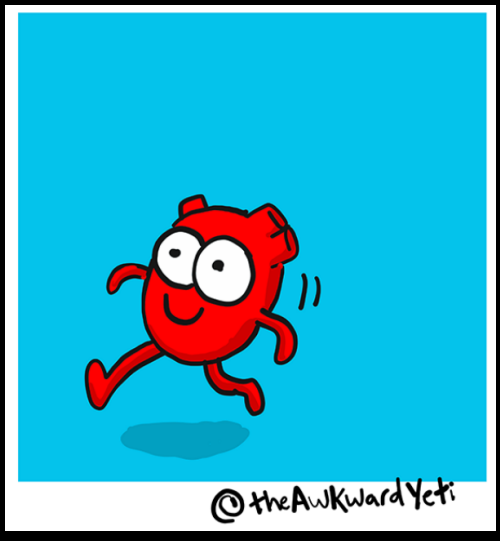
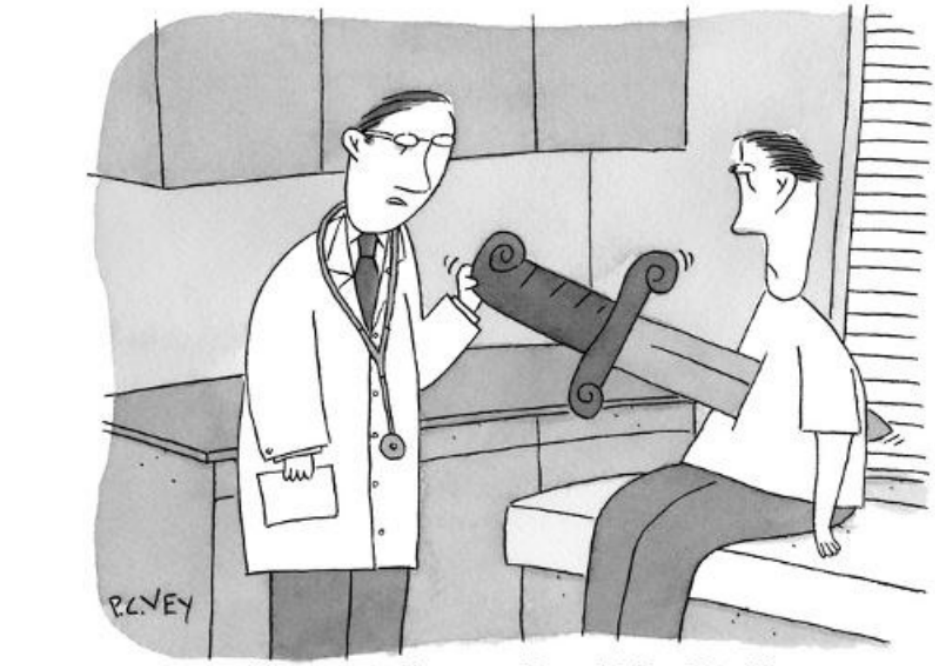
Trauma Ultrasound

Vancouver POCUS Symposium Apr 2019
Grahame Quan MD FRCPC
Royal Columbian and Eagle Ridge Hospitals

Image: www.flickr.com/people/mitchelh/

I have no affiliations or conflicts of interest.



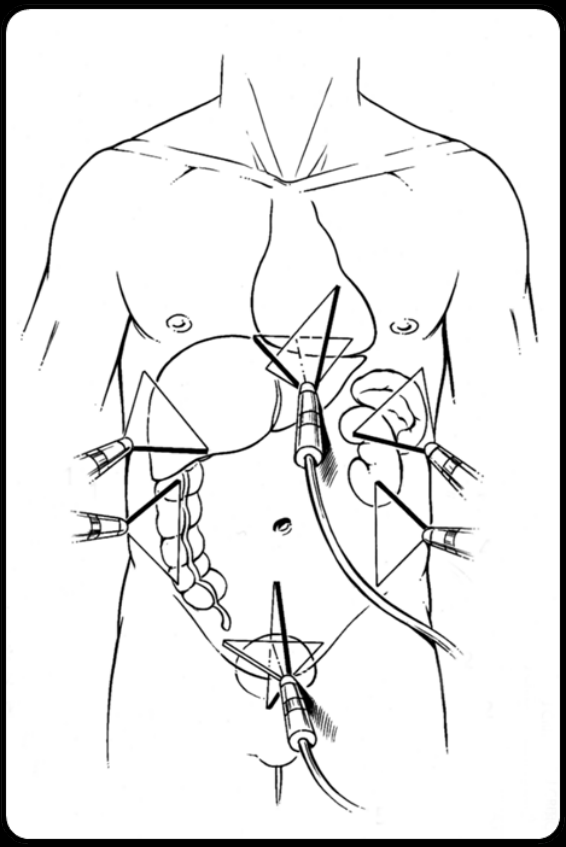


"Does it hurt when I do this?"

