

Veterinary Point of Care Ultrasound

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MedVet Asheville

History

- POC ultrasound utilized by physicians since the 1980's
- Development of FAST protocols (focused assessment with sonography for trauma)
- Shown to be
 - Rapid
 - Easily performed
 - Sensitive
- Aid in assessment/treatment

> [Am J Emerg Med.](#) 1989 Nov;7(6):605-11. doi: 10.1016/0735-6757(89)90283-0.

Emergency department sonography by emergency physicians

[D Jehle](#)¹, [E Davis](#), [T Evans](#), [F Harchelroad](#), [M Martin](#), [K Zaiser](#), [J Lucid](#)

> [J Trauma.](#) 1995 Sep;39(3):492-8; discussion 498-500. doi: 10.1097/00005373-199509000-00016

A prospective study of surgeon-performed ultrasound as the primary adjuvant modality for injured patient assessment

[G S Rozycki](#)¹, [M G Ochsner](#), [J A Schmidt](#), [H L Frankel](#), [T P Davis](#), [D Wang](#), [H R Champion](#)

Veterinary POCUS/FAST examinations

- Studies to evaluate efficacy in veterinary medicine
- Development of AFAST
 - AFS
- Development of TFAST
 - Modifications
 - Addendums
- Movement beyond trauma
- Utility
 - Any trauma patient
 - Cardio/respiratory instability
 - Collapse/unstable
 - Acute abdominal pain
 - Post operative monitoring
 - Concern for
 - Pericardial effusion (PCE)
 - Pneumothorax (PTX)
 - Pleural effusion (PE)
 - Intra-abdominal free fluid

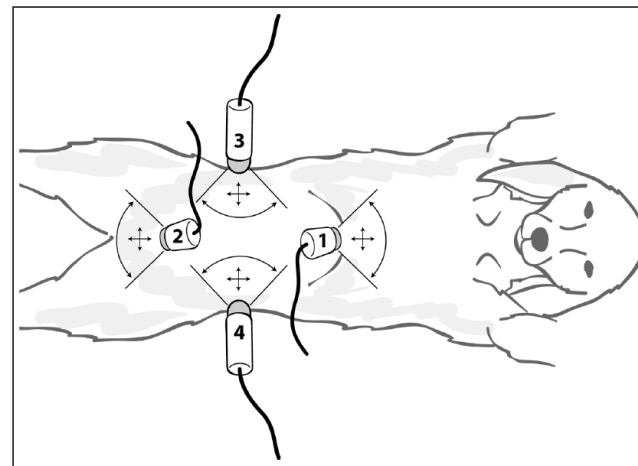
AFAST Development

- Training
 - 2 hours didactic training
 - FAST on 5 dogs
- Procedure
 - Left lateral (right if required)
 - 4 sites
 - Subxiphoid, bladder, L and R flanks
 - Shaved, alcohol, gel
 - 2 views (transverse, longitudinal)
 - Fan 45°
 - Move 1" in 4 directions

Evaluation of a focused assessment with sonography for trauma protocol to detect free abdominal fluid in dogs involved in motor vehicle accidents

Søren R. Boysen, DVM; Elizabeth A. Rozanski, DVM, DACVECC, DACVIM; Amy S. Tidwell, DVM, DACVR; Jen L. Holm, DVM; Scott P. Shaw, DVM; John E. Rush, DVM, MS, DACVIM, DACVECC

JAVMA, Vol 225, No. 8, October 15, 2004



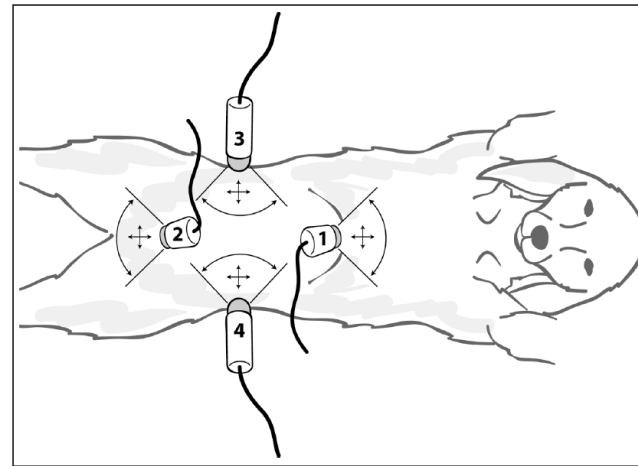
AFAST Development

- Results
 - 45/100- free fluid
 - 38/40 blood
 - 9 required transfusion
 - 2/40 urine
 - Simple, rapid
 - 2/91 had disagreement
 - <10 min
 - Gravity dependent & SXV
 - Guide sx reccs and monitoring
 - No HA underwent sx
 - Sx for UA

