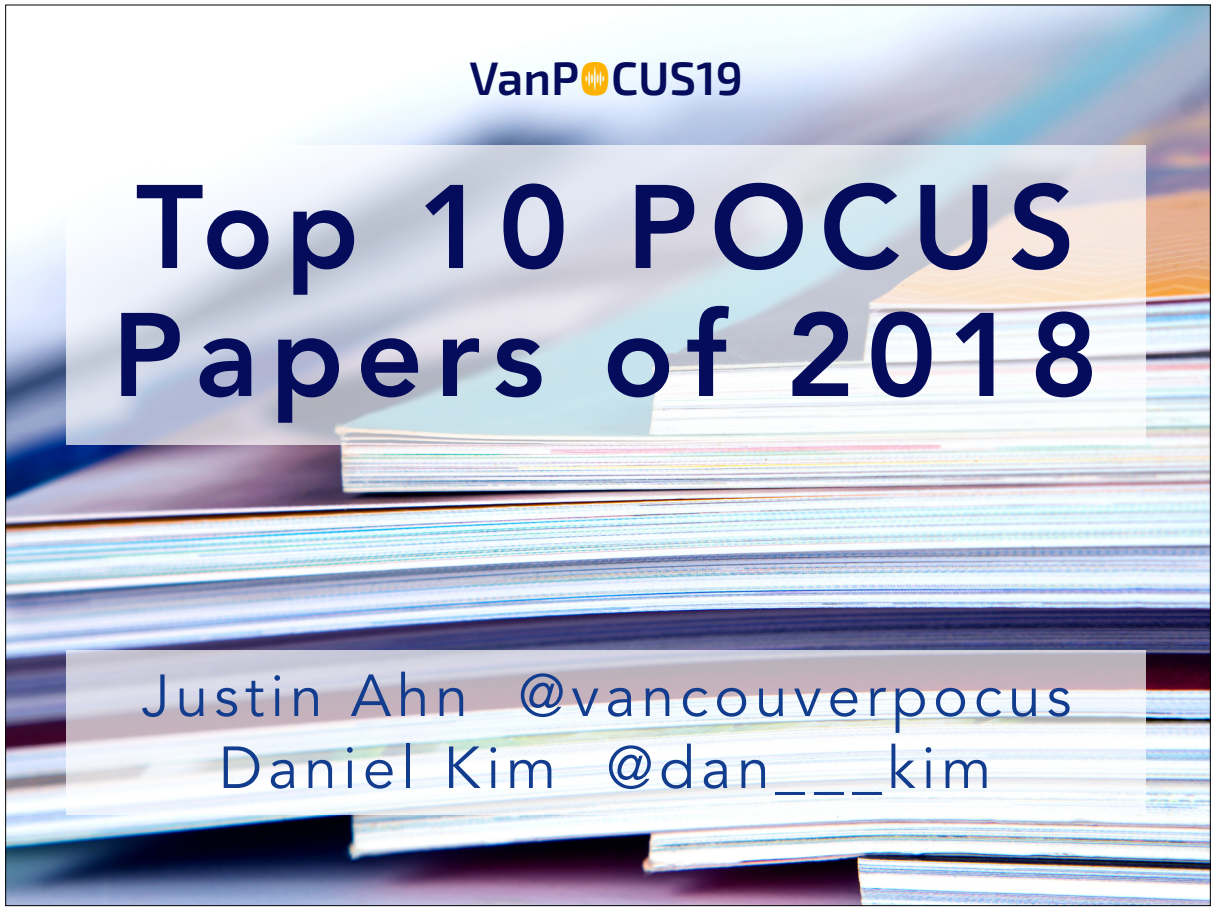


Disclosures

Dr. Ahn: none

Dr. Kim: medical advisory board of Clarius Mobile Health

1. The 5th Pillar

JAMA Cardiology | Special Communication

Time to Add a Fifth Pillar to Bedside Physical Examination
Inspection, Palpation, Percussion, Auscultation, and Insonation

Jagat Narula, MD, PhD; Y. Chandrashekhar, MD; Eugene Braunwald, MD

Inspection, palpation, percussion, and auscultation have been the 4 pillars of clinical bedside medicine. Although these basic methods of physical examination have served us well, traditional bedside examination, for a number of reasons including diminishing interest and expertise, performs well less than what is required of a modern diagnostic strategy. Improving the performance of physical examination is vital given that it is crucial to guide diagnostic possibilities and further testing. Current efforts at improving physical examination skills during medical training have not been very successful, and incorporating appropriate technology at the bedside might improve its performance. Selective use of bedside ultrasound (or *insonation*) can be one such strategy that could be incorporated as the fifth component of the physical examination. Seeing pathology through imaging might improve interest in physical examination among trainees, and permit appropriate downstream testing and possibly superior decision making. Current ultrasound technology makes this feasible, and further miniaturization of ultrasound devices and reduced cost will allow for routine use at the bedside. It is time to have a wider debate and a possible consensus about updates required to enhance current paradigms of physical examination.

JAMA Cardiol. doi:10.1001/jamacardio.2018.0001
Published online February 28, 2018.

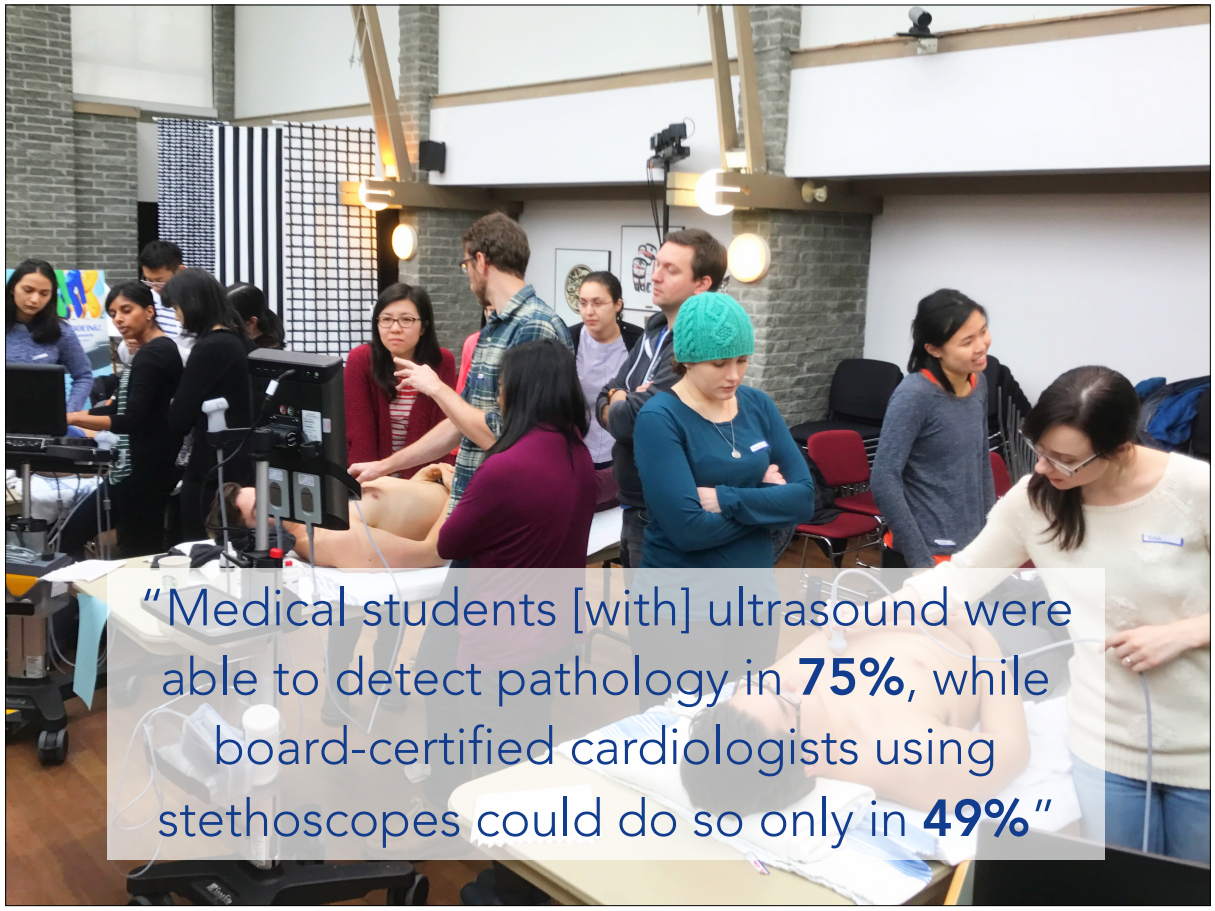
Invited Commentary

Author Affiliations: Icahn School of Medicine at Mount Sinai, New York, New York (Narula); University of Minnesota School of Medicine and Veterans Affairs Medical Center, Minneapolis (Chandrashekhar); Brigham and Women's Hospital and Harvard Medical School, Boston, Massachusetts (Braunwald).

Corresponding Author: Jagat Narula, MD, PhD, Icahn School of Medicine at Mount Sinai, One Gustave L. Levy Place, GP-1W, Box 1030, New York, NY 10029 (jagat.narula@mountsinai.org).

Stethos = chest

Scope = to see



Take Home Message

Ultrasound is the **new** stethoscope

2. Do We Have to Worry About the Anti Vax Movement?

JAMA Pediatrics | Original Investigation

Association of Prenatal Ultrasonography and Autism Spectrum Disorder

N. Paul Rosman, MD; Rachel Vassar, MD; Gheorghe Doros, PhD; James DeRosa, MPH; Allison Froman, MPH; Audrey DiMauro, MD, PhD; Sherry Santiago, MD; Jodi Abbott, MD

IMPORTANCE The prevalence of autism spectrum disorder (ASD) has been increasing rapidly, with current estimates of 1 in 68 children affected. Simultaneously, use of prenatal ultrasonography has increased substantially, with limited investigation into its safety and effects on brain development. Animal studies have demonstrated that prenatal ultrasonography can adversely affect neuronal migration.

OBJECTIVE To quantify prenatal ultrasound exposure by the frequency, timing, duration, and strength of ultrasonographic scans in children with later ASD, developmental delay, and typical development.

DESIGN, SETTING, AND PARTICIPANTS This case-control study included 107 patients with ASD, 104 control individuals with developmental delay, and 209 controls with typical development. Participants were identified from medical records based on prenatal care and delivery at Boston Medical Center, a diverse, academic, safety-net medical center, from July 1, 2006, through December 31, 2014, with a gestational age at birth of at least 37 weeks. Data were analyzed from May 1, 2015, through November 30, 2017.

EXPOSURES Ultrasonographic exposure was quantified by the number and timing of scans, duration of exposure, mean strength (depth, frame rate, mechanical index, and thermal index), and time of Doppler and 3- and 4-dimensional imaging.