Objectives

- Optimizing the FAST exam
- Thoracic POCUS in trauma
- Cardiac POCUS for consideration of resuscitative thoracotomy

Quick review of FAST scan

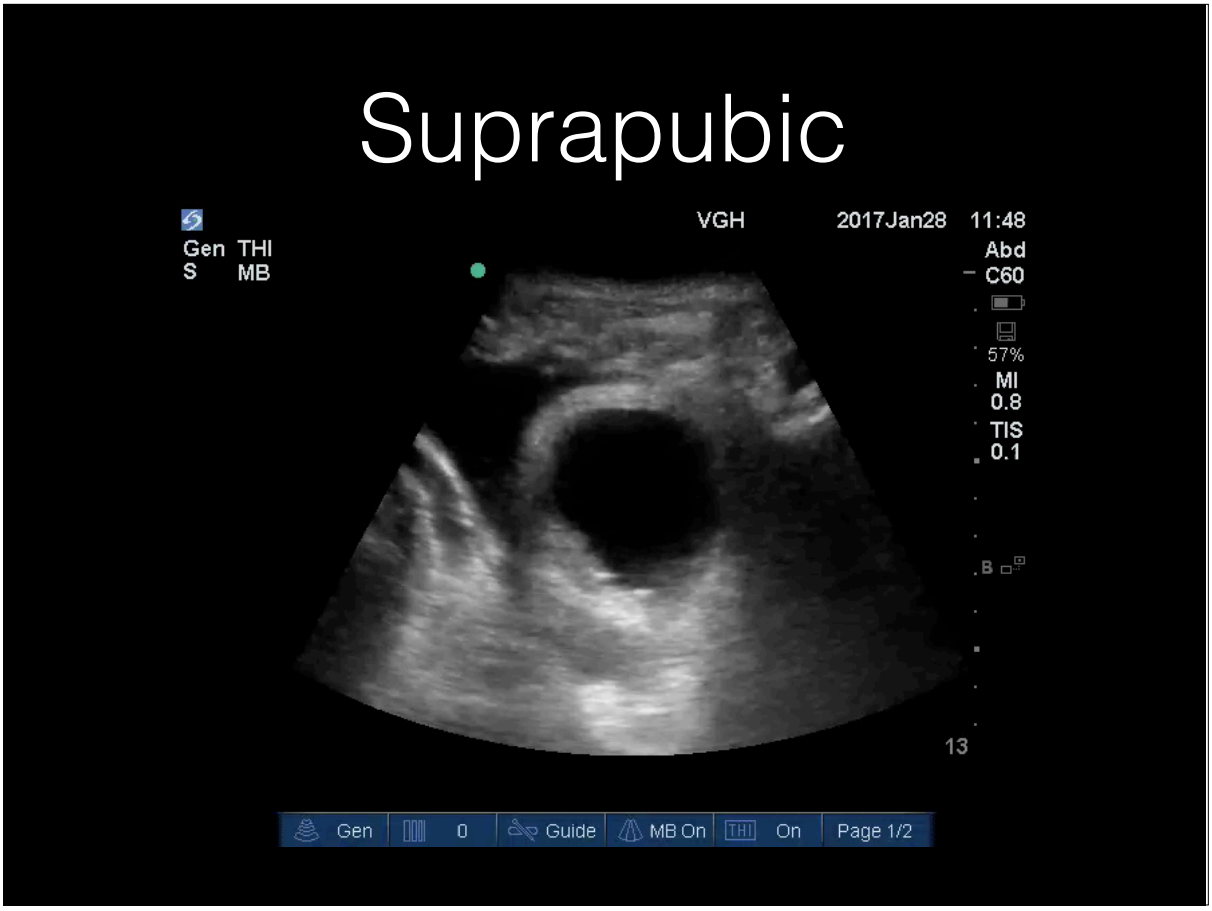


RUQ


DENVER HEALTH EMERGENCY MEDICINE
ABD 01/12/03
09:51:02
S3.75
31HZ
5/1/1
60/ 80
15.0CM
LP ACQ VCF

LUQ

Suprapubic



Subxiphoid view

Identify free fluid in the unstable pt. To rule in not rule out.