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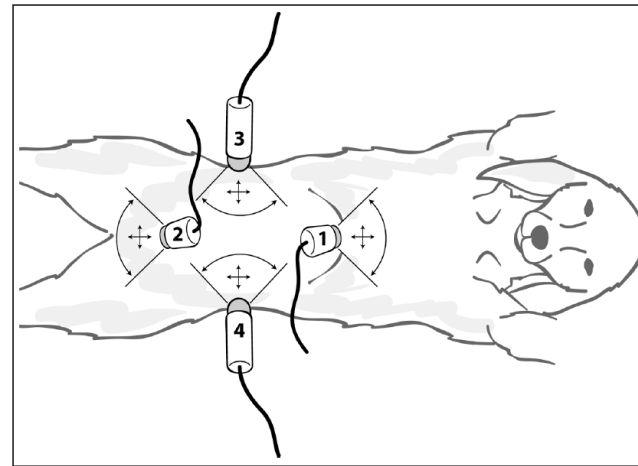
AFAST Development

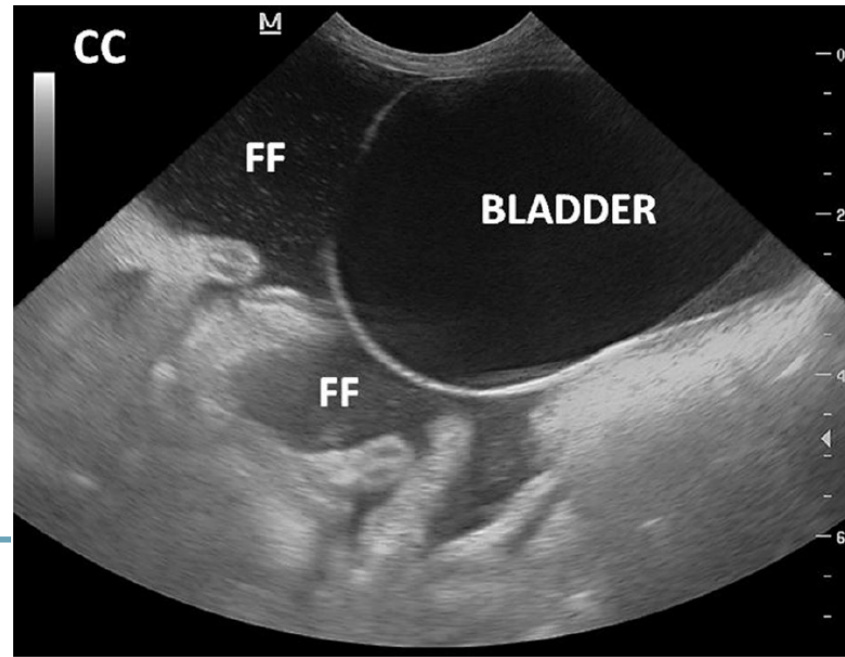
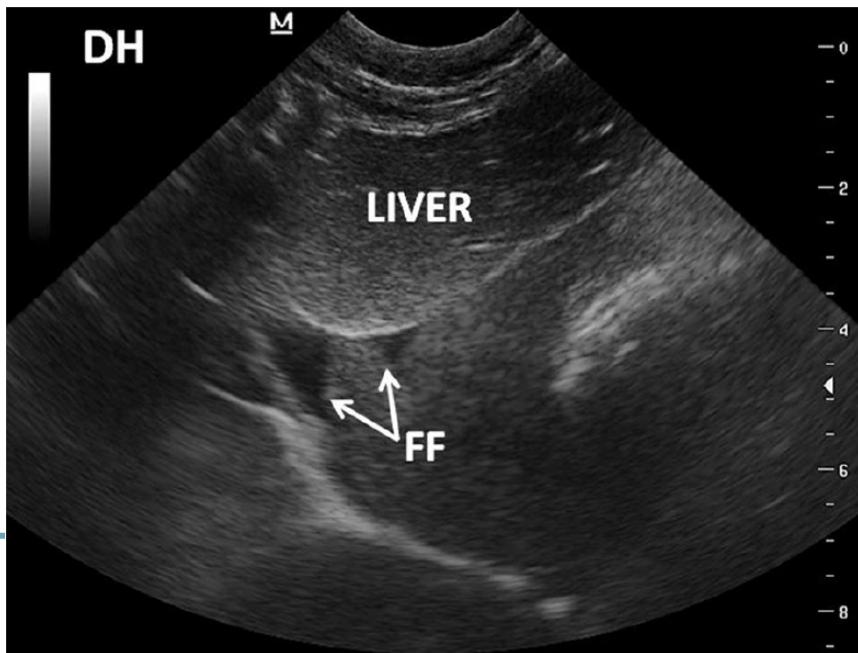
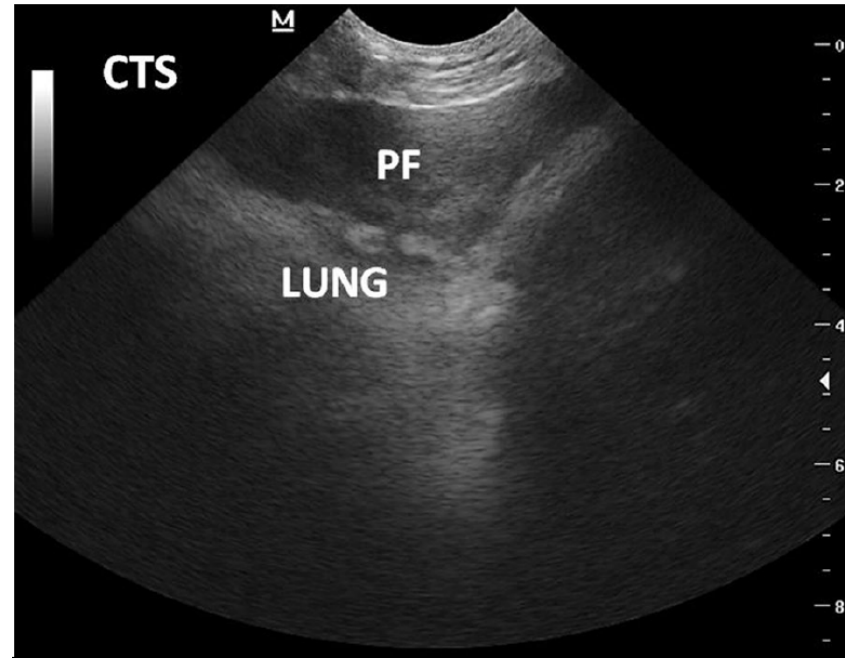
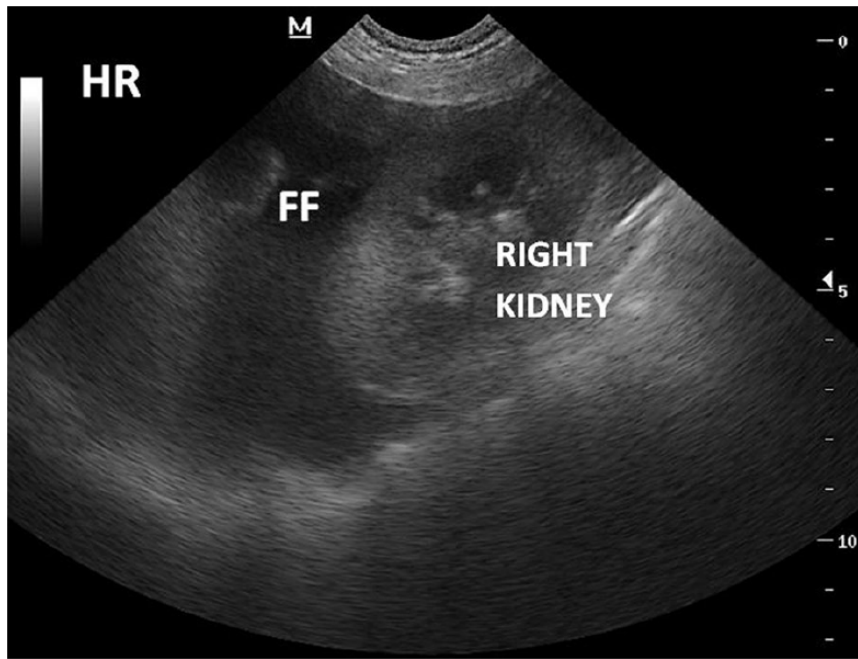
- Simple to perform
 - Minimal training
- More sensitive than radiographs, DPL
- Minimally invasive, inexpensive
 - vs CT
- Helps to localize injury
- Doesn't rule out trauma
 - Blunt vs penetrating
 - Initial hypovolemia