107 ASD patients

104 Non-ASD developmental delay patients

209 Developmentally normal

ASD Associated With

Fewer **number** of ultrasounds

Shorter **duration** of ultrasound

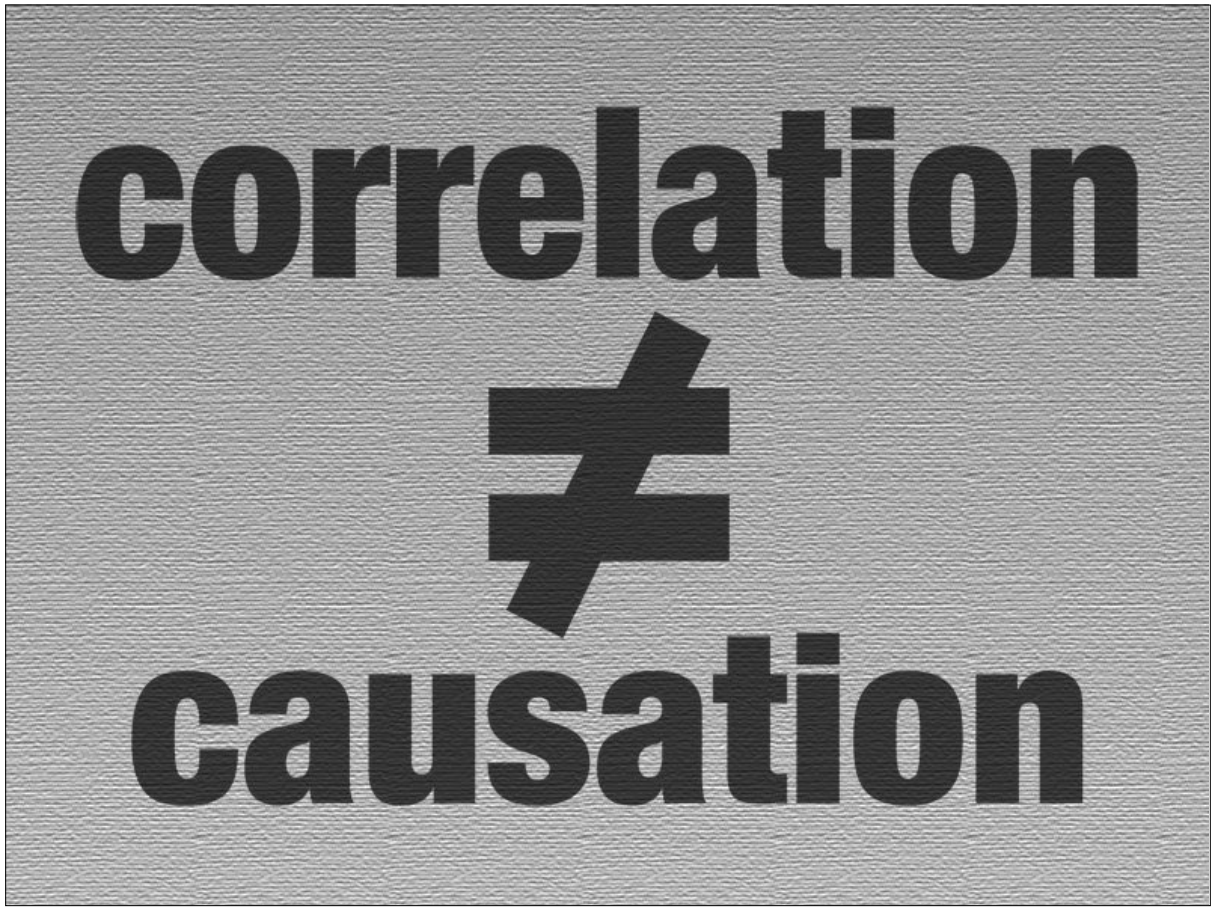
Received 1st ultrasound **10 days later**

Greater mean **depth**

DEPTH???

Ultrasound beams **lose energy** as they penetrate tissue

Depth is a **measurement** and dependent on body habitus



Take Home Message

There is **no** evidence that ultrasound causes autism

Remember ALARA, and **never** use **color doppler** on the fetus

3. Cochrane Review of FAST

Cochrane Library

Cochrane Database of Systematic Reviews

Point-of-care ultrasonography for diagnosing thoracoabdominal injuries in patients with blunt trauma (Review)

Stengel D, Leisterer J, Ferrada P, Ekkernkamp A, Mutze S, Hoenning A

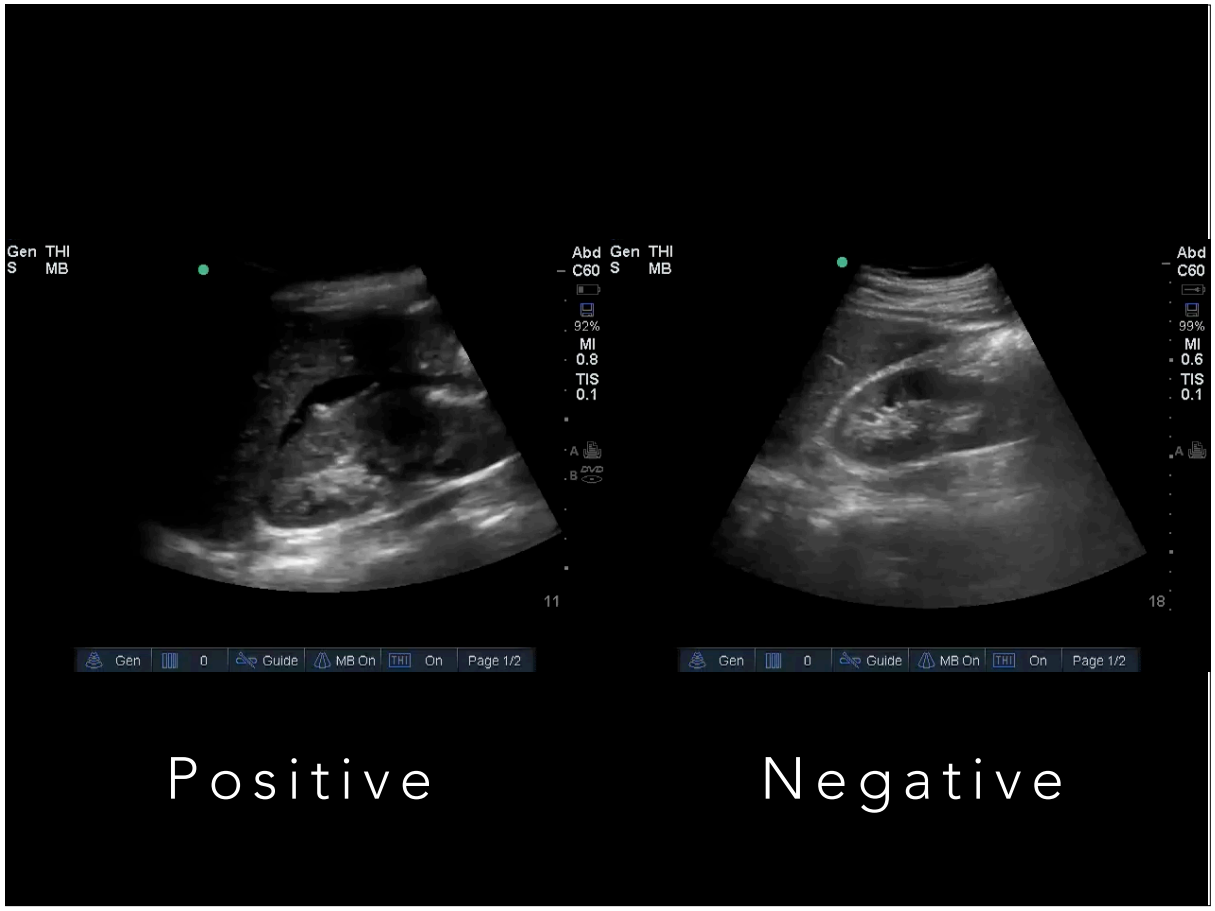
34 studies

8,635 patients

Intra-abdominal Injury

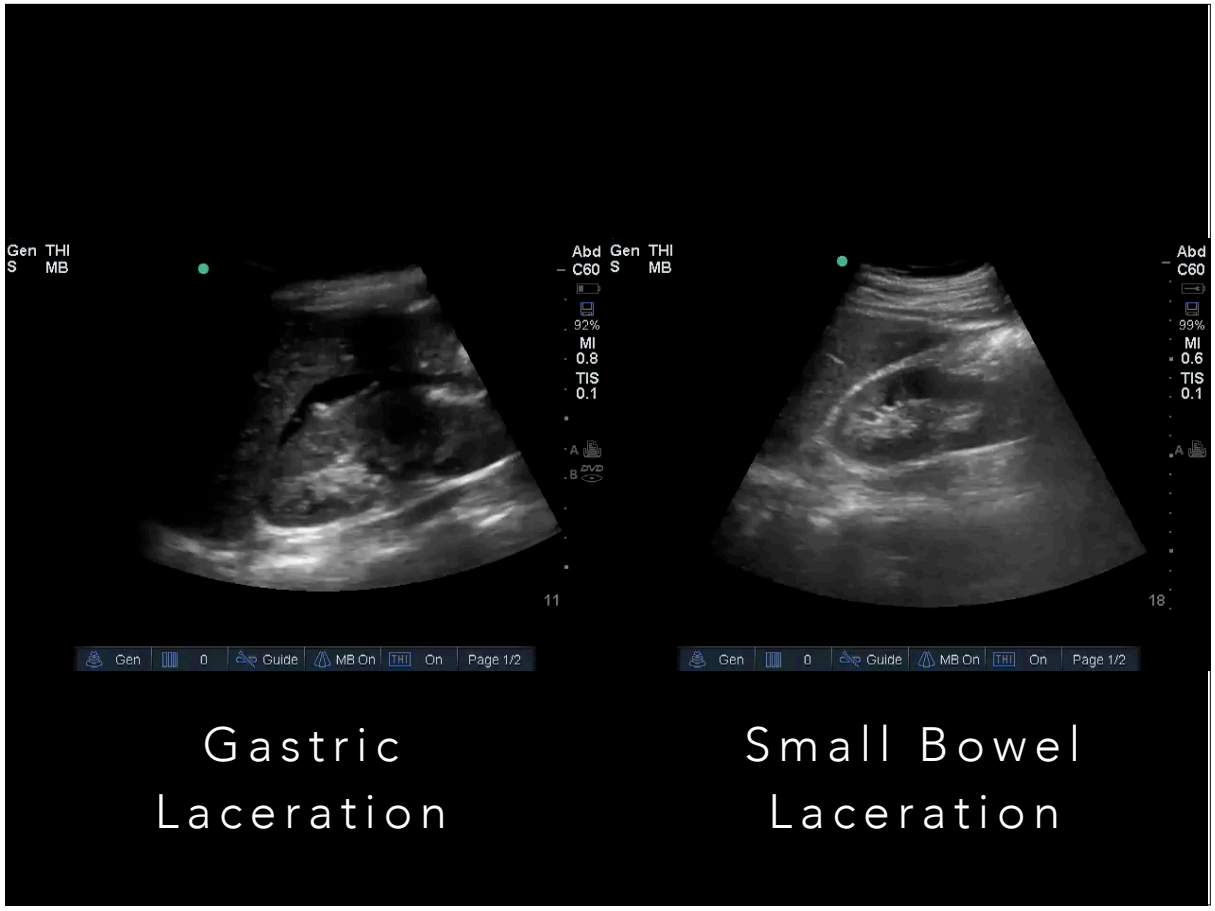
Sensitivity **68%**

Specificity **95%**



Positive

Negative



Gastric Laceration

Small Bowel Laceration

Solid organ injury

Bowel injury

Mesenteric injury

Diaphragm injury

Retroperitoneal hemorrhage

Take Home Message

A negative FAST does **not** rule out intra-abdominal injury

4. Fasting and Stomach Fullness

"Full Stomach" Despite the Wait: Point-of-care Gastric Ultrasound at the Time of Procedural Sedation in the Pediatric Emergency Department

Julie Leviter, MD, Dale W. Steele, MD, MS, Erika Constantine, MD, James G. Linakis, PhD, MD, and Siraj Amanullah, MD, MPH