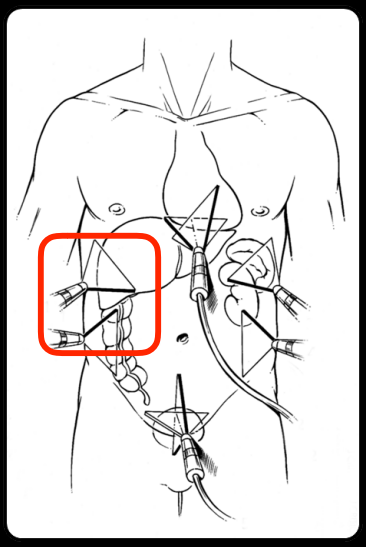
SENS 62-89%

Surg Clin N Am 2011 91:195–207; Trauma Surg Acute Care Open 2019;4

Optimizing our FAST exam

Where is the most sensitive location for identifying free fluid

RUQ



Hepato-renal interface

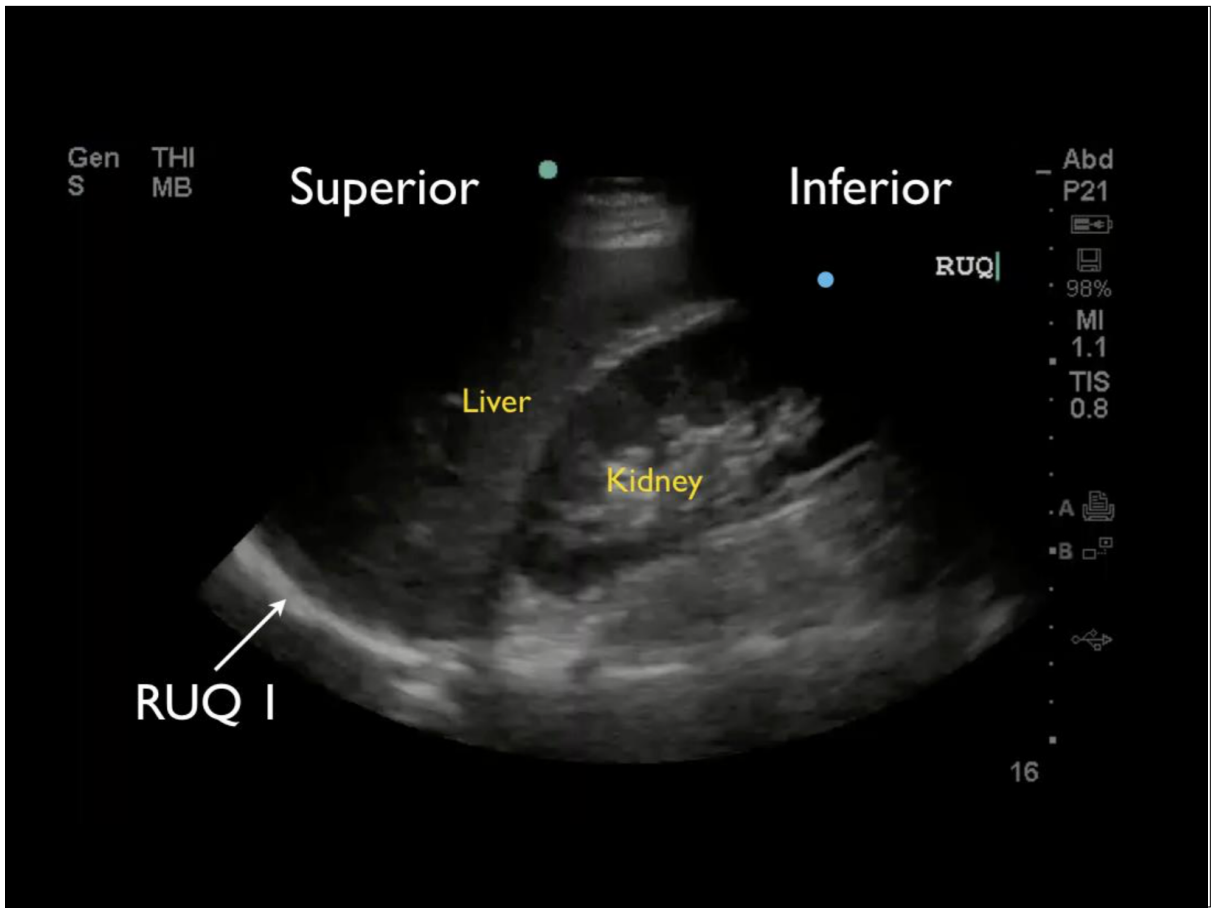
Caudal Edge of the Liver in the Right Upper Quadrant (RUQ) View Is the Most Sensitive Area for Free Fluid on the FAST Exam