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AFAST Development

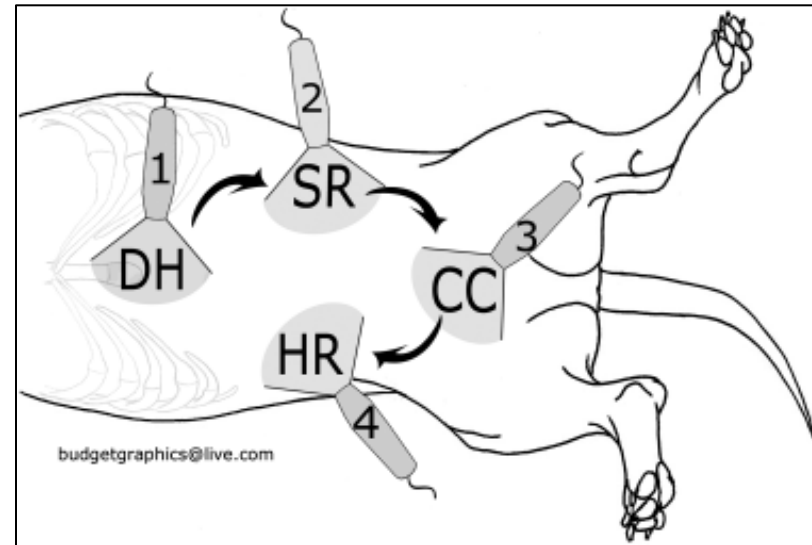
- Didactic and hands on training
- Timing
 - <15 min after arrive
 - Repeat in 4 hours
- Prep
 - No clipping
 - Alcohol only (+/- gel)
- Position
 - Right lateral
 - Avoid spleen, perform TFAST, PC, ECG