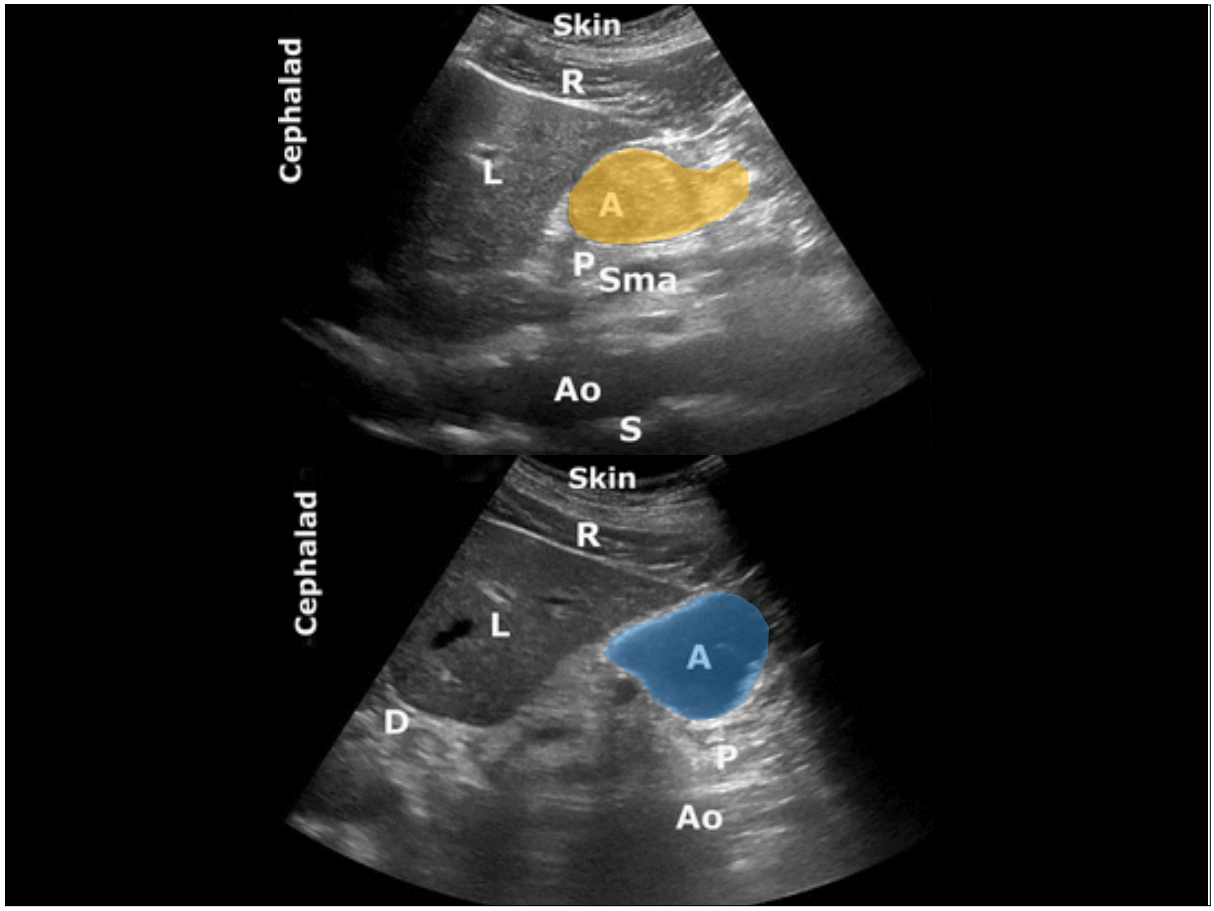
ABSTRACT

Objectives: The objective was to use gastric point-of-care ultrasound (POCUS) to assess gastric contents and volume, summarize the prevalence of "full stomach," and explore the relationship between fasting time and gastric contents at the time of procedural sedation.

Methods: This was a prospective study of patients aged 2 to 17 years fasting prior to procedural sedation. A single sonographer scanned each patient's gastric antrum in two positions: supine with the upper body elevated and right lateral decubitus (RLD). Gastric content (empty, liquid, or solid) was noted, and the gastric volume (mL/kg) was estimated from antral cross-sectional area (CSA). "Full stomach" was defined as any solid content or >1.2 mL/kg of liquid gastric content.

Results: We enrolled 116 subjects, with a median fasting time of 5.8 hours. Of the 107 with evaluable images, 74 patients, 69% (95% confidence interval [CI] = 60%–77%), were categorized as having a full stomach. Each hour of fasting was associated with lower odds (odds ratio = 0.79, 95% CI = 0.65–0) of a full stomach. However, the knowledge of fasting time alone provides little ability to discriminate between risk groups (C-index = 0.66).

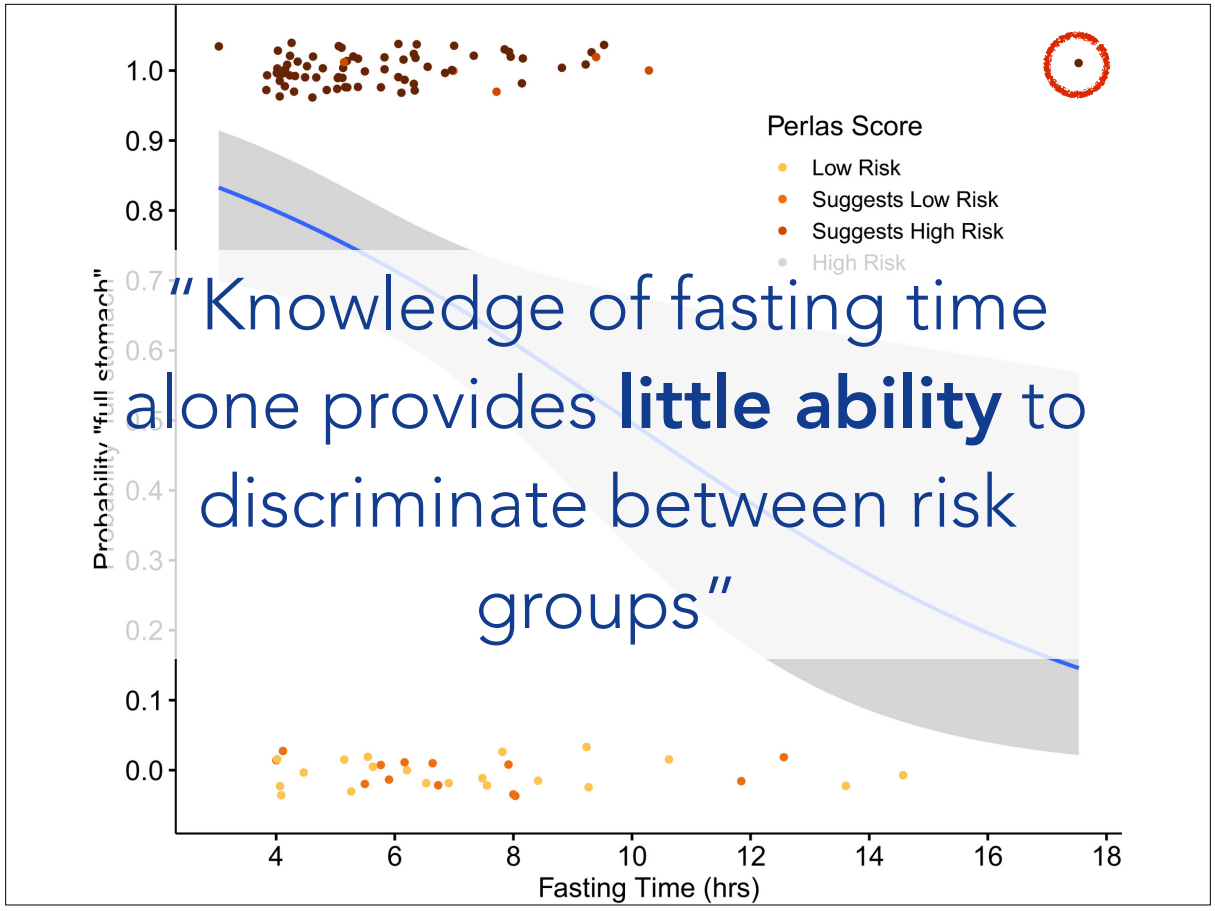
Conclusions: Gastric POCUS classified many patients as having a full stomach at the time of expected procedural sedation, despite prolonged fasting times. These findings may inform risk–benefit considerations when planning the timing and medication choice for procedural sedation.



107 patients

Empty stomach **33**
Full stomach **74**


TIMEX
QUARTZ
Median fasting time
5.8 hr


Perlas Score
Low Risk
Suggests Low Risk
Suggests High Risk
High Risk
Probability "full stomach"
1.0
0.9
0.8
0.7
0.6
0.4
0.3
0.2
0.1
0.0
4
6
8
10
12
14
16
18
Fasting Time (hrs)
"Knowledge of fasting time alone provides **little ability** to discriminate between risk groups"

American College of Emergency Physicians®

ADVANCING EMERGENCY CARE

"**Do not delay** procedural sedation in adults or pediatrics in the ED based on fasting time"

-2014 ACEP Clinical Policy

Take Home Message

Fasting times **do not correlate** with empty stomachs in kids

(And don't bother learning gastric ultrasound)

5. Novel Approach to Pericardiocentesis

Ultrasound-guided pericardiocentesis: a novel parasternal approach

Adi Osman[a,*], Tan Wan Chuan[a,*], Jamalludin Ab Rahman[b], Gabriele Via[c] and Guido Tavazzi[d,e]

Objective **The aim of this study was to evaluate a novel pericardiocentesis technique using an in-plane parasternal medial-to-lateral approach with the use of a high-frequency probe in patients with cardiac tamponade.**

Background **Echocardiography is pivotal in the diagnosis of pericardial effusion and tamponade physiology. Ultrasound guidance for pericardiocentesis is currently considered the standard of care. Several approaches have been described recently, which differ mainly on the site of puncture (subxiphoid, apical, or parasternal). Although they share the use of low-frequency probes, there is absence of complete control of needle trajectory and real-time needle visualization. An in-plane and real-time technique has only been described anecdotally.**

Methods and results **A retrospective analysis of 11 patients (63% men, mean age: 37.7 ± 21.2 years) presenting with cardiac tamponade admitted to the tertiary-care emergency department and treated with parasternal medial-to-lateral in-plane pericardiocentesis was carried out. The underlying causes of cardiac tamponade were different among the population. All the pericardiocentesis were successfully performed in the emergency department, without complications, relieving the hemodynamic instability. The mean time taken to perform the eight-step procedure was 309 ± 76.4 s, with no procedure-related complications.**

Conclusion **The parasternal medial-to-lateral in-plane pericardiocentesis is a new technique theoretically free of complications and it enables real-time monitoring of needle trajectory. For the first time, a pericardiocentesis approach with a medial-to-lateral needle trajectory and real-time, in-plane, needle visualization was performed in a tamponade patient population.** ***European Journal of Emergency Medicine*** **00:000–000**

European Journal of Emergency Medicine 2017, **00**:000–000

Keywords: cardiac tamponade, focused cardiac ultrasound, pericardiocentesis, point of care ultrasound, procedural guidance, ultrasound-guided pericardiocentesis

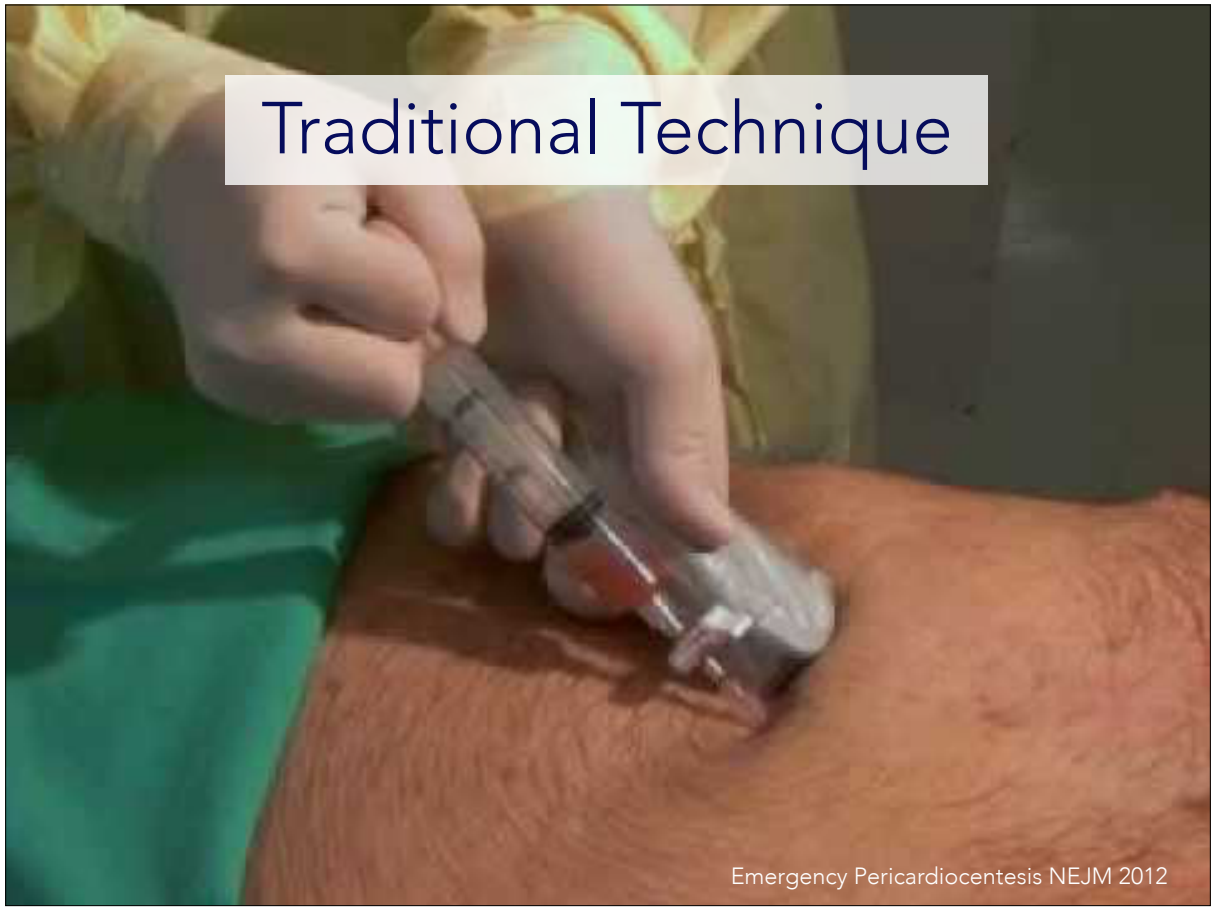
[a]Emergency and Trauma Department, Raja Permaisuri Bainun Hospital, Jalan Raja Ashman (Jalan Hospital), Ipoh, Perak, [b]Department of Community Medicine, Faculty of Medicine, International Islamic University, Kuantan, Pahang, Malaysia, [c]Cardiac Anesthesia & Intensive Care – Cardiocentro Ticino, Lugano, Switzerland, [d]Emergency Department, Anaesthesia and Intensive Care Unit, Fondazione IRCCS Policlinico S. Matteo and [e]Department of Clinical, Surgical, Diagnostic and Paediatric Sciences, Anaesthesia, Intensive Care and Pain Therapy Unit, University of Pavia, Pavia, Italy