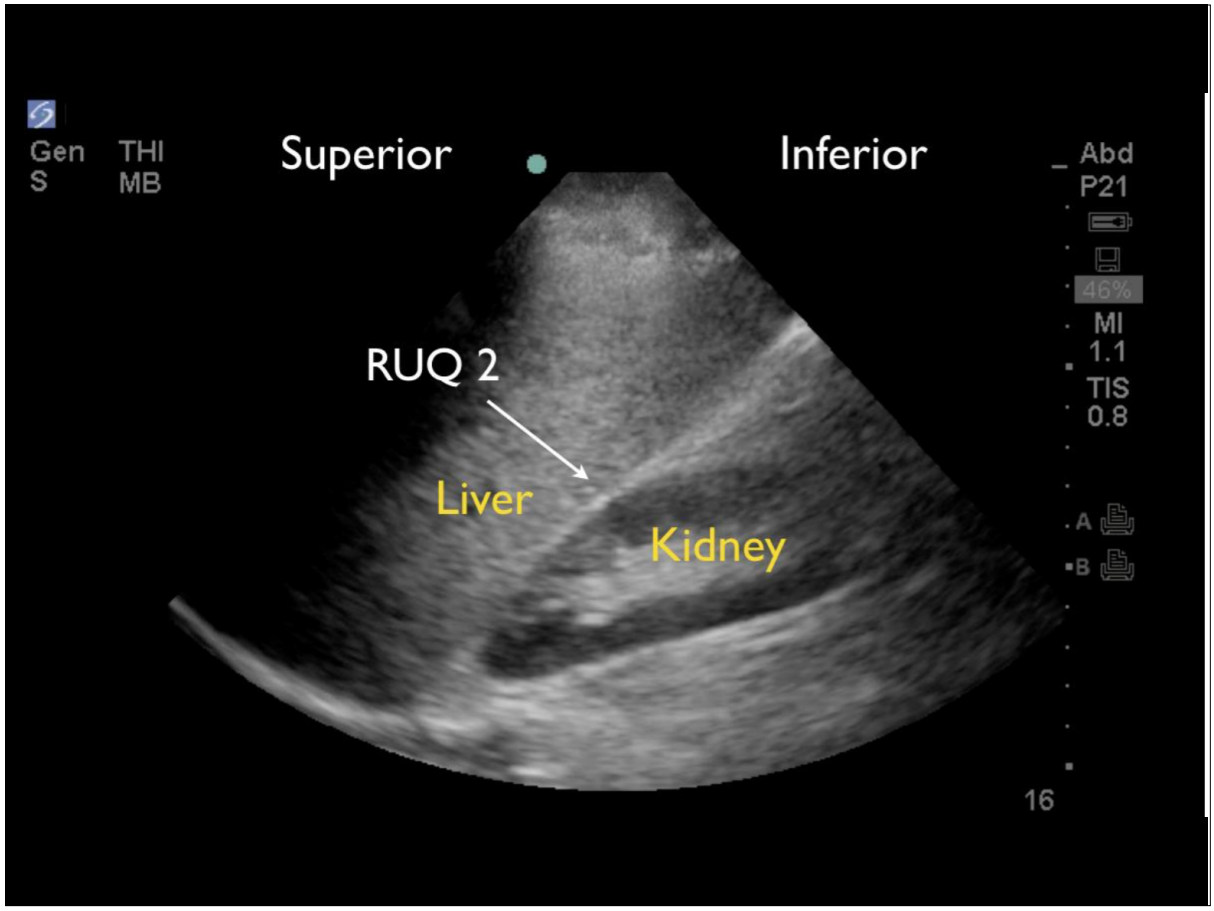
Viveta Lobo, MD*
Michelle Hunter-Behrend, MD*
Erin Cullnan, MD*
Rebecca Higbee, MD*
Caleb Phillips, MS, PhD†
Sarah Williams, MD*
Philips Perera, MD*
Laleh Gharahbaghian, MD*