Original Study

Journal of Veterinary Emergency and Critical Care 19(5) 2009, pp 426–437
doi:10.1111/j.1476-4431.2009.00459.x

Evaluation of an abdominal fluid scoring system determined using abdominal focused assessment with sonography for trauma in 101 dogs with motor vehicle trauma

Gregory R. Lisciandro, DVM, DABVP, DACVECC; Michael S. Lagutchik, DVM, MS, DACVECC; Kelly A. Mann, DVM, MS, DACVR; Geoffrey T. Fosgate, DVM, PhD, DACVPM; Elizabeth G. Tiller, DVM; Nicholas R. Cabano, DVM; Leslie D. Bauer, DVM; Bradley P. Book, DVM, DABVP and Philip K. Howard, DVM



AFAST Development

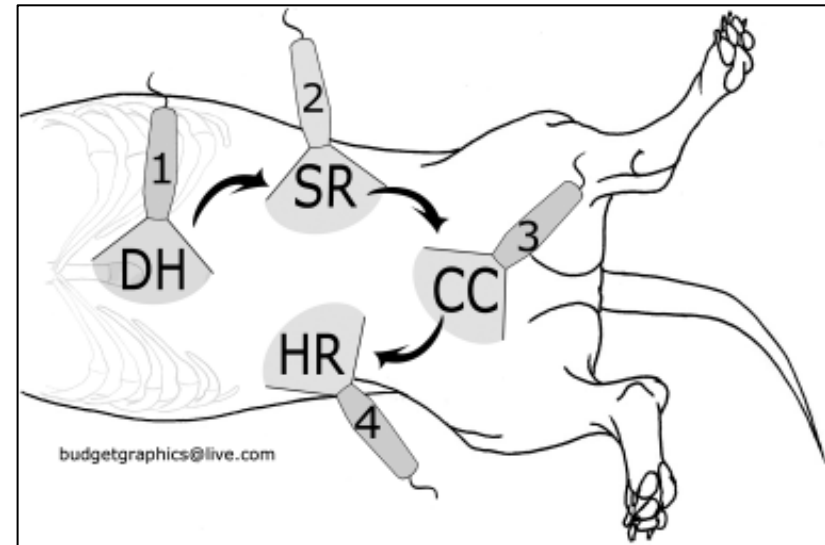
- Scan points
 - Same as *Boysen et al 2004*
 - Anatomic names
 - Diaphragmatico-hepatic (DH)
 - Spleno-renal (SR)
 - Cysto-colic (CC)
 - Hepato-renal (HR)
- Abdominal Fluid Scoring (AFS)
 - 0- no FF noted
 - 1- (1/4 sites)
 - 2- (2/4 sites)
 - 3- (3/4 sites)
 - 4- (4/4 sites)

Original Study

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AFAST Development

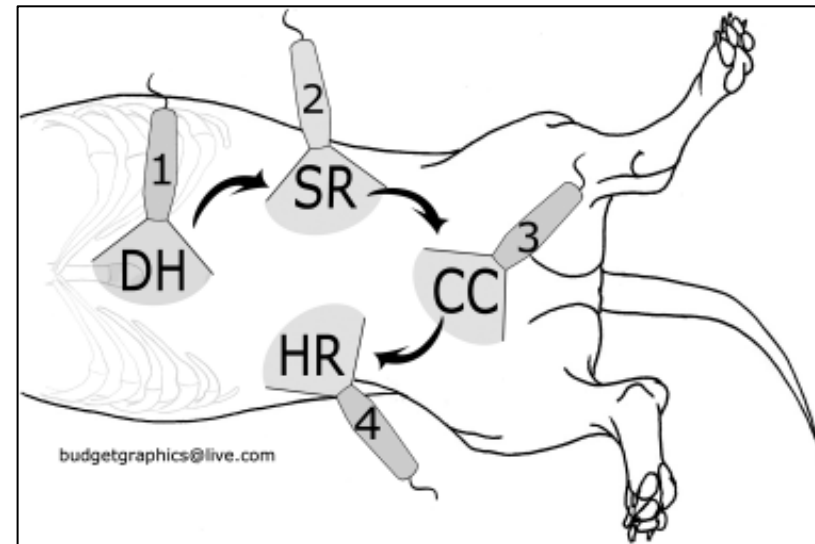
- Findings:
 - 27/101 had FF
 - Initially or on serial exam
 - 71 had serial AFAST
 - 12/71 had AFS change (+/-)
 - None required surgery
 - DH site most common
 - Only AFS 3,4 became anemic
 - Transfusions only in ASF 3,4
 - Survival
 - AFS + 63%
 - AFS – 91%