Correspondence to Adi Osman, MD, Hospital Raja Permaisuri Bainun, 30450 Ipoh, Perak, Malaysia
Tel: +60 125 390 911; fax: +60 52 425 033; e-mail: osman.adi@gmail.com

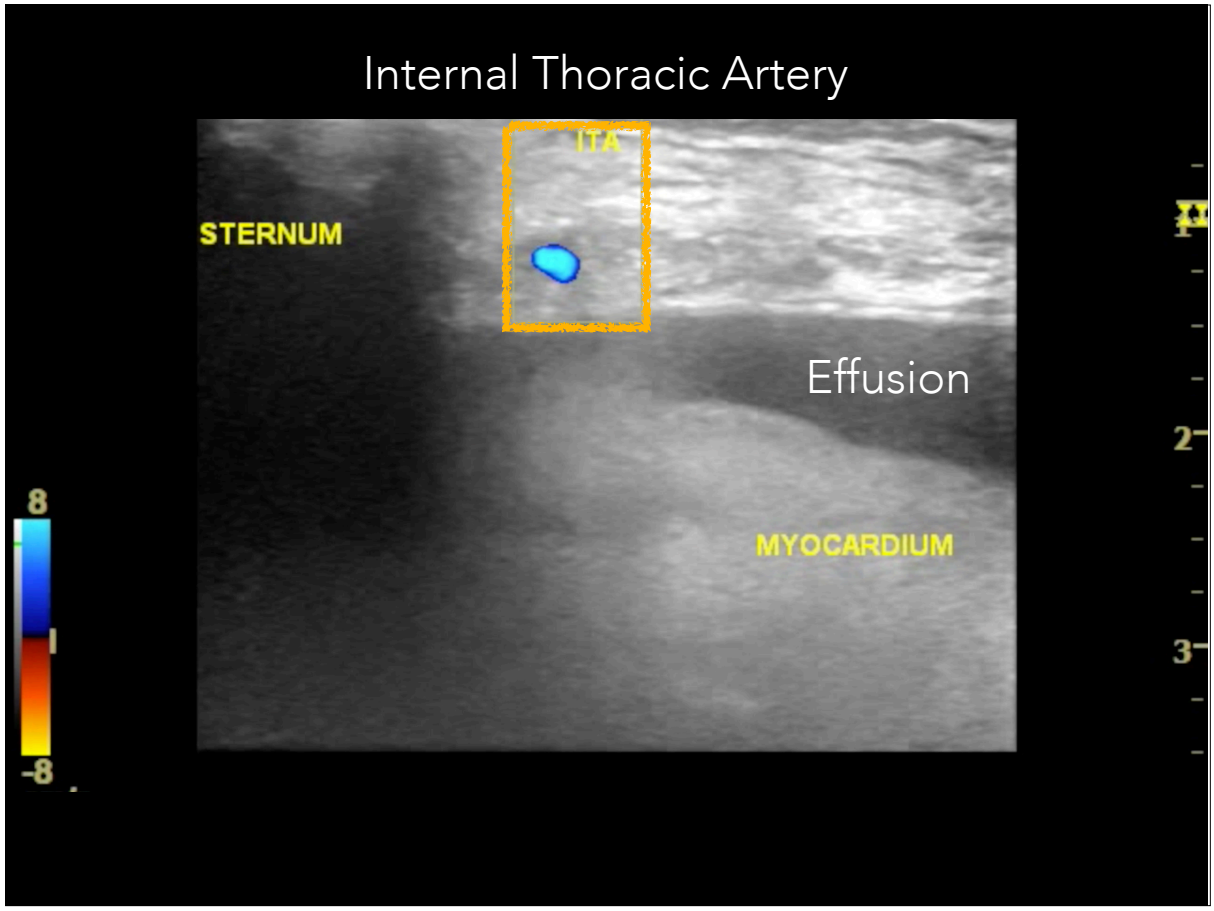
*Adi Osman and Tan Wan Chuan contributed equally to the writing of this article.

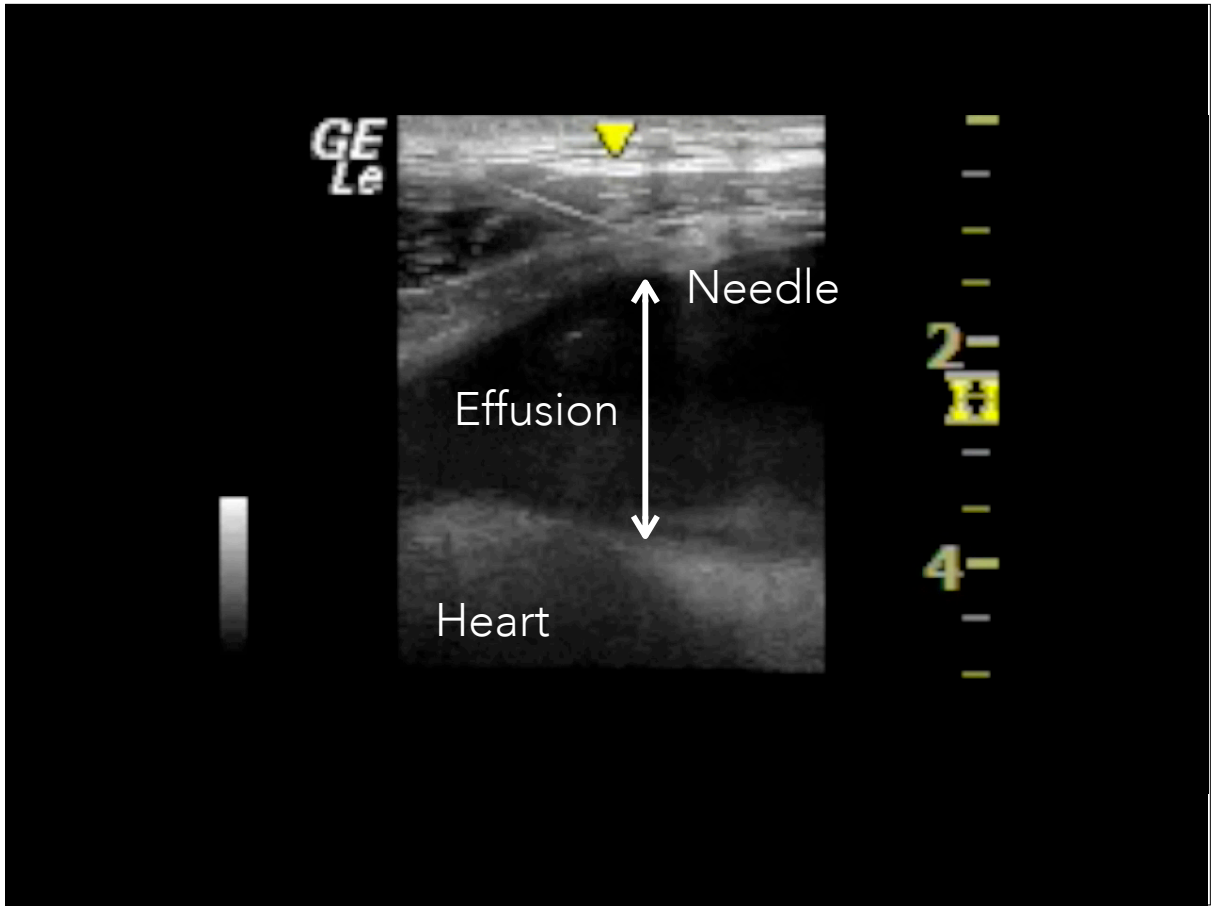
Received 29 November 2016 **Accepted** 18 April 2017

Traditional Technique



Emergency Pericardiocentesis NEJM 2012


Internal Thoracic Artery
ITA
STERNUM
Effusion
MYOCARDIUM
8
-8
2
3


GE
Needle
Effusion
Heart
2
4

11 patients

100% success
Mean time **5.15 min**

No complications

Take Home Message

Use the **anterior** approach with a **linear probe** in thin patients with a large anterior effusion

6. Confused About Standstill

Variability in Interpretation of Cardiac Standstill Among Physician Sonographers

Kevin Hu, MD; Nachi Gupta, MD, PhD; Felipe Teran, MD; Turandot Saul, MD; Bret P. Nelson, MD; Phillip Andrus, MD*

*Corresponding Author. E-mail: pandrus@gmail.com, Twitter: @pandrus.

Study objective: Cardiac standstill on point-of-care ultrasonography has been widely studied as a marker of prognosis in cardiac arrest. Return of spontaneous circulation has been reported in as few as 0% and as many as 45% of patients with cardiac standstill. When explicitly documented, the definition of cardiac activity in these studies varied from any slight change in echogenicity of the myocardium to any kinetic cardiac activity. We hypothesize that the variability in research definitions of cardiac activity may affect interpretation of video clips of patients in cardiac arrest. The goal of this study is to assess the variability in interpretation of standstill among physician sonographers.

Methods: We surveyed physician sonographers at 6 conferences held at 3 academic medical centers in the Greater New York area. Survey respondents were allotted 20 seconds per slide to determine whether each of 15 video clips of patients in cardiac arrest were standstill or not. Data were collected anonymously with radio frequency remotes.

Results: There were 127 total participants, including faculty, fellows, and resident physicians specializing in emergency medicine, critical care, and cardiology. There was only moderate interrater agreement among all participants (α=0.47). This lack of agreement persisted across specialties, self-reported training levels, and self-reported ultrasonographic expertise.

Conclusion: According to the results of our study, there appears to be considerable variability in interpretation of cardiac standstill among physician sonographers. Consensus definitions of cardiac activity and standstill would improve the quality of cardiac arrest ultrasonographic research and standardize the use of this technology at the bedside. [Ann Emerg Med. 2018;71:193-198.]

Please see page 194 for the Editor's Capsule Summary of this article.