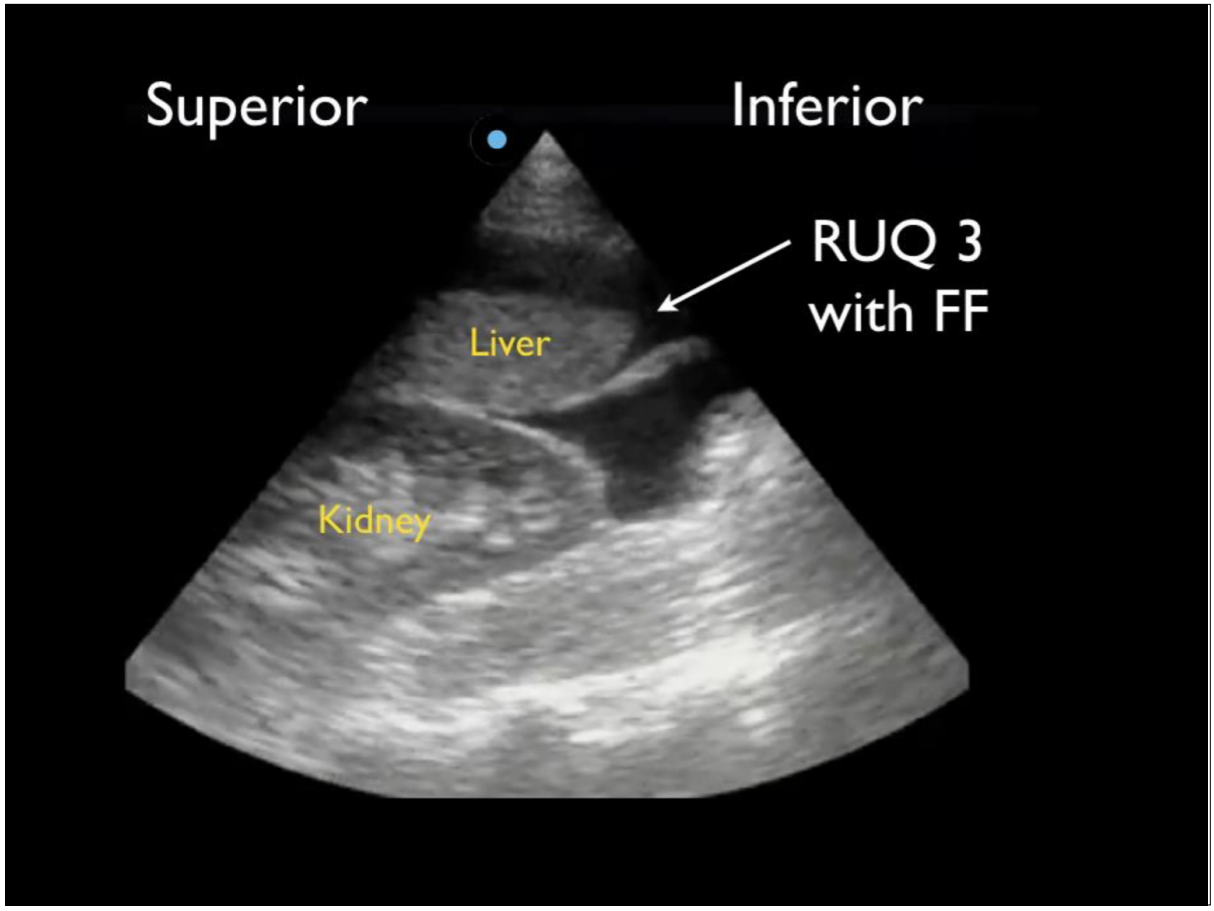
*Stanford University Medical Center, Department of Emergency Medicine, Palo Alto, California
†University of Colorado, Department of Computer Science, Boulder, Colorado

RUQ - 66.7% (32/48) +ve
Caudal edge of liver "RUQ3" 93.8% (30/32) +ve

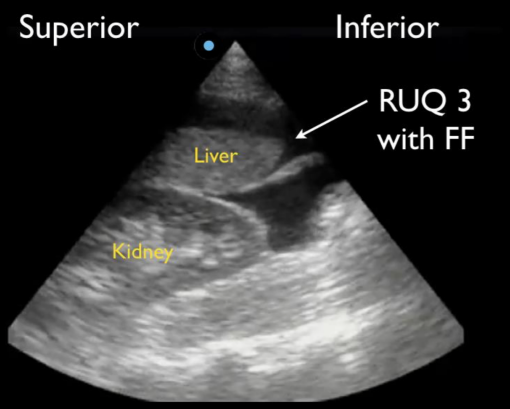
West J Emerg Med 2017;18(2)270-280




Gen
S
THI
MB
Superior
Inferior
Abd
P21
46%
MI
1.1
TIS
0.8
RUQ 2
Liver
Kidney
A
B
16