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AFAST Development

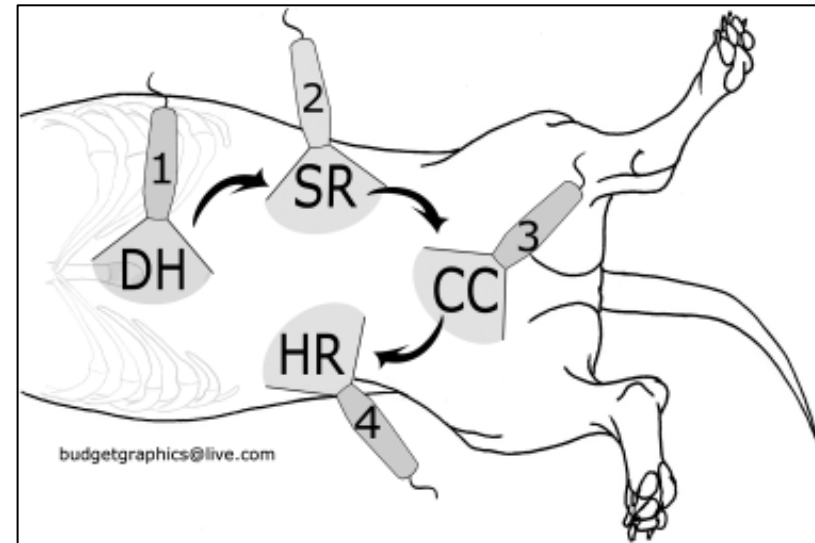
- Findings:
 - Transfusion frequency
 - 10% compared to 24% in *Boysen et al 2004*
 - Low volume resuscitation?
 - Abdominocentesis
 - 98% success (all blood)
 - Higher than earlier studies
 - AFS sites
 - Lower scores had ↑ NGD sites
 - Early hemorrhage/site of hemorrhage?
 - Impact on therapy?

Original Study

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AFAST Development

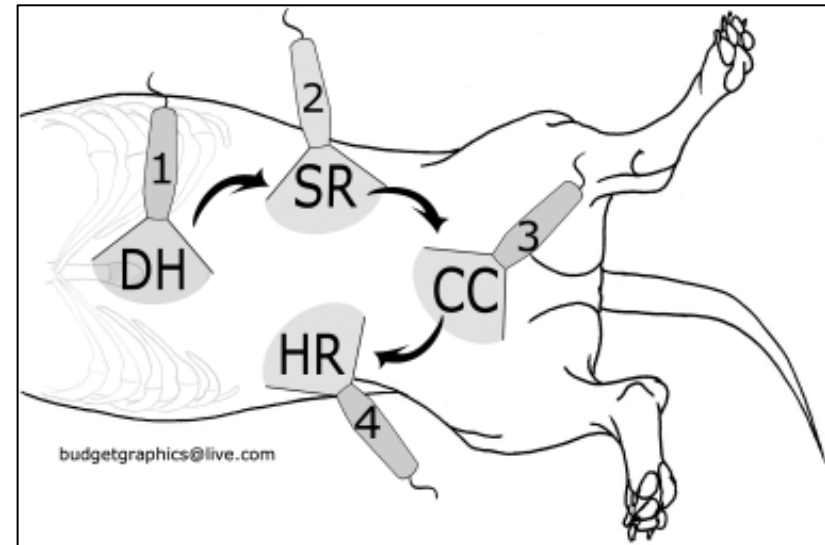
- Summary
 - AFS scoring reliable to quantify hemorrhage
 - Note severity of injury
 - Direct initial therapy
 - Provided more info than radiographs/initial PCV
 - Serial testing importance
 - 50% of AFS increases were initially 0
 - Sensitive, specific
 - Easy to perform
 - Quick

Original Study

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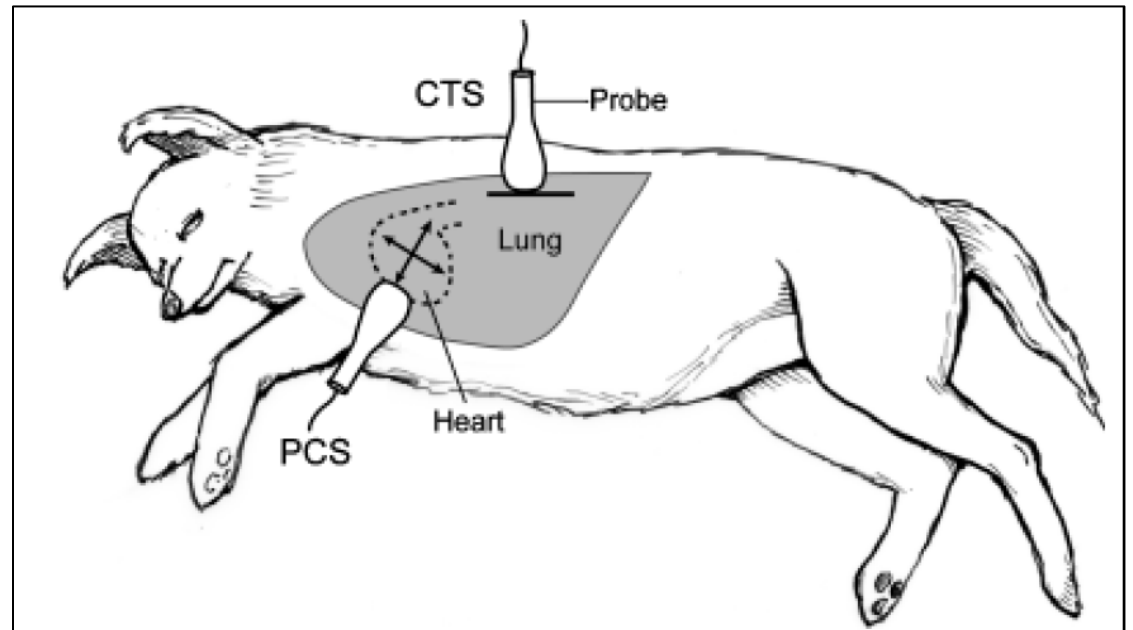
TFAST development