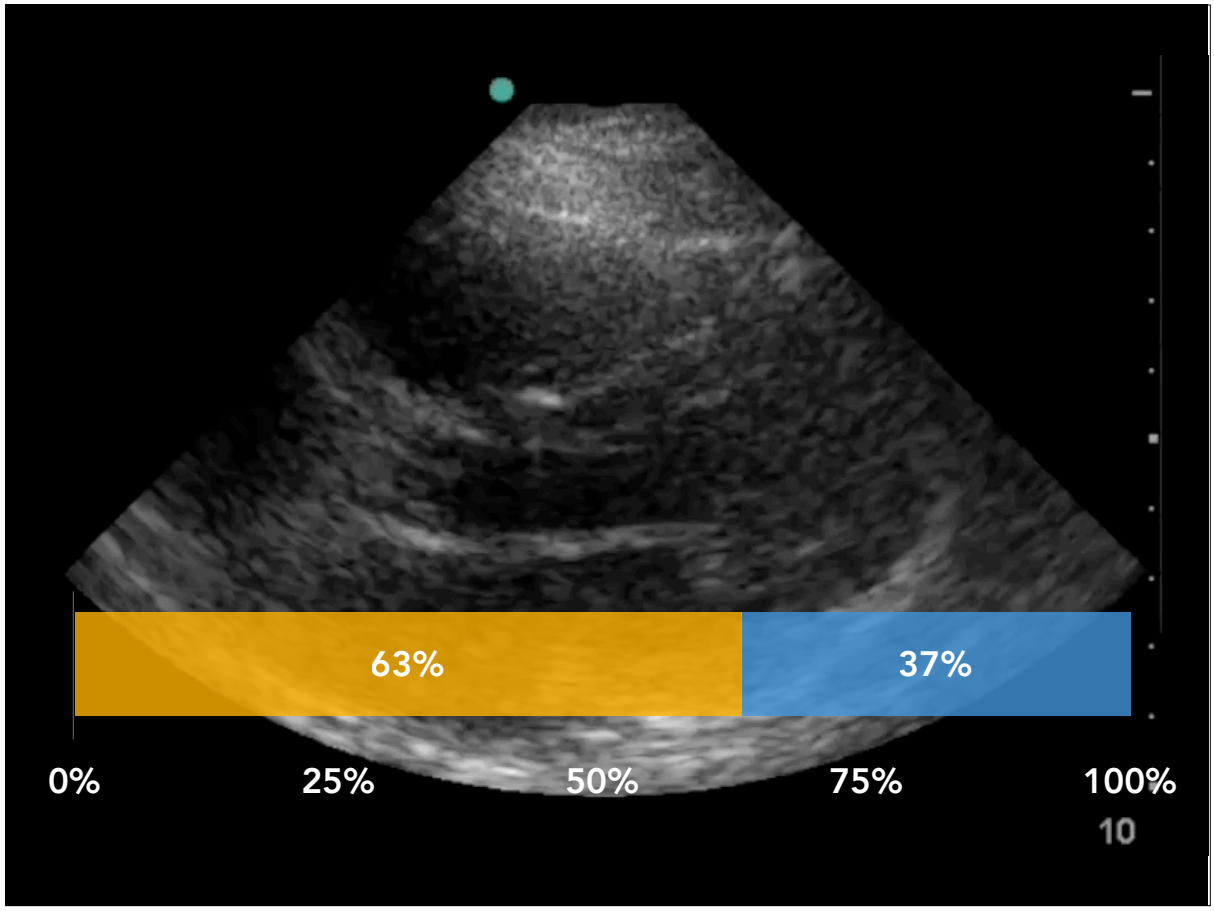
Cardiac standstill =
absence of cardiac activity

But...

What is **cardiac activity**?

127 physicians

Moderate interrater agreement
alpha = 0.47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100%
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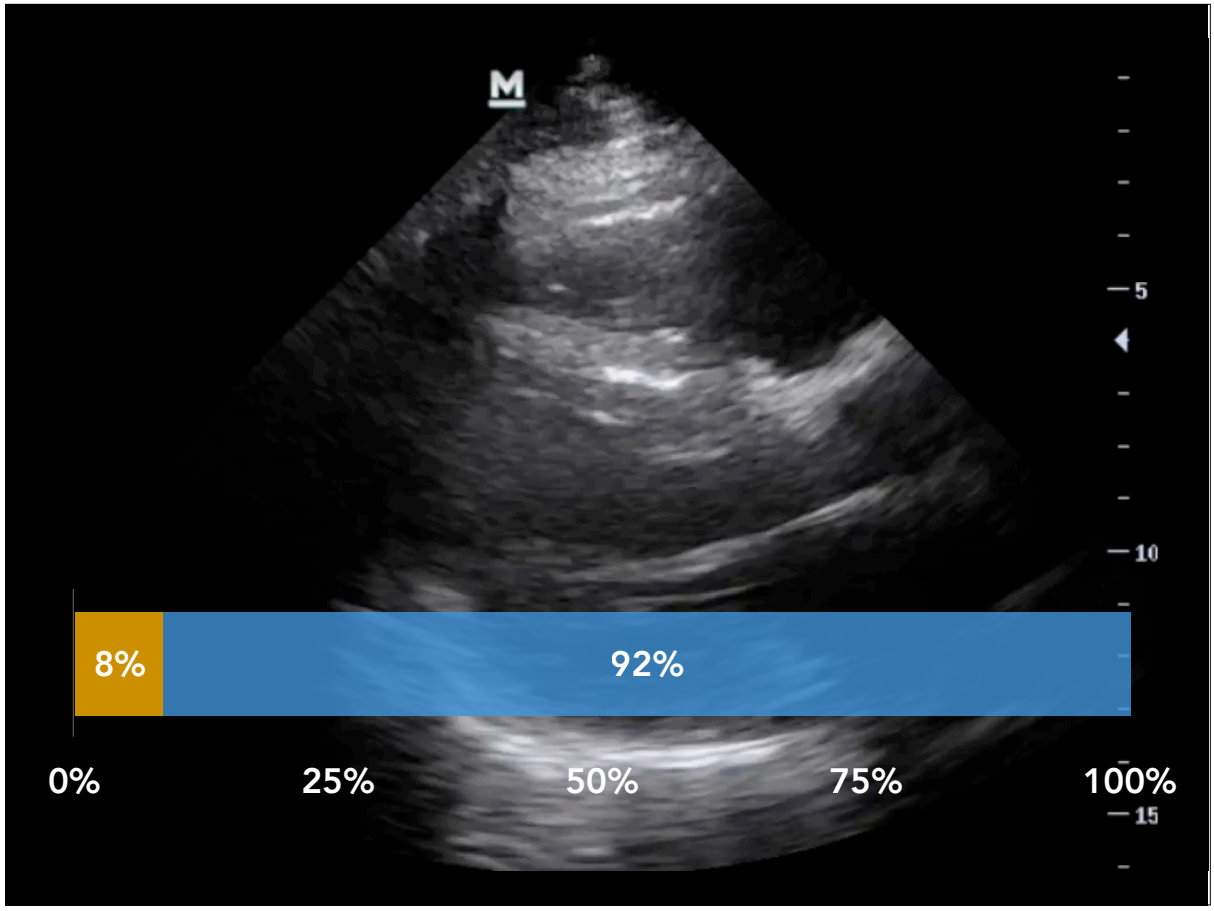
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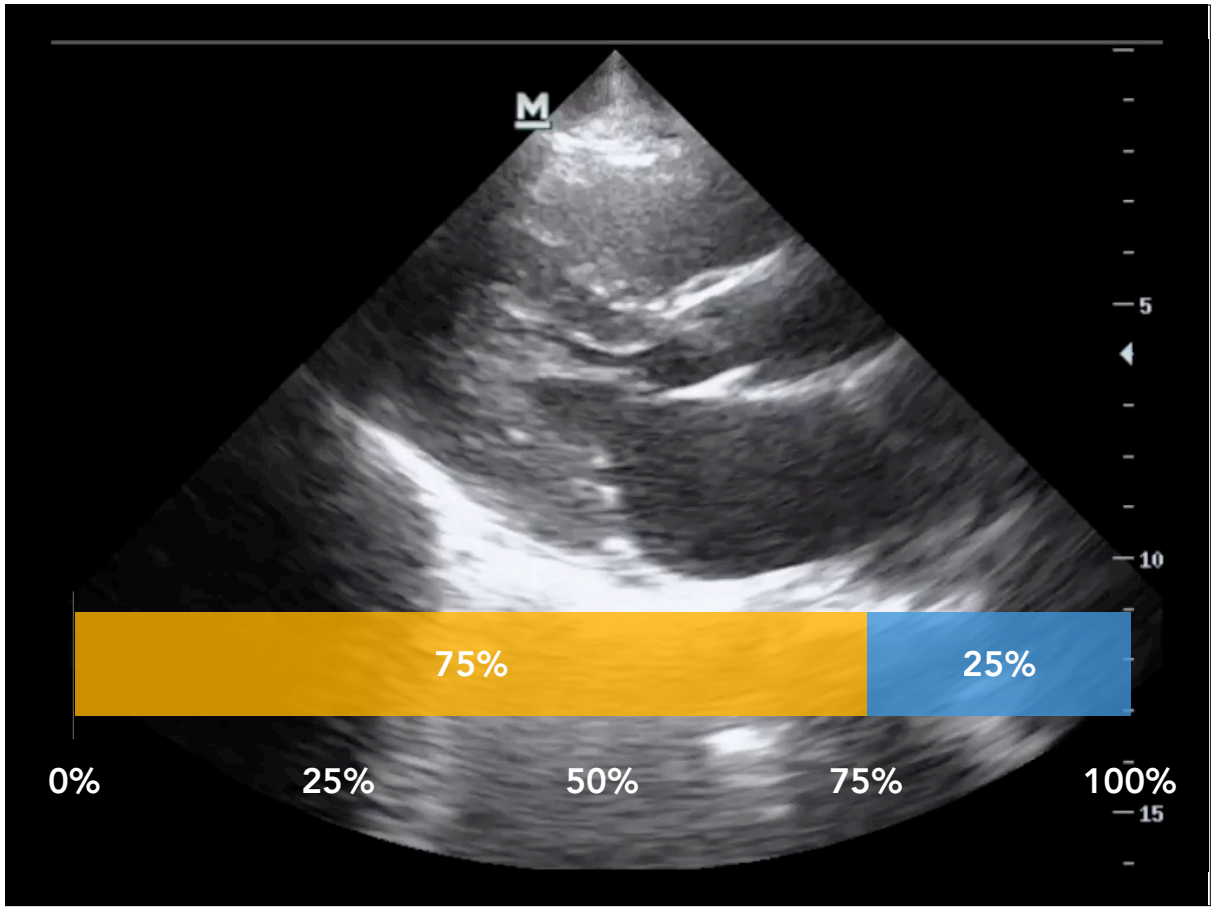
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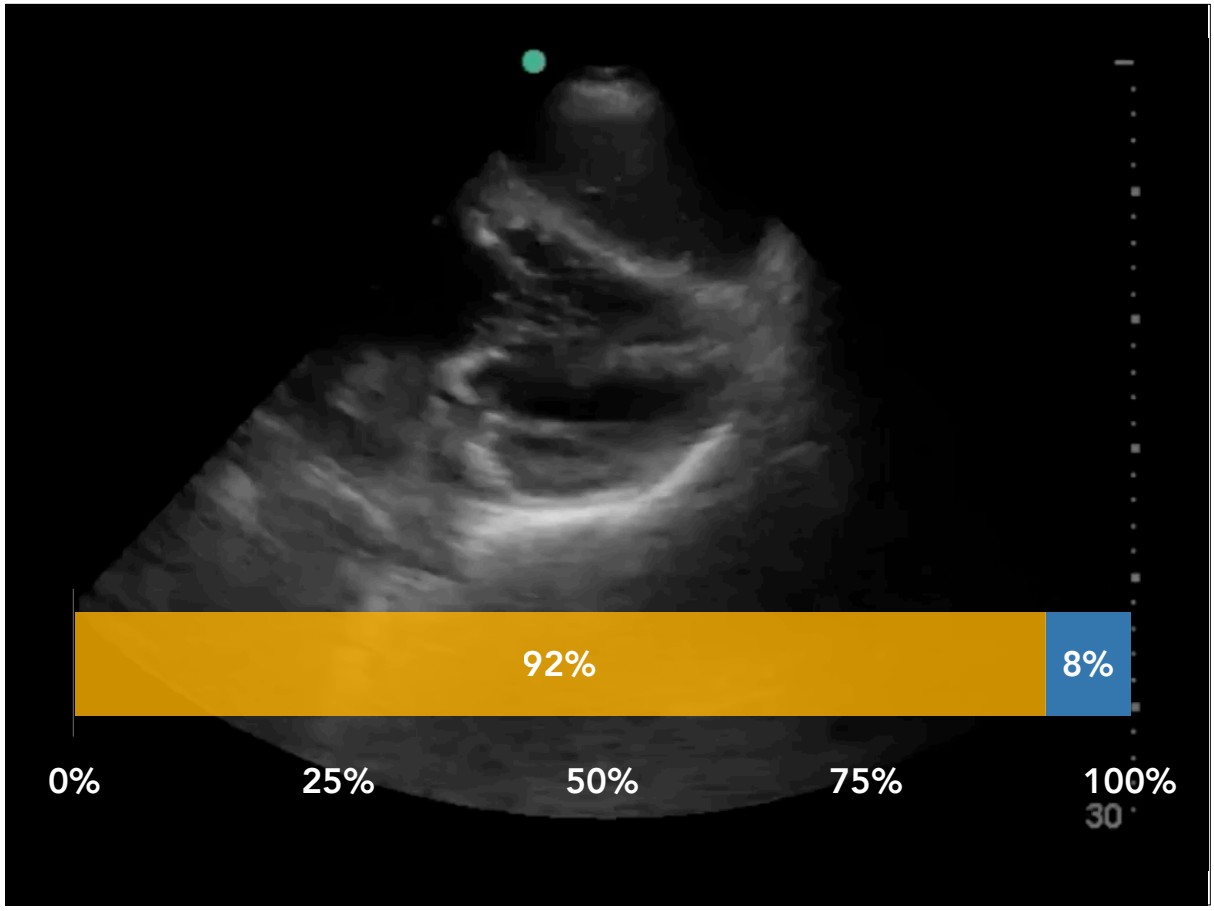
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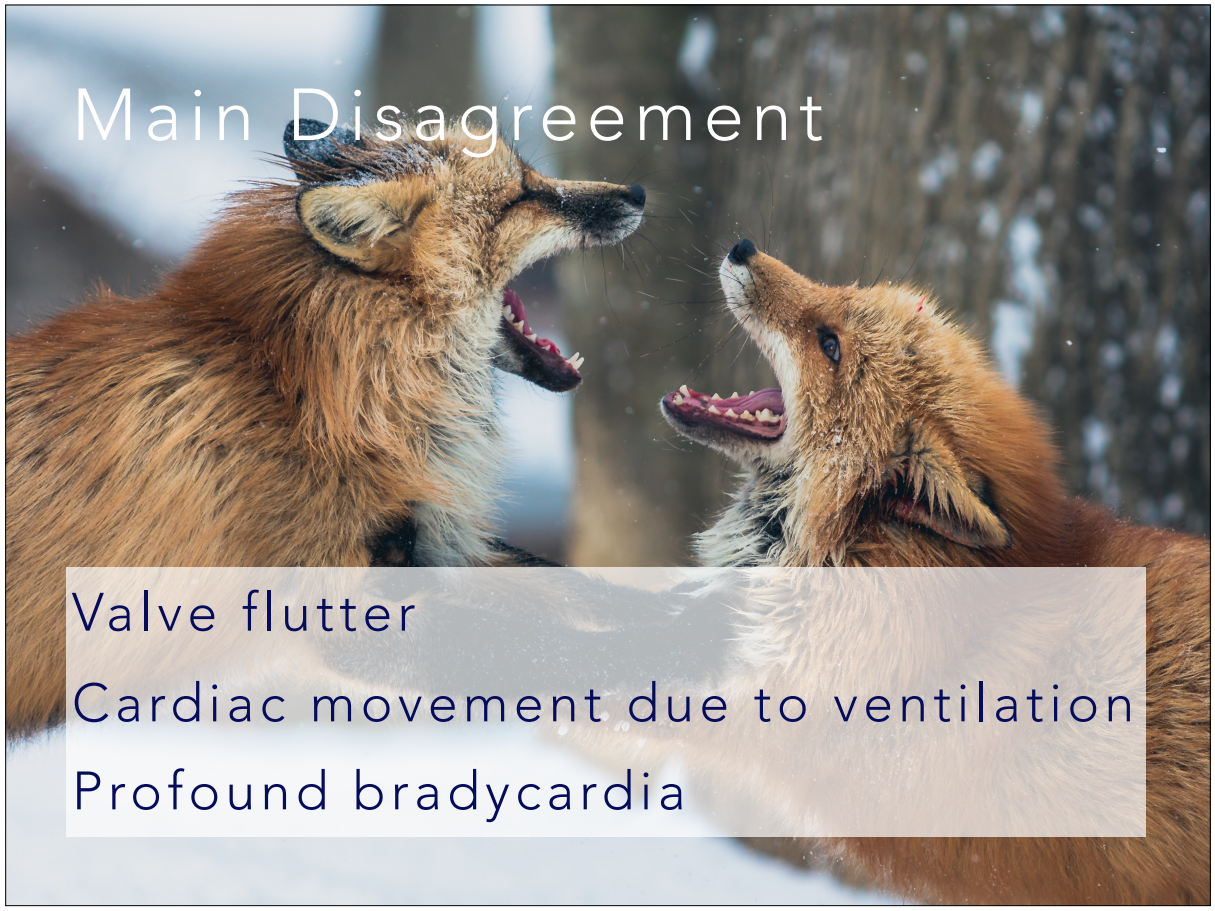