Superior
Inferior
RUQ 3
with FF
Liver
Kidney

Take Home point



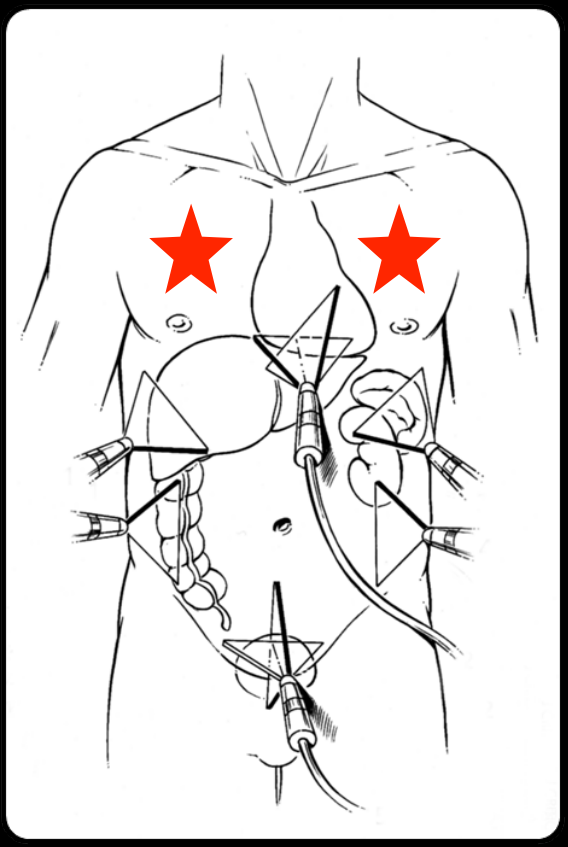
Prioritize obtaining a view of caudal tip on RUQ

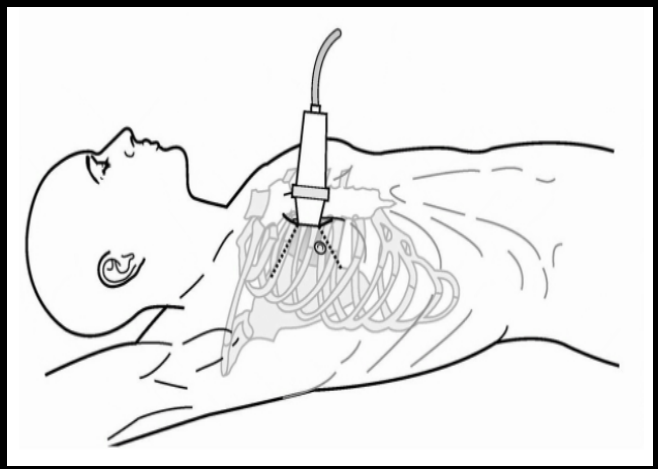
Consider serial FAST exams

Secondary FAST exams improve sensitivity

J Trauma. 2004;57:934–938 ; Iran J Radiol. 2014;11(3)

Thoracic US for Trauma eFAST



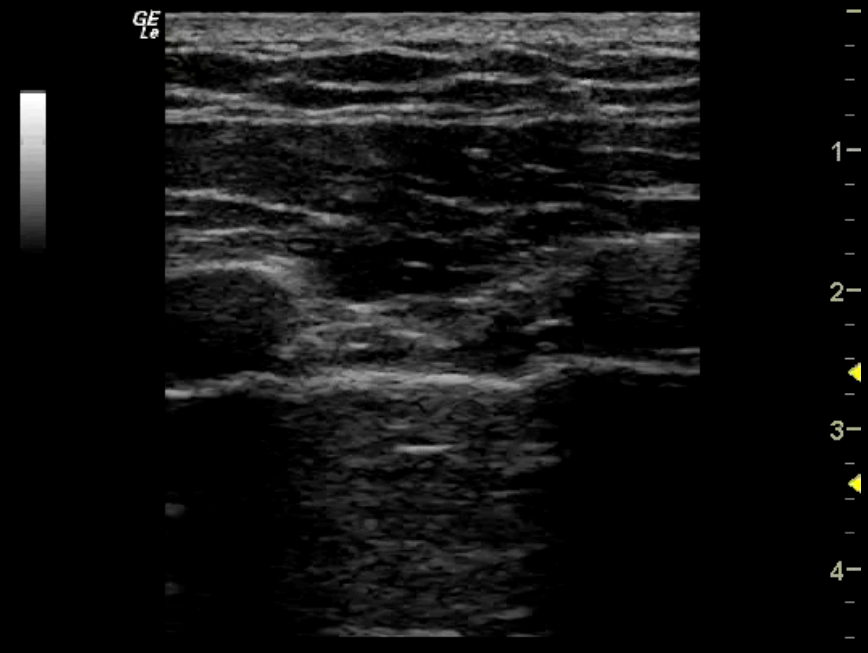


Identifying PTX

Looking for absence of lung sliding

Normal lung sliding

Absent lung sliding



Identifying Hemothorax

Xray vs PoCUS

Sensitivity of Bedside Ultrasound and Supine Anteroposterior Chest Radiographs for the Identification of Pneumothorax After Blunt Trauma

