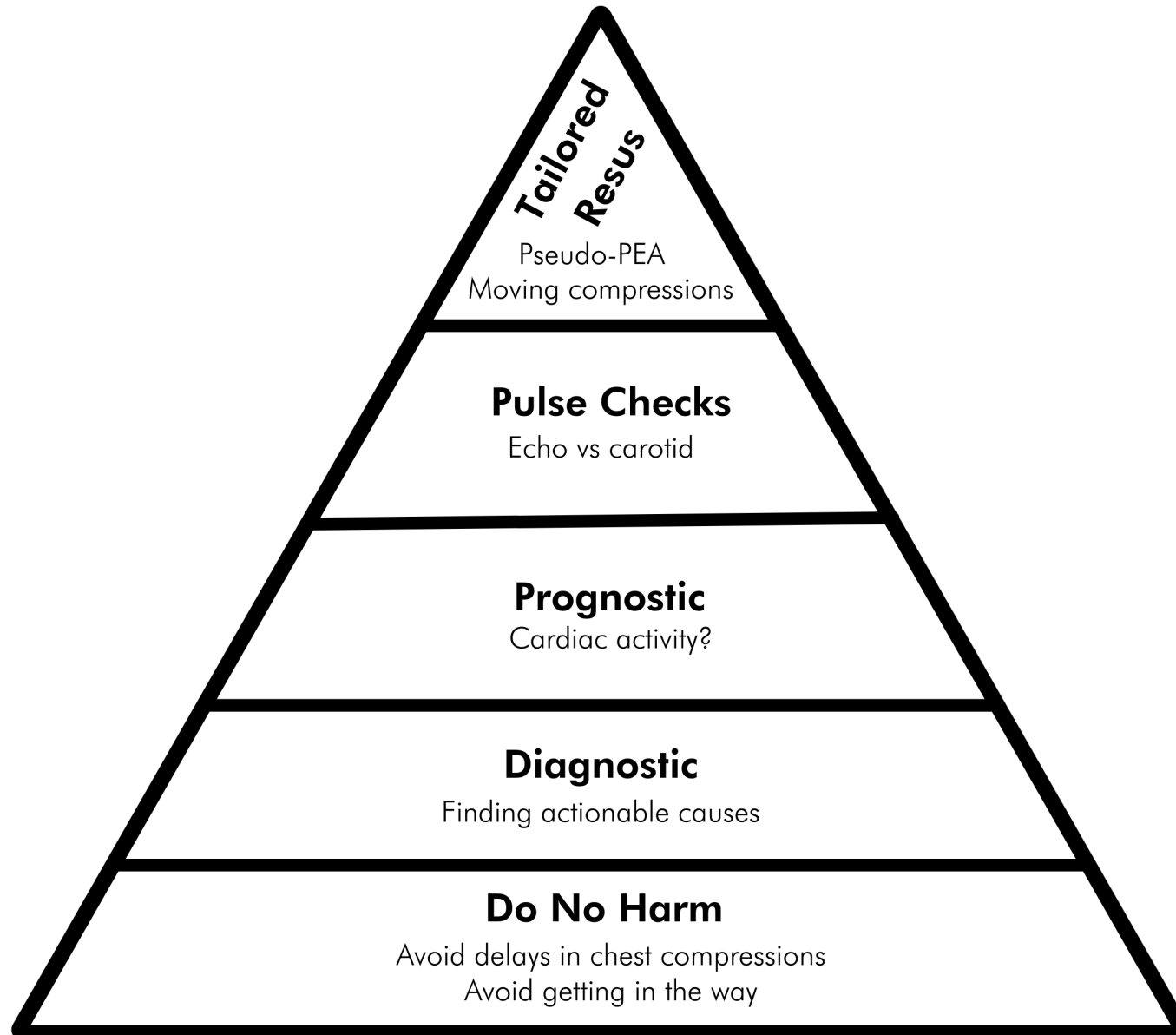
- The absence of cardiac activity on presentation is not 100% sensitive for non-survivors though the rate of survival to discharge was vanishingly low (0.6%)



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A POCUS APPROACH TO CARDIAC ARREST



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A POCUS APPROACH TO CARDIAC ARREST

- 1) Reversible Cases - **Look at the heart**
- 2) PoCUS Pulse - **Look at the pulse (carotid/femoral artery)**

DO NOT DELAY YOUR PULSE CHECK * <10 sec*

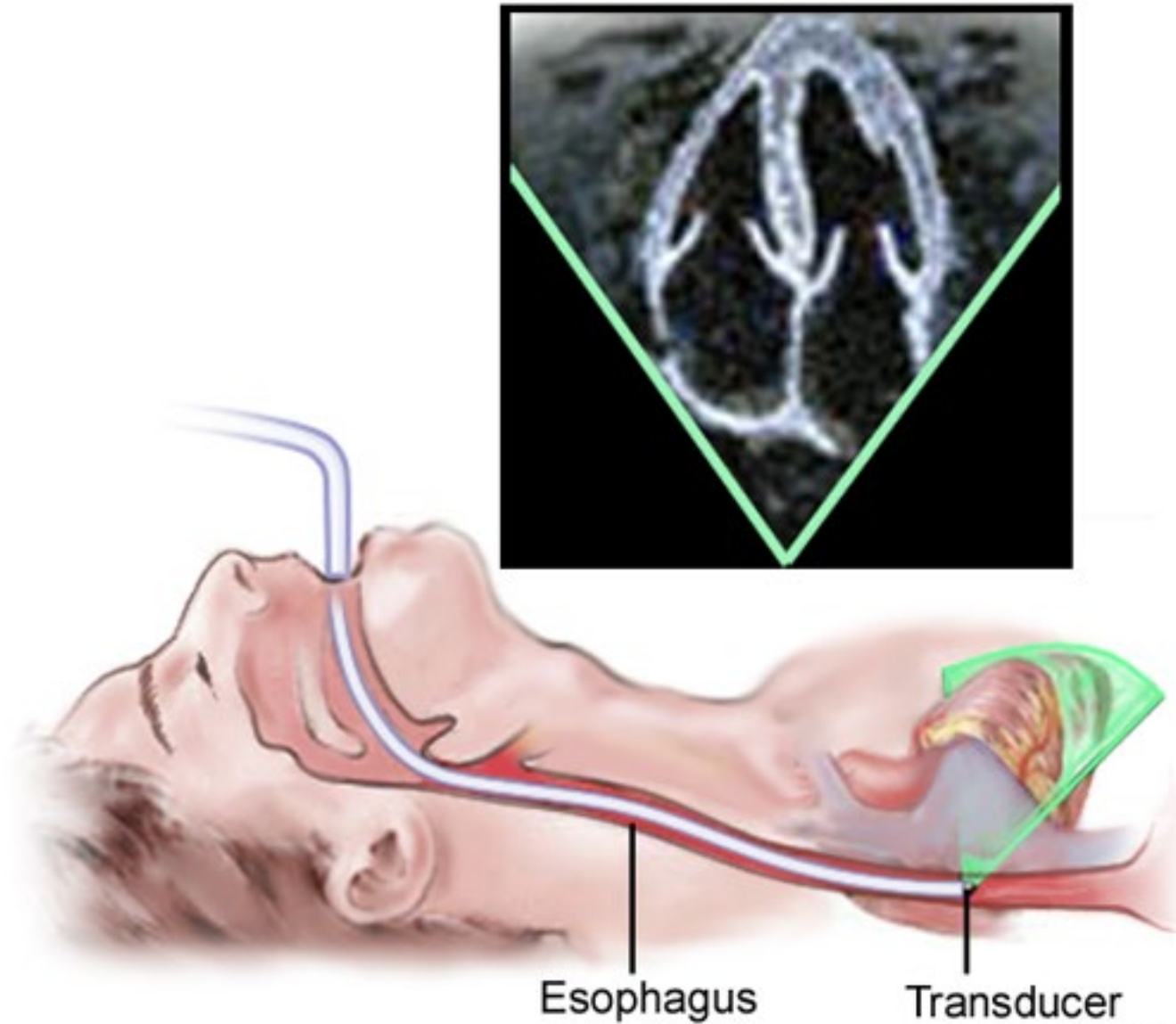


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TEE

Transesophageal echocardiogram



TEE

Review > J Am Coll Cardiol. 2020 Aug 11;76(6):745-754. doi: 10.1016/j.jacc.2020.05.074.