Take Home Message

We need **clear** and **consistent** definitions of cardiac standstill and activity

7. Are You SHoC-ed?

Does Point-of-Care Ultrasonography Improve Clinical Outcomes in Emergency Department Patients With Undifferentiated Hypotension? An International Randomized Controlled Trial From the SHoC-ED Investigators

Paul R. Atkinson, MBBChBAO, MA*; James Milne, MD; Laura Diegelmann, MD; Hein Lamprecht, MBChB, PhD; Melanie Stander, MBBCh, MMed; David Lussier, MD; Chau Pham, MD, MBA; Ryan Henneberry, MD; Jacqueline M. Fraser, RNBN; Michael K. Howlett, MD, MHSA; Jayanand Mekwan, MBBS; Brian Ramrattan, MBBS; Joanna Middleton, MD; Daniel J. van Hoving, MBChB, MMed; Mandy Peach, MD; Luke Taylor, MD; Tara Dahn, MD; Sean Hurley, MD; Kayla MacSween; Luke R. Richardson, MD, MPH; George Stoica, PhD; Samuel Hunter; Paul A. Olszynski, MD, MEd; David A. Lewis, MBBS

*Corresponding Author. E-mail: paul.atkinson@dal.ca, Twitter: @eccucourse.

Study objective: Point-of-care ultrasonography protocols are commonly used in the initial management of patients with undifferentiated hypotension in the emergency department (ED). There is little published evidence for any mortality benefit. We compare the effect of a point-of-care ultrasonography protocol versus standard care without point-of-care ultrasonography for survival and clinical outcomes.

Methods: This international, multicenter, randomized controlled trial recruited from 6 centers in North America and South Africa and included selected hypotensive patients (systolic blood pressure <100 mm Hg or shock index >1) randomized to early point-of-care ultrasonography plus standard care versus standard care without point-of-care ultrasonography. Diagnoses were recorded at 0 and 60 minutes. The primary outcome measure was survival to 30 days or hospital discharge. Secondary outcome measures included initial treatment and investigations, admissions, and length of stay.

Results: Follow-up was completed for 270 of 273 patients. The most common diagnosis in more than half the patients was occult sepsis. We found no important differences between groups for the primary outcome of survival (point-of-care ultrasonography group 104 of 136 patients versus standard care 102 of 134 patients; difference 0.35%; 95% binomial confidence interval [CI] −10.2% to 11.0%), survival in North America (point-of-care ultrasonography group 76 of 89 patients versus standard care 72 of 88 patients; difference 3.6%; CI −8.1% to 15.3%), and survival in South Africa (point-of-care ultrasonography group 28 of 47 patients versus standard care 30 of 46 patients; difference 5.6%; CI −15.2% to 26.0%). There were no important differences in rates of computed tomography (CT) scanning, inotrope or intravenous fluid use, and ICU or total length of stay.

Conclusion: To our knowledge, this is the first randomized controlled trial to compare point-of-care ultrasonography to standard care without point-of-care ultrasonography in undifferentiated hypotensive ED patients. We did not find any benefits for survival, length of stay, rates of CT scanning, inotrope use, or fluid administration. The addition of a point-of-care ultrasonography protocol to standard care may not translate into a survival benefit in this group. [Ann Emerg Med. 2018;72:478-489.]

Please see page 479 for the Editor's Capsule Summary of this article.

273 patients

138 in POCUS group
135 in control group

Survival

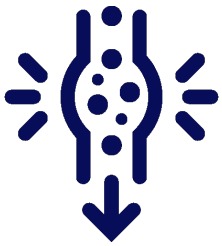
POCUS group **76.5%**
Control group **76.1%**

No Difference

Noncardiogenic **88%**

Sepsis **52%**

Exclusions


Stopped **early** (futility)

Underpowered

Take Home Message

In **this trial** of ED patients with undifferentiated shock, a POCUS protocol did **not** affect 30 day mortality

Take Home Message

But remember... POCUS is still a **powerful tool** in differentiating cause of shock and has **huge potential** to change patient care

8. Primum non nocere

Point-of-care ultrasound use in patients with cardiac arrest is associated prolonged cardiopulmonary resuscitation pauses: A prospective cohort study

Eben J Clattenburg[a,*], Peter Wroe[a], Stephen Brown[b], Kevin Gardner[a], Lia Losonczy[a], Amandeep Singh[a], Arun Nagdev[a,b]

[a] Department of Emergency Medicine, Highland Hospital—Alameda Health System, Oakland, CA, United States
[b] School of Medicine, University of California, San Francisco, CA, United States

ARTICLE INFO

Article history:
Received 30 July 2017
Received in revised form 9 November 2017
Accepted 22 November 2017

Keywords:
Cardiopulmonary resuscitation
Point-of-care ultrasound

ABSTRACT

Objective: We aim to evaluate if point-of-care ultrasound use in cardiac arrest is associated with CPR pause duration.
Methods: This is a prospective cohort study of patients with cardiac arrest (CA) presenting to an urban emergency department from July 2016 to January 2017. We collected video recordings of patients with CA in designated code rooms with video recording equipment. The CAs recordings were reviewed and coded by two abstractors. The primary outcome was the difference CPR pause duration when POCUS was and was not performed.
Results: A total of 110 CPR pauses were evaluated during this study. The median CPR pause with POCUS performed lasted 17 s (IQR 13 – 22.5) versus 11 s (IQR 7 – 16) without POCUS. In addition, multiple regression analysis demonstrated that POCUS was associated with longer pauses (6.4 s, 95%CI 2.1- 10.8); ultrasound fellowship trained faculty trended towards shorter CPR pauses (-4.1 s, 95%CI −8.8–0.6) compared to non-ultrasound fellowship trained faculty; and when the same provider led the resuscitation and performed the POCUS, pause durations were 6.1 s (95%CI 0.4 −11.8) longer than when another provider performed the POCUS.
Conclusion: In this prospective cohort trial of 24 patients with CA, POCUS during CPR pauses was associated with longer interruptions in CPR.