R. Gentry Wilkerson, MD, and Michael B. Stone, MD, RDMS

US - Sens 86-98% Spec 97-100

vs

CXR - Sens 28-75% Spec 100

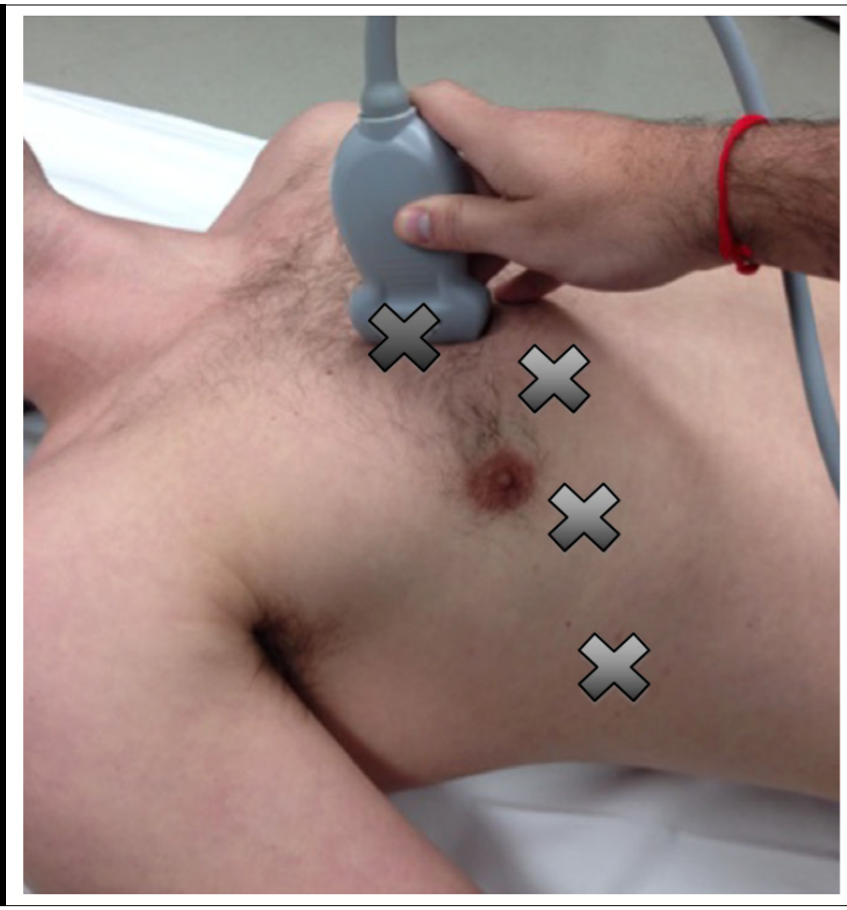
ACAD EMERG MED, 2010, Vol. 17, No. 1

What is an adequate view for pneumothorax?

Comparison of Four Views to Single-view Ultrasound Protocols to Identify Clinically Significant Pneumothorax

Gregg Helland, MD, Romolo Gaspari, MD, Samuel Licciardo, MD, Alexandra Sanseverino, MD, Ulises Torres, MD, Timothy Emhoff, MD, and David Blehar, MD

ACADEMIC EMERGENCY MEDICINE 2016;23:1170–1175



Clinically significant PTX

SENS US 1 view - 93%
SENS US 4 views 93.3%

Single view is adequate

US for PTX has good sensitivity

0.80-0.99 Sens

ACAD EMERG MED, 2010, Vol. 17, No. 1, ACAD EMERG MEDICINE 2016;23:1170–1175, Injury, Int. J. Care Injured 49 (2018) 457–466

US for Hemothorax not so good

SENS 0.60 SPEC 0.98

Injury, Int. J. Care Injured 49 (2018) 457–466

Can POCUS help us make a decision for resuscitative thoracotomy?

FAST Ultrasound Examination as a Predictor of Outcomes After Resuscitative Thoracotomy

A Prospective Evaluation

Kenji Inaba, MD, Konstantinos Chouliaras, MD,* Scott Zakaluzny, MD,* Stuart Swadron, MD,† Thomas Mailhot, MD,† Dina Seif, MD,† Pedro Teixeira, MD,* Emre Sivrikoz, MD,* Crystal Ives, MD,* Galinos Barmparas, MD,* Nikolaos Koronakis, MD,* and Demetrios Demetriades, MD**