Focused Transesophageal Echocardiography During Cardiac Arrest Resuscitation: JACC Review Topic of the Week

Felipe Teran ¹, Michael I Prats ², Bret P Nelson ³, Ross Kessler ⁴, Michael Blaivas ⁵,
Mary Ann Peberdy ⁶, Sasha K Shillcutt ⁷, Robert T Arntfield ⁸, David Bahner ²

Affiliations + expand

PMID: 32762909 DOI: [10.1016/j.jacc.2020.05.074](https://doi.org/10.1016/j.jacc.2020.05.074)

Free article



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TEE

- Focused TEE overcomes some of the difficulties of performing surface echocardiography during cardiac arrest resuscitation.
- TEE can provide reliable, high-quality cardiac images regardless of any patient-related or external factors.
- Continuous TEE images during cardiac arrest allow feedback on the quality of CPR.
- Like TTE, TEE allows identification of reversible pathologies and can provide prognostic information.
- Future research should include larger and multicenter studies evaluating the diagnostic value, impact in survival, and neurological outcomes of TEE-guided CPR.



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TEE

Canadian Journal of Cardiology 39 (2023) 458–473

Review

Transesophageal Echocardiography in Patients in Cardiac Arrest: The Heart and Beyond

Geneviève Riendeau Beaulac, MD,^a Felipe Teran, MD, MSCE,^b Vincent Lecluyse, MD,^a
Adrian Costescu, MD,^a Marc Belliveau, MD,^a Georges Desjardins, MD,^c and
André Denault, MD, PhD^c

^a Department of Anesthesiology, Hôpital du Sacré-Coeur de Montréal, Université de Montréal, Montreal, Quebec, Canada

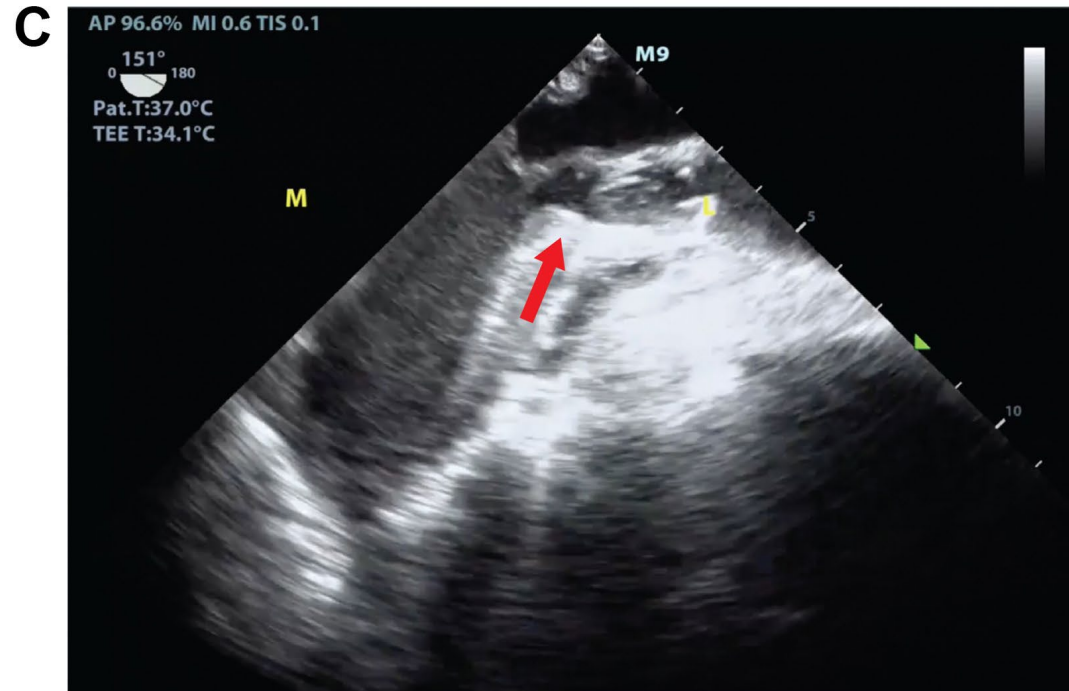
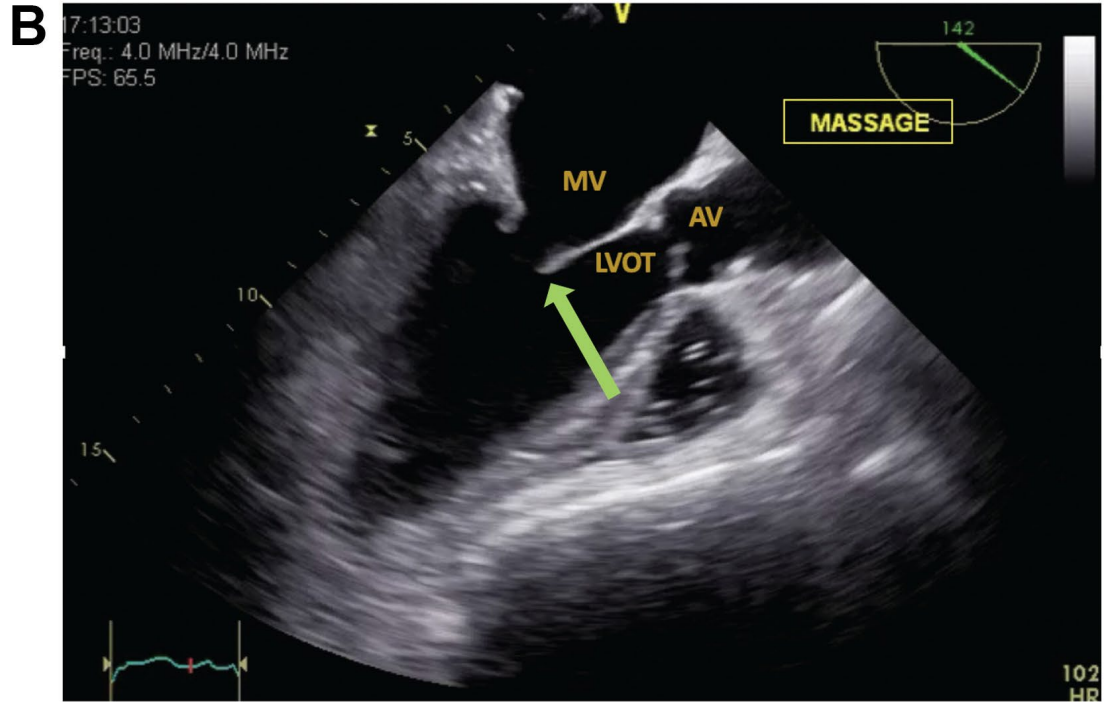
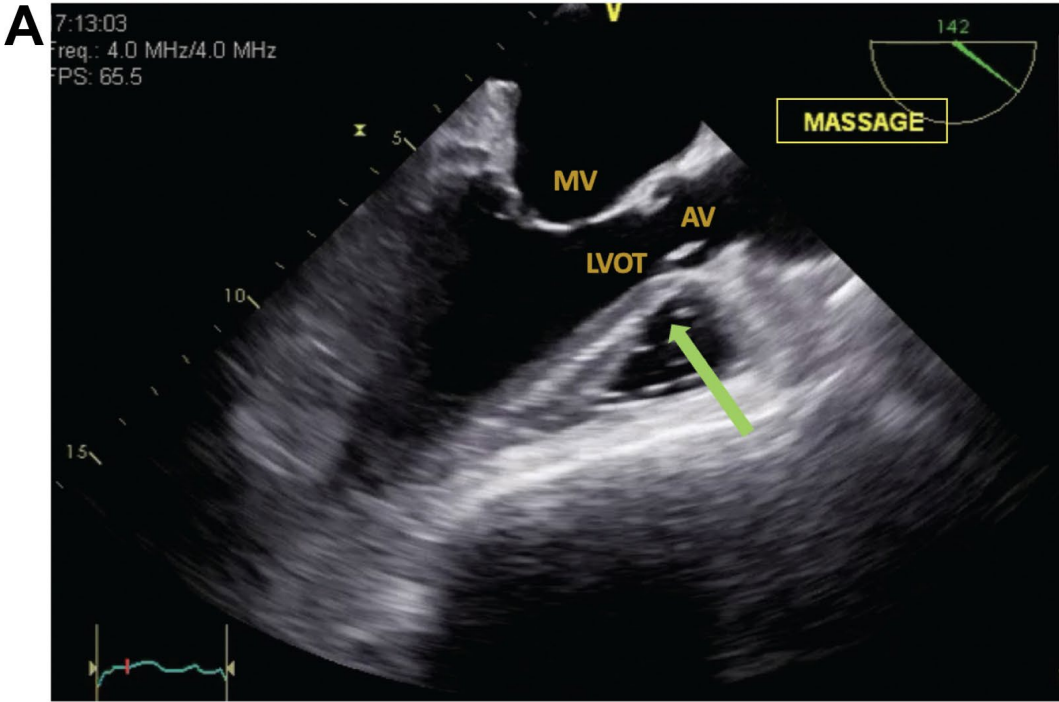
^b Department of Emergency Medicine, Weill Cornell Medicine, New York, New York, USA

^c Department of Anesthesiology, Montreal Heart Institute, Université de Montréal, Montreal, Quebec, Canada



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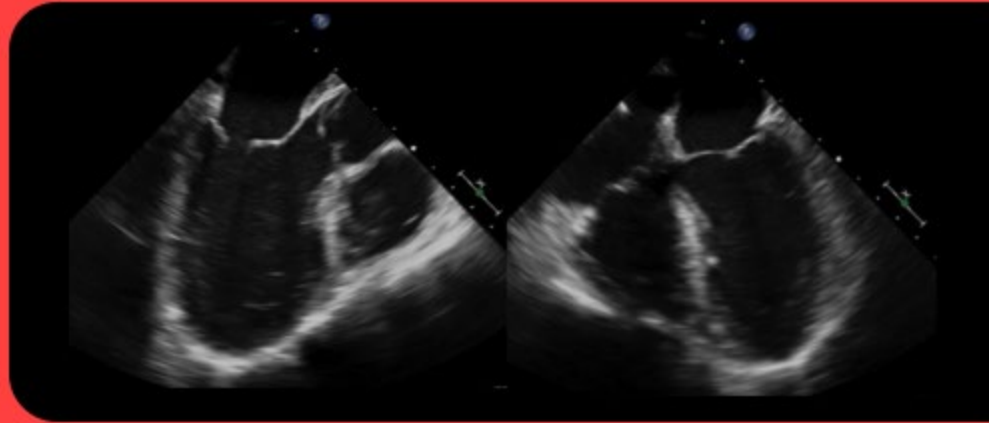


TEE

G.E.L.



TEE TO ↓ CPR PAUSES



Question:

Are TEE guided pulse/rhythm checks shorter than TTE or manual?

Methods:

Retrospective cohort of recorded cardiac arrests. All pauses in compressions timed and type or absence of US noted. Pauses with other interventions excluded. 25 cardiac arrests analyzed.

**n = 139
pauses**

RESULTS

	Mean pause duration (s)	95% CI
TEE	9	5-12
TTE	19	16-22
Manual	11	8-14

No significant difference between TEE and Manual but TEE and Manual both shorter than TTE

Fair J, Mallin MP, Adler A, et al. Transesophageal Echocardiography During Cardiopulmonary Resuscitation Is Associated With Shorter Compression Pauses Compared With Transthoracic Echocardiography. Annals of emergency medicine. 2019



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CASE #5

29 yo male

Collapses after bench pressing a lawnmower for a TikTok video

PMHx: Healthy

<5 min downtime

Arrival at SPH/VGH with ongoing CPR <30min



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ECMO



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ECMO



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ECMO



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A POCUS APPROACH TO CARDIAC ARREST

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DO NOT DELAY YOUR PULSE CHECK * <10 sec*



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Upcoming Rural PoCUS Rounds:

2025 Cardiac Sessions:

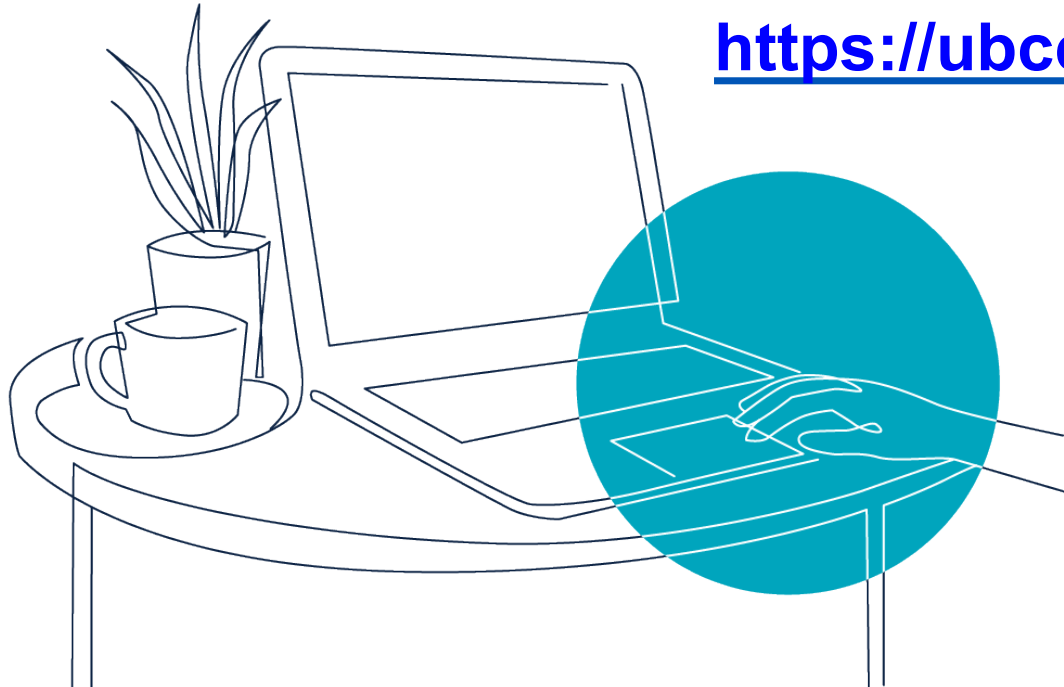
Feb 7th - Valves w/ Dr. Claire Heslop

March 14th - RV and pericardium w/ Dr. Virginia Robinson

April 25th - Diastology w/ Dr. Irina Sainchuck

June 20th - LV w/ Dr. Tracy Morton

<https://ubccpd.ca/rural-pocus-rounds>



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QUESTIONS



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RESOURCES MENTIONED

- <https://www.bcpocus.ca/>
- <https://www.ultrasoundgel.org/>
- <https://www.thepocusatlas.com/>
- <https://coreultrasound.com/>
- <https://www.pocus101.com/>



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RESOURCES MENTIONED

- <https://emergencymedicinecases.com/cardiac-arrest-pocus-integration-communication-strategies-e-cpr/>
- <https://www.tamingthesru.com/blog/ultrasound-of-the-month/october-2022/pocus-in-cardiac-arrest>
- <https://www.acep.org/emultrasound/newsroom/january-2022/use-of-ultrasound-in-cardiac-arrest2>
- <https://www.acepnow.com/article/how-to-safely-incorporate-ultrasound-into-cardiac-arrest-resuscitation/>
- <https://emcrit.org/emcrit/ultrasound-cardiac-arrest/>



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RESOURCES MENTIONED

- <https://recapem.com/pulseless-electrical-activity-in-the-emergency-department/>
- <https://www.ahajournals.org/doi/10.1161/CIR.0000000000001095>



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RESOURCES MENTIONED

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<https://doi.org/10.1186/s13089-023-00346-1>
- Magon F, Longhitano Y, Savioli G, Piccioni A, Tesauro M, Del Duca F, Napoletano G, Volonnino G, Maiese A, La Russa R, Di Paolo M, Zanza C. Point-of-Care Ultrasound (POCUS) in Adult Cardiac Arrest: Clinical Review. *Diagnostics (Basel)*. 2024 Feb 16;14(4):434. doi: 10.3390/diagnostics14040434. PMID: 38396471; PMCID: PMC10887671.
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- Kim DJ, Atkinson P, Sheppard G, Chenkin J, Thavanathan R, Lewis D, Bell CR, Jelic T, Lalande E, Buchanan IM, Heslop CL, Burwash-Brennan T, Myslik F, Olszynski P. POCUS literature primer: key papers on POCUS in cardiac arrest and shock. *CJEM*. 2024 Jan;26(1):15-22. doi: 10.1007/s43678-023-00611-1. Epub 2023 Nov 23. PMID: 37996693.
- Goudie A, Blaivas M, Horn R, Lien W-C, Michels G, Wastl D, Dietrich CF. Ultrasound during Advanced Life Support—Help or Harm? *Diagnostics*. 2024; 14(6):593. <https://doi.org/10.3390/diagnostics14060593>



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RESOURCES MENTIONED

- Gottlieb M, Alerhand S. Managing Cardiac Arrest Using Ultrasound. *Ann Emerg Med*. 2023 May;81(5):532-542. doi: 10.1016/j.annemergmed.2022.09.016. Epub 2022 Nov 2. PMID: 36334956.
- Gaspari R, Harvey J, DiCroce C, Nalbandian A, Hill M, Lindsay R, Nordberg A, Graham P, Kamilaris A, Gleeson T. Echocardiographic pre-pause imaging and identifying the acoustic window during CPR reduces CPR pause time during ACLS - A prospective Cohort Study. *Resusc Plus*. 2021 Mar 6;6:100094. doi: 10.1016/j.resplu.2021.100094. PMID: 34223359; PMCID: PMC8244425.
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- Tibballs J, Russell P. Reliability of pulse palpation by healthcare personnel to diagnose paediatric cardiac arrest. *Resuscitation*. 2009 Jan;80(1):61-4. doi: 10.1016/j.resuscitation.2008.10.002. Epub 2008 Nov 6. PMID: 18992985



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RESOURCES MENTIONED

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- Cohen AL, Li T, Becker LB, Owens C, Singh N, Gold A, Nelson MJ, Jafari D, Haddad G, Nello AV, Rolston DM; Northwell Health Biostatistics Unit. Femoral artery Doppler ultrasound is more accurate than manual palpation for pulse detection in cardiac arrest. *Resuscitation*. 2022 Apr;173:156-165. doi: 10.1016/j.resuscitation.2022.01.030. Epub 2022 Feb 4. PMID: 35131404.
- Riendeau Beaulac G, Teran F, Lecluyse V, Costescu A, Belliveau M, Desjardins G, Denault A. Transesophageal Echocardiography in Patients in Cardiac Arrest: The Heart and Beyond. *Can J Cardiol*. 2023 Apr;39(4):458-473. doi: 10.1016/j.cjca.2022.12.027. Epub 2023 Jan 6. PMID: 36621564.
- Teran F, Prats MI, Nelson BP, Kessler R, Blaivas M, Peberdy MA, Shillcutt SK, Arntfield RT, Bahner D. Focused Transesophageal Echocardiography During Cardiac Arrest Resuscitation: JACC Review Topic of the Week. *J Am Coll Cardiol*. 2020 Aug 11;76(6):745-754. doi: 10.1016/j.jacc.2020.05.074. PMID: 32762909.



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NOTES

G.E.L.



CASA PULSE CHECKS



Question:

Does teaching a sequential sonographic assessment during cardiac arrest reduce CPR pause durations with ultrasound?

Methods:

Pre and post design. Pulse checks timed from video recorded cardiac arrests before and after teaching Cardiac Arrest Sonographic Assessment (CASA) protocol.

n = 210 POCUS pulse checks

Results

Duration of Pulse Checks with POCUS (sec)	Pre	Post
	19.8	15.8

Multivariable Regression	Time Savings (sec)
Post Group	3.3
US Fellowship Trained Attending	3.1
Placing US prior to stopping CPR	3.1

19% POCUS pulse checks \leq 10 sec in Post group

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



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NOTES - CASA PROTOCOL

During First Three Pauses

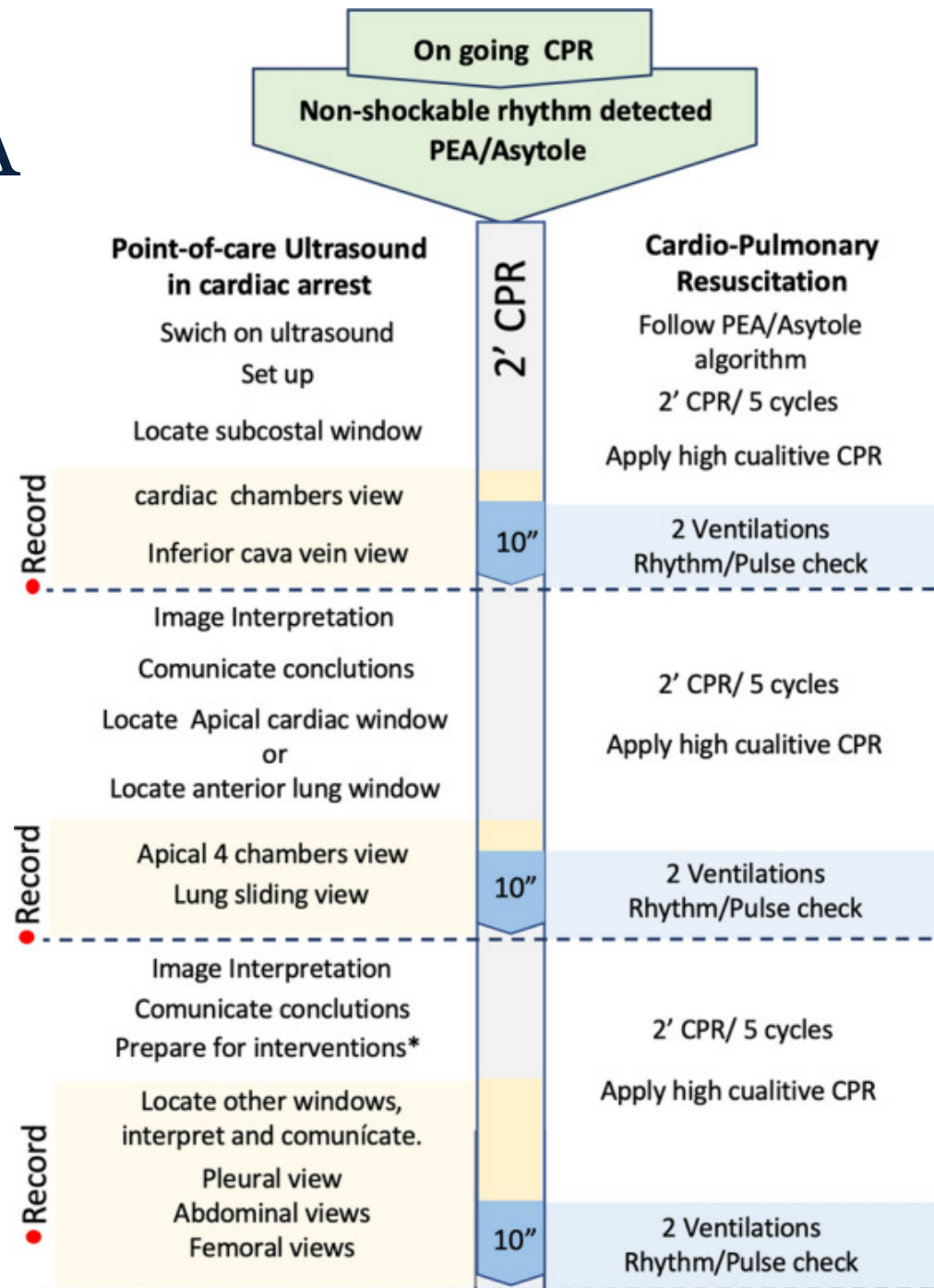
- 1) First pause → Evaluate for tamponade
- 2) Second pause → Evaluate for pulmonary embolism
- 3) Third Pause → Evaluate for cardiac activity

During CPR

- Evaluate for pneumothorax
- Check IVC and FAST scan



NOTES - POCUS-CA



- Protocol (POCUS-CA)

ARREST CLIP X₃