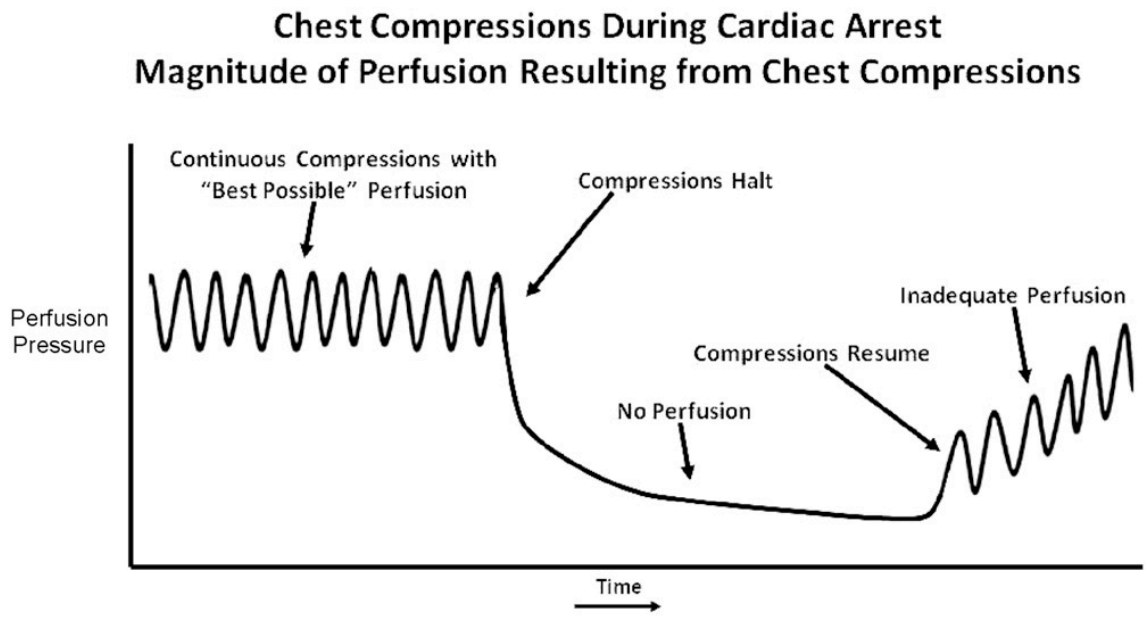
Fan M et al. BMJ Open 2016;6:e013683. doi: 10.1136/bmjopen-2016-013683

82 cardiac arrests resuscitated in the ED

24 had video recordings

CPR Pause Duration

POCUS: median **17 sec**
No US: median **11 sec**



Take Home Message

Be mindful that POCUS during CPR pauses is associated with **longer interruptions**

9. Primum non nocere: One Solution

Implementation of the Cardiac Arrest Sonographic Assessment (CASA) protocol for patients with cardiac arrest is associated with shorter CPR pulse checks☆

Eben J. Clattenburg[a,*], Peter C. Wroe[a], Kevin Gardner[a], Cody Schultz[a], Jon Gelber[a], Amandeep Singh[a], Arun Nagdev[a,b]

[a] Department of Emergency Medicine, Highland Hospital—Alameda Health System, Oakland, CA, United States
[b] School of Medicine, University of California, San Francisco, CA, United States

ARTICLE INFO

Keywords:
Cardiopulmonary resuscitation
Point-of-care ultrasound

ABSTRACT

Objective: We aim to evaluate whether implementation of the "Cardiac Arrest Sonographic Assessment" (CASA) protocol reduces the duration of interruptions in CPR during resuscitation of cardiac arrest (CA) compared to the pre-intervention period.

Methods: This was a quasi-experimental pre and post intervention study completed over 19 months in an urban Emergency Department. CA resuscitations were filmed and analyzed with respect to pulse check duration and use of point-of-care ultrasound (POCUS). After one year, an intervention was implemented: ED residents and faculty were taught the CASA protocol and instructed on how to implement it within CA resuscitation. The primary outcome was the difference in CPR pulse check duration between the pre and post intervention period. Videos from pre and post intervention CA resuscitations were coded by two reviewers.

Results: Data was collected prospectively for 267 sequential cardiac arrests. 38 pre-intervention and 45 post-intervention resuscitations were videoed and included in analysis. Both groups had a median of 3 pulse checks and 2 POCUS exams performed per code. CPR pulse checks involving POCUS exams were 4.0 s (95%CI 1.7–6.3) shorter in the post-intervention group than in the pre-intervention group. CPR pause durations were 3.1 s (95%CI 0.7–5.6) shorter when the ultrasound probe was placed on the chest before stopping CPR compared to placement after stopping CPR, and 3.1 s (95%CI 0.6–5.6) shorter when an ED ultrasound fellowship trained faculty was present compared to non-ultrasound fellowship faculty. The proportion of pulse checks with ultrasound use increased from 64% before the intervention to 80% after the intervention.

Conclusion: In this pre and post-intervention study, the implementation of a structured algorithm for ultrasound use during cardiac arrest significantly reduced the duration of CPR interruptions when ultrasound was performed.

Preparation

Machine plugged in

Machine on

Correct probe

Gel on probe

Probe on patient **before** halting CPR

Probe ready on chest

Mean **3.1** **sec** shorter CPR pauses

CASA Protocol

1st pause: PCE

2nd pause: RV strain

3rd pause: contractility

During CPR: FAST, PTX

CPR Pause Duration

Pre-CASA: mean **19.8 sec**
Post-CASA: mean **15.8 sec**

Take Home Message

Simple steps can reduce pauses in CPR

Answer **one question** per pause

10. Primum non nocere: Another Solution?

Transesophageal Echocardiography: Guidelines for Point-of-Care Applications in Cardiac Arrest Resuscitation

James Fair, MD*; Michael Mallin, MD; Haney Mallemat, MD; Joshua Zimmerman, MD; Robert Arntfield, MD; Ross Kessler, MD; Jonathan Bailitz, MD; Michael Blaivas, MD

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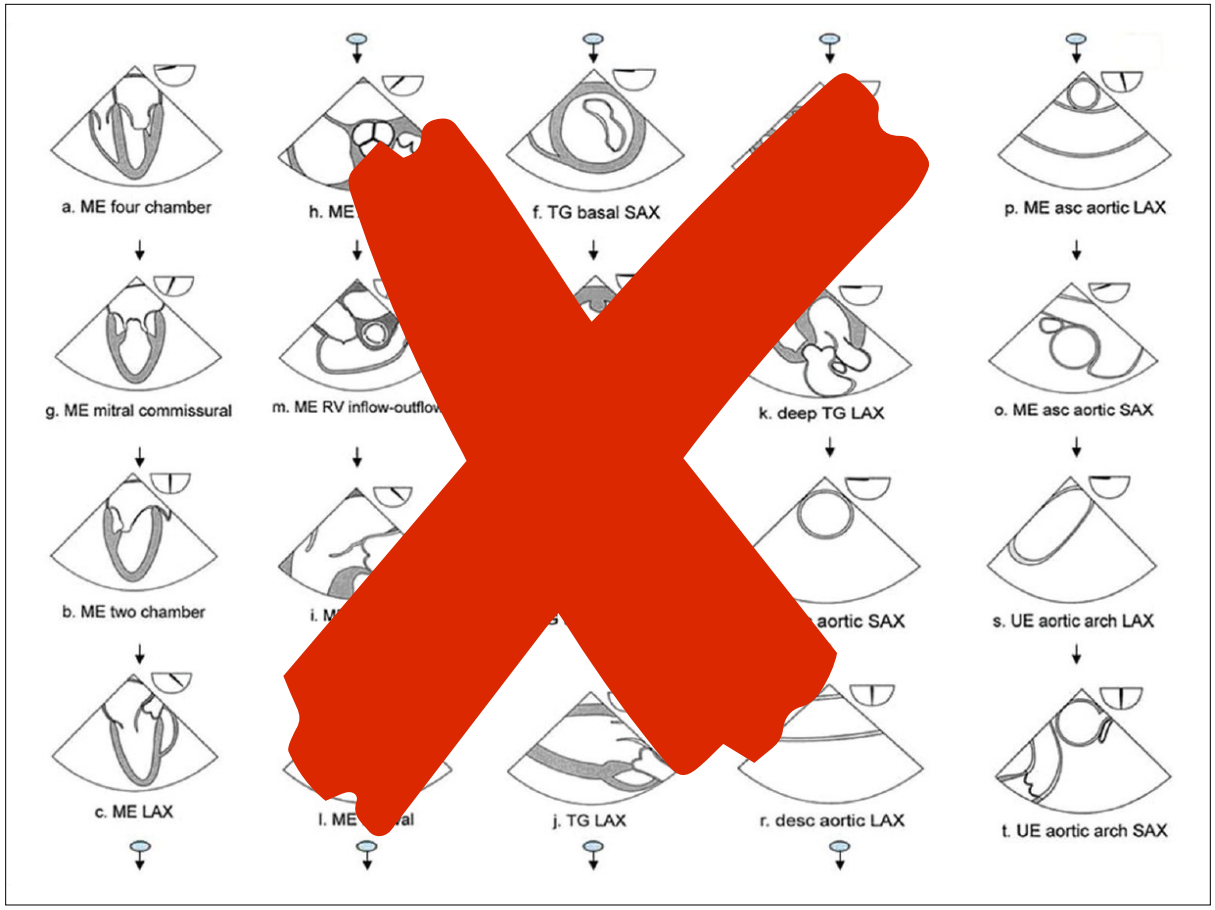
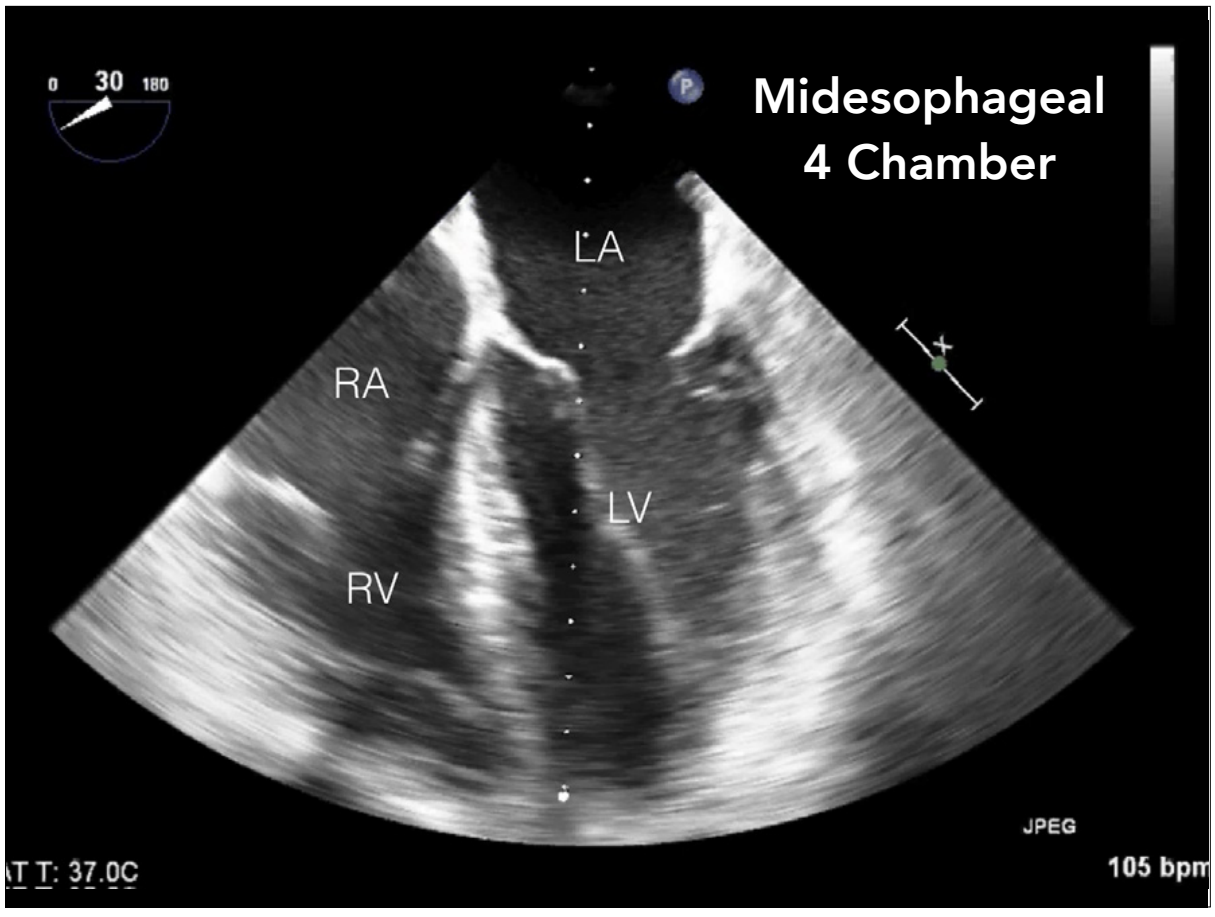
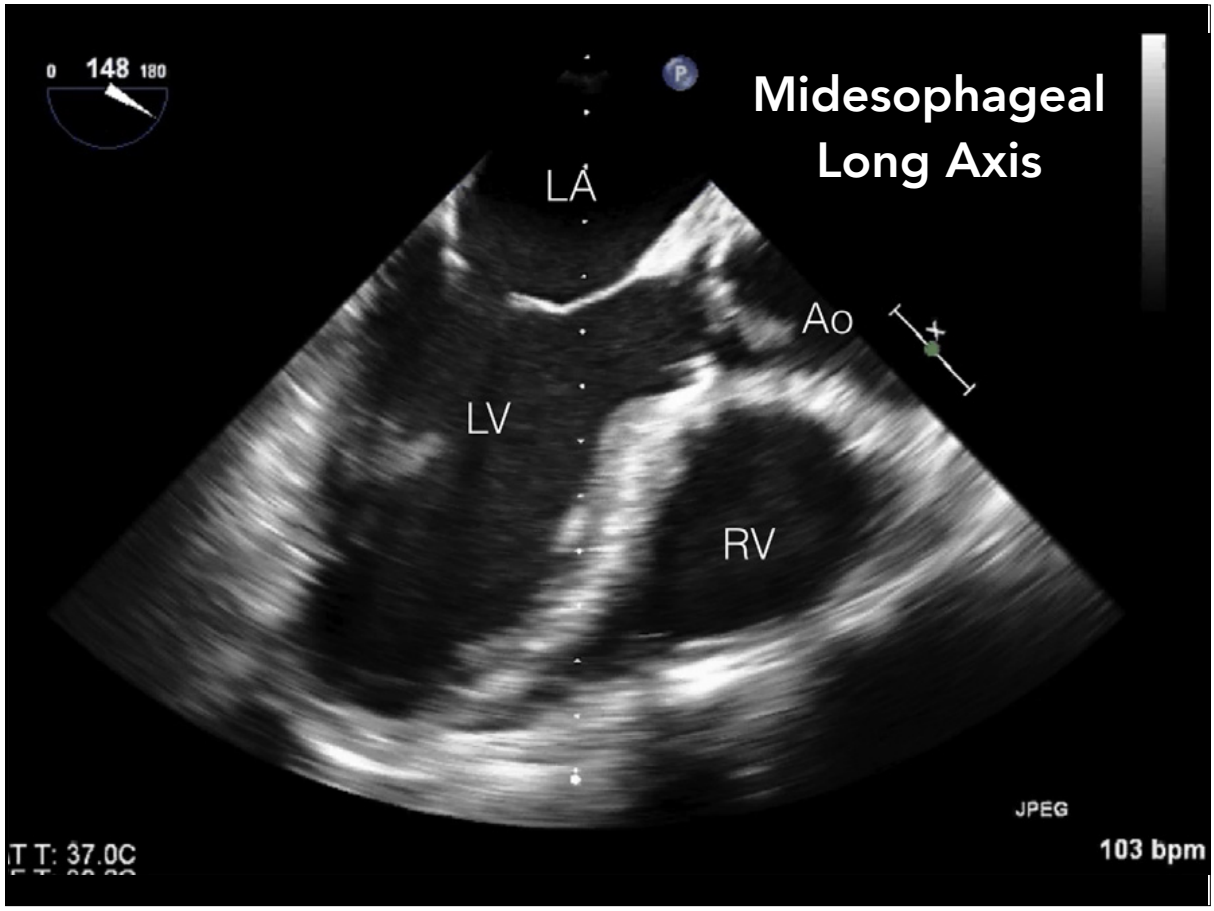
Cardiac arrest is one of the most challenging patient presentations managed by emergency care providers, and echocardiography can be instrumental in the diagnosis, prognosis, and treatment guidance in these critically ill patients. Transesophageal echocardiography has many advantages over transthoracic echocardiography in a cardiac arrest resuscitation. As transesophageal echocardiography is implemented more widely at the point of care during cardiac arrest resuscitations, guidelines are needed to assist emergency providers in acquiring the equipment and skills necessary to successfully incorporate it into the management of cardiac arrest victims. [Ann Emerg Med. 2018;71:201-207.]