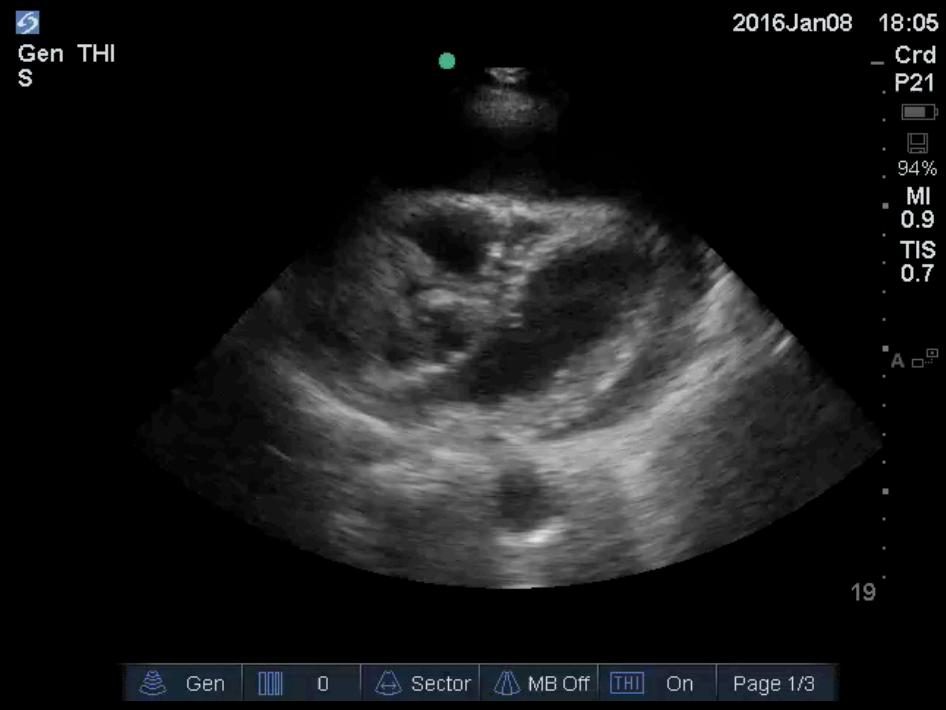
Ann Surg 2015;262:512–518

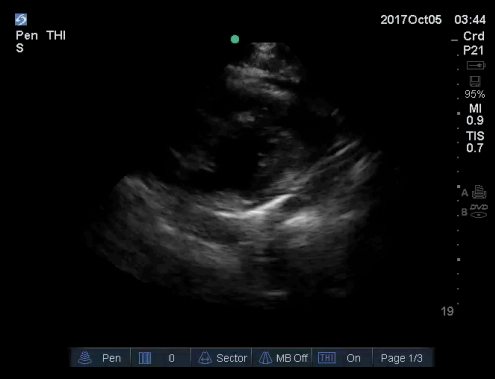
FAST Ultrasound Examination as a Predictor of Outcomes After Resuscitative Thoracotomy

- Assessed 2 cardiac US findings
  - Cardiac motion
  - Pericardial fluid

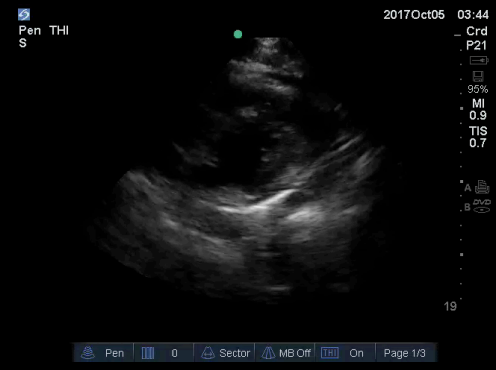
Cardiac motion

Pericardial free fluid

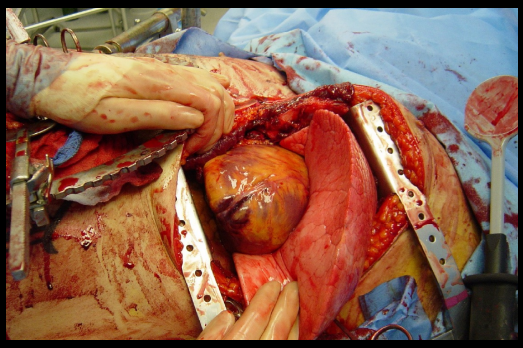




- Cardiac motion alone predicted survivors/organ donors SENS 100%; SPEC 73%
- Pericardial effusion did not impact prediction of survivors/organ donors



- No patients w absence of cardiac activity +/- pericardial effusion survived or became an organ donor
- NPV of cardiac motion was 100%



https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1459269/figure/F2/

Strongly consider avoiding resuscitative thoracotomy in absence of cardiac activity and pericardial effusion on cardiac US

- Optimizing the FAST exam
- Thoracic POCUS in trauma
- Cardiac POCUS for consideration of resuscitative thoracotomy

Questions to follow.