- Methods
 - Trained by DACVR
 - Scan ASAP & 4hr post
 - No shave, alcohol (+/- gel)
 - Lateral Recumbency
 - Sternal if distressed
 - 4-point protocol
 - CTS (7-9th ICS)
 - Stationary longitudinal
 - PCS (5-6th ICS)
 - Transverse and longitudinal

****Compared TFAST to TXR****

Original Study *Journal of Veterinary Emergency and Critical Care* **18**(3) 2008, pp 258–269
doi: 10.1111/j.1476-4431.2008.00312.x

Evaluation of a thoracic focused assessment with sonography for trauma (TFAST) protocol to detect pneumothorax and concurrent thoracic injury in 145 traumatized dogs



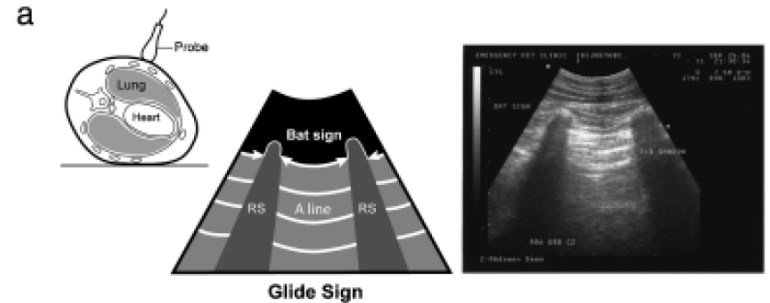
TFAST development

- Glide sign
 - To and fro motion
 - Visceral pleura against parietal pleura
 - Rules out PTX
- Step Sign
 - Normal glide with deviation of linear continuity wall trauma

Original Study *Journal of Veterinary Emergency and Critical Care* **18(3)** 2008, pp 258–269
doi: 10.1111/j.1476-4431.2008.00312.x

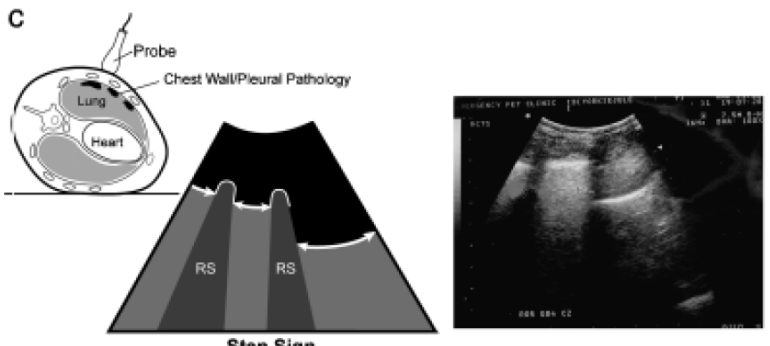
Evaluation of a thoracic focused assessment with sonography for trauma (TFAST) protocol to detect pneumothorax and concurrent thoracic injury in 145 traumatized dogs

a



Glide Sign

c



Step Sign

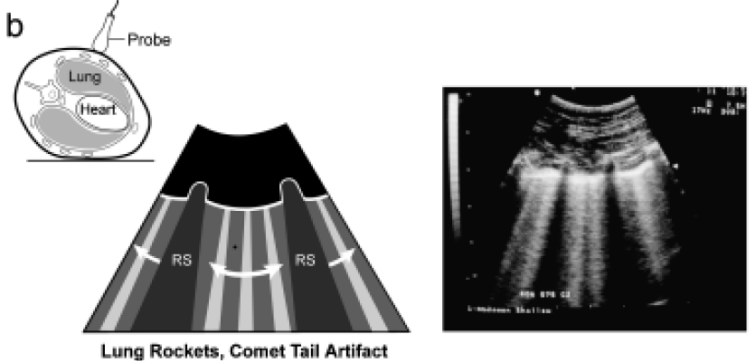
TFAST development

- B-lines
 - Infiltrated lung
 - Rules out PTX
 - As long as moving (rule out z, e lines)
- No Glide
 - Signifies PTX
 - Difficult to assess w/ panting or rapid, shallow breathing
 - Must be breathing to assess!

Original Study *Journal of Veterinary Emergency and Critical Care* **18(3)** 2008, pp 258–269
doi: 10.1111/j.1476-4431.2008.00312.x

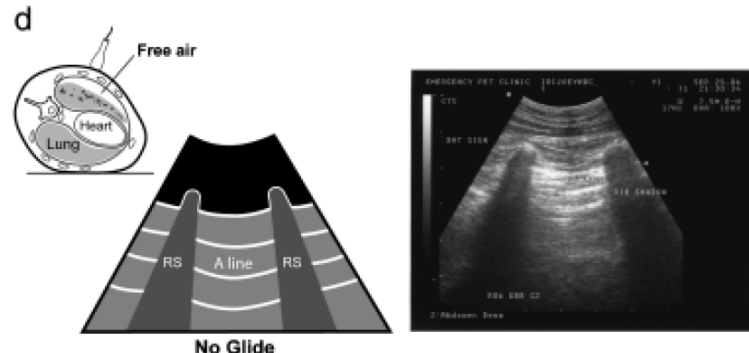
Evaluation of a thoracic focused assessment with sonography for trauma (TFAST) protocol to detect pneumothorax and concurrent thoracic injury in 145 traumatized dogs

b



Lung Rockets, Comet Tail Artifact

d



No Glide

Jun/22/2021 06:39:35

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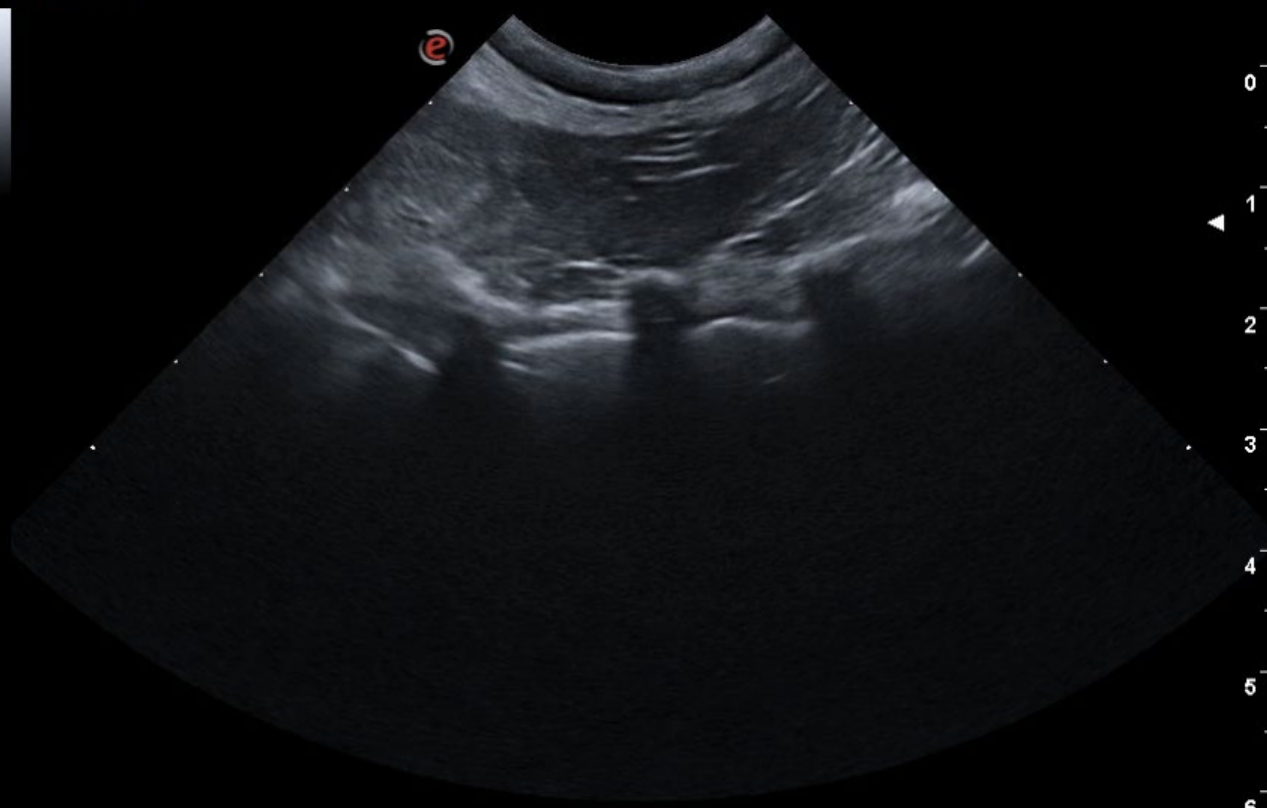
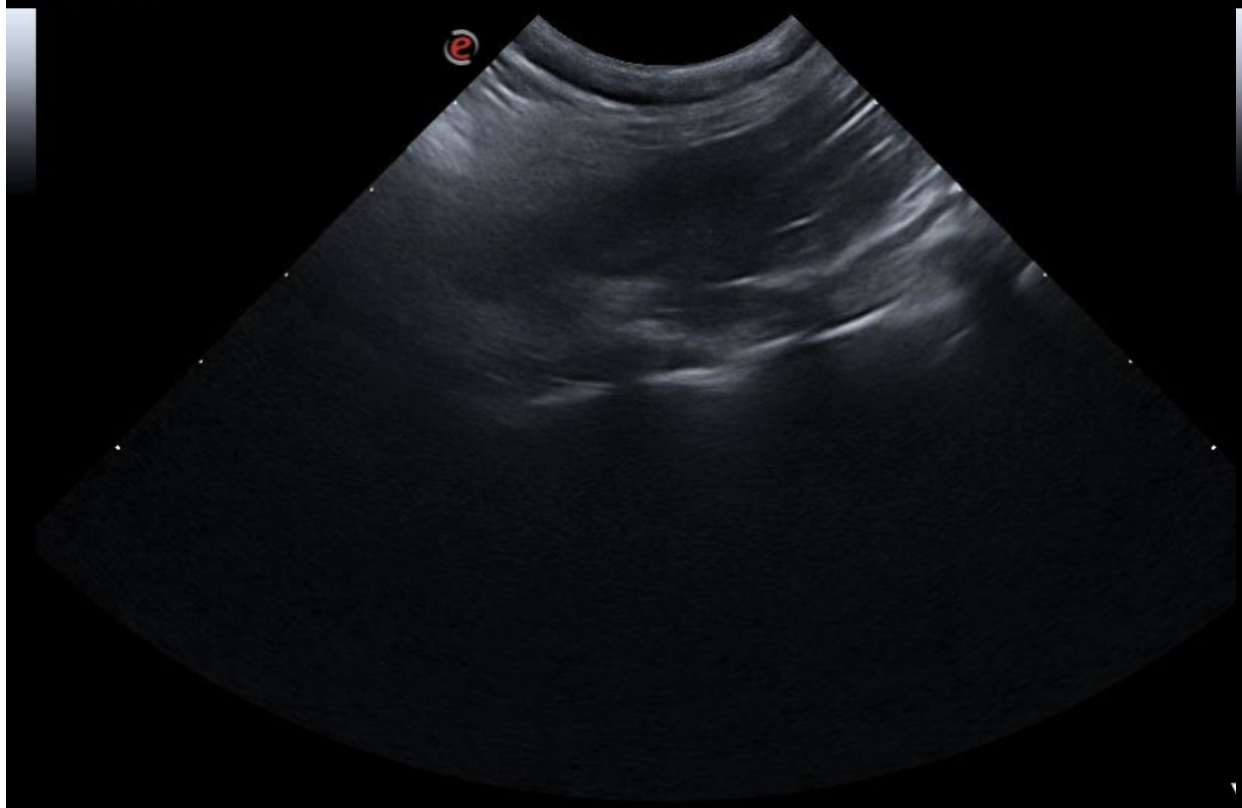
B	Res-M	AG	—
TEI	D 61 mm	X/M	C1/1
	PRC 13/2/2/3	PRS	1

P	80%	MI	0.B	Res-M	AG	—
		TIS	0.TEI	D 61 mm	X/M	C1/1
				PRC 13/2/2/3	PRS	1

P	80%	MI	1.2
		TIS	0.1

Abdominal Feline
mC 3-11 VETMED

Abdominal Feline
mC 3-11 VETMED



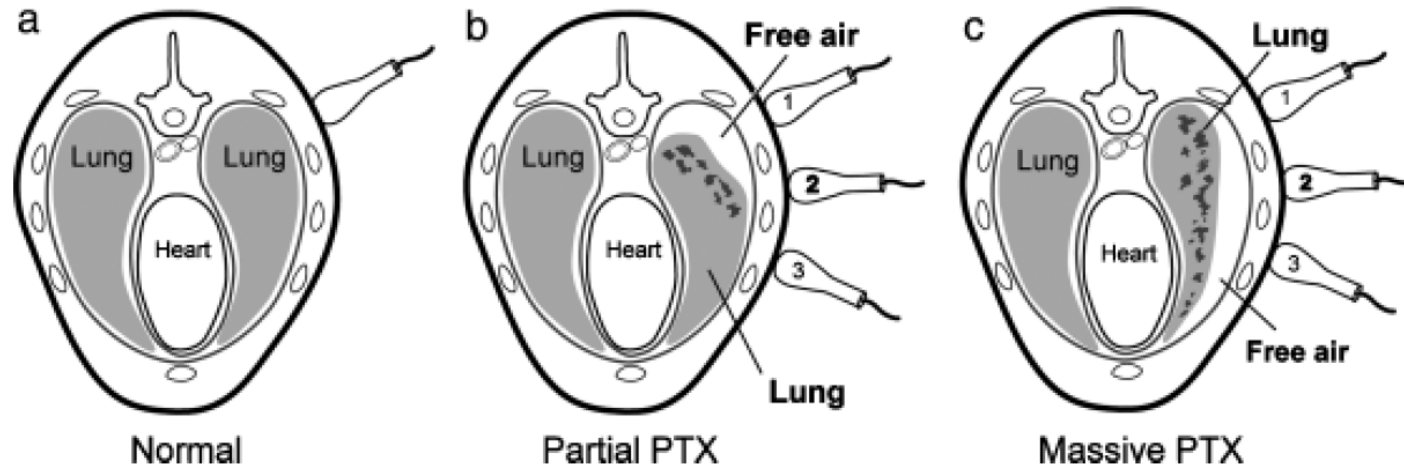