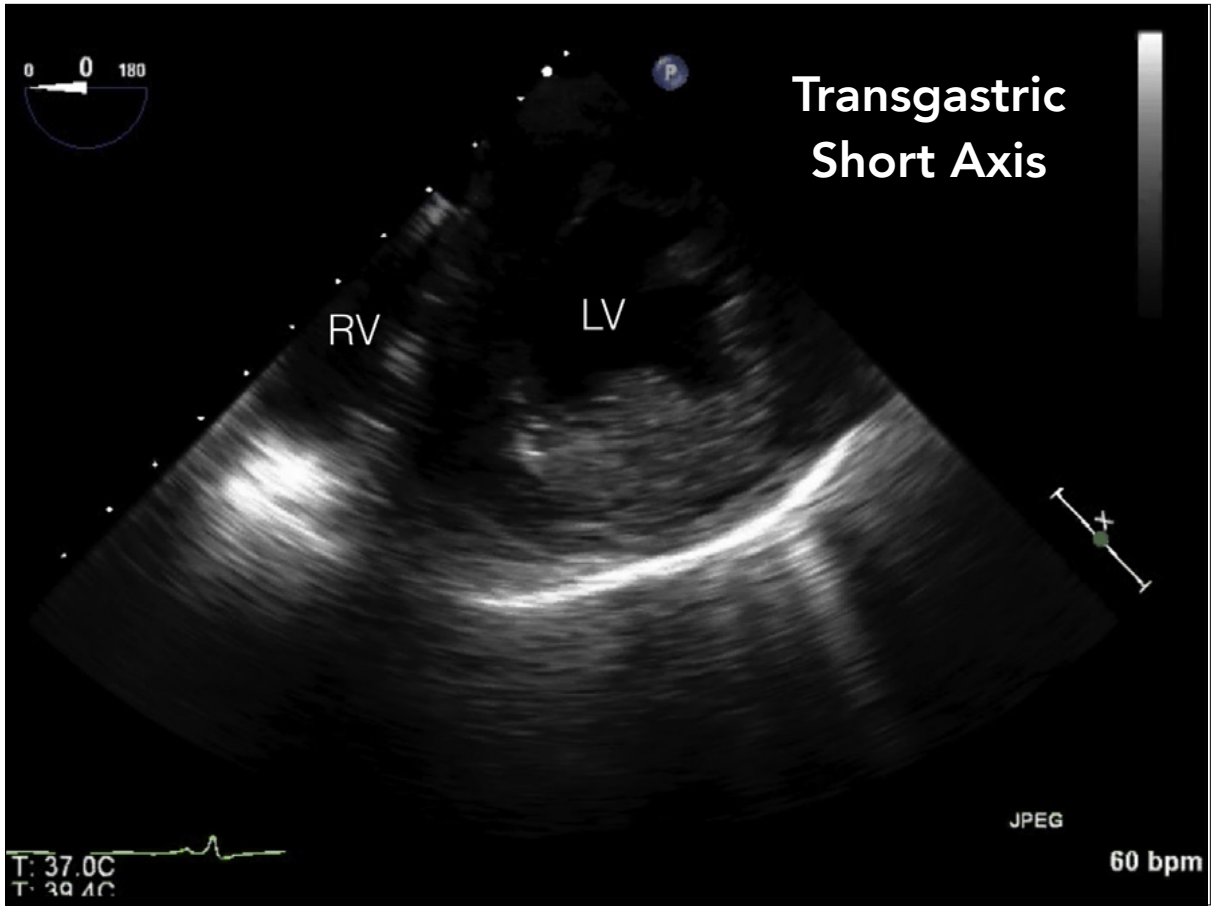

Resuscitative TEE Project


a. ME four chamber
h. ME
f. TG basal SAX
p. ME asc aortic LAX
g. ME mitral commissural
m. ME RV inflow-outflo
k. deep TG LAX
o. ME asc aortic SAX
b. ME two chamber
i. M
aortic SAX
s. UE aortic arch LAX
c. ME LAX
l. ME
al
j. TG LAX
r. desc aortic LAX
t. UE aortic arch SAX

Only **3** views




0 148 180
Midesophageal
Long Axis
LA
Ao
LV
RV
JPEG
T T: 37.0C
103 bpm


0 0 180
Transgastric
Short Axis
RV
LV
JPEG
T: 37.0C
60 bpm

1. Organized cardiac activity
2. LV systolic function
3. RV dilation
4. Volume status
5. Pericardial effusion

Take Home Message

Brace yourselves

TEE is coming

Review

JAMA Cardiology | Special Communication

Time to Add a Fifth Pillar to Bedside Physical Examination
Inspection, Palpation, Percussion, Auscultation, and Insonation

Jagat Narula, MD, PhD; Y. Chandrashekhar, MD; Eugene Braunwald, MD

1. Ultrasound is the **new** stethoscope

JAMA Pediatrics | Original Investigation

Association of Prenatal Ultrasonography and Autism Spectrum Disorder

N. Paul Rosman, MD; Rachel Vassar, MD; Gheorghe Doros, PhD; James DeRosa, MPH; Allison Froman, MPH; Audrey DiMauro, MD, PhD; Sherry Santiago, MD; Jodi Abbott, MD

2. There is **no** evidence that ultrasound causes autism

Point-of-care ultrasonography for diagnosing thoracoabdominal injuries in patients with blunt trauma (Review)

Stengel D, Leisterer J, Ferrada P, Ekkernkamp A, Mutze S, Hoenning A

3. A negative FAST does **not** rule out intra-abdominal injury

"Full Stomach" Despite the Wait: Point-of-care Gastric Ultrasound at the Time of Procedural Sedation in the Pediatric Emergency Department

Julie Leviter, MD, Dale W. Steele, MD, MS, Erika Constantine, MD, James G. Linakis, PhD, MD, and Siraj Amanullah, MD, MPH

4. Fasting times **do not correlate** with empty stomachs in kids

Ultrasound-guided pericardiocentesis: a novel parasternal approach

Adi Osman[a,*], Tan Wan Chuan[a,*], Jamalludin Ab Rahman[b], Gabriele Via[c] and Guido Tavazzi[d,e]

5. Use the **anterior approach** with a **linear probe** in thin patients with a large anterior effusion

Variability in Interpretation of Cardiac Standstill Among Physician Sonographers

Kevin Hu, MD; Nachi Gupta, MD, PhD; Felipe Teran, MD; Turandot Saul, MD; Bret P. Nelson, MD; Phillip Andrus, MD*

6. We need **clear** and **consistent** definitions of cardiac standstill and activity

Does Point-of-Care Ultrasonography Improve Clinical Outcomes in Emergency Department Patients With Undifferentiated Hypotension? An International Randomized Controlled Trial From the SHoC-ED Investigators

Paul R. Atkinson, MBBChBAO, MA*; James Milne, MD; Laura Diegelmann, MD; Hein Lamprecht, MBChB, PhD; Melanie Stander, MBBCh, MMed; David Lussier, MD; Chau Pham, MD, MBA; Ryan Henneberry, MD; Jacqueline M. Fraser, RNBN; Michael K. Howlett, MD, MHSA; Jayanand Mekwan, MBBS; Brian Ramrattan, MBBS; Joanna Middleton, MD; Daniel J. van Hoving, MBChB, MMed; Mandy Peach, MD; Luke Taylor, MD; Tara Dahn, MD; Sean Hurley, MD; Kayla MacSween; Luke R. Richardson, MD, MPH; George Stoica, PhD; Samuel Hunter; Paul A. Olszynski, MD, MEd; David A. Lewis, MBBS

7. In **this trial** of ED patients with undifferentiated shock, a POCUS protocol did **not** affect 30 day mortality

Point-of-care ultrasound use in patients with cardiac arrest is associated prolonged cardiopulmonary resuscitation pauses: A prospective cohort study

Eben J Clattenburg[a,*], Peter Wroe[a], Stephen Brown[b], Kevin Gardner[a], Lia Losonczy[a], Amandeep Singh[a], Arun Nagdev[a,b]

8. Be mindful that POCUS during CPR pauses is associated with **longer interruptions**

Implementation of the Cardiac Arrest Sonographic Assessment (CASA) protocol for patients with cardiac arrest is associated with shorter CPR pulse checks☆

Eben J. Clattenburg[a,*], Peter C. Wroe[a], Kevin Gardner[a], Cody Schultz[a], Jon Gelber[a], Amandeep Singh[a], Arun Nagdev[a,b]

9. Answer **one question** (with POCUS) per pause

Transesophageal Echocardiography: Guidelines for Point-of-Care Applications in Cardiac Arrest Resuscitation

James Fair, MD*; Michael Mallin, MD; Haney Mallemat, MD; Joshua Zimmerman, MD; Robert Arntfield, MD; Ross Kessler, MD; Jonathan Bailitz, MD; Michael Blaivas, MD

10. **Resuscitative TEE** is coming to an ED near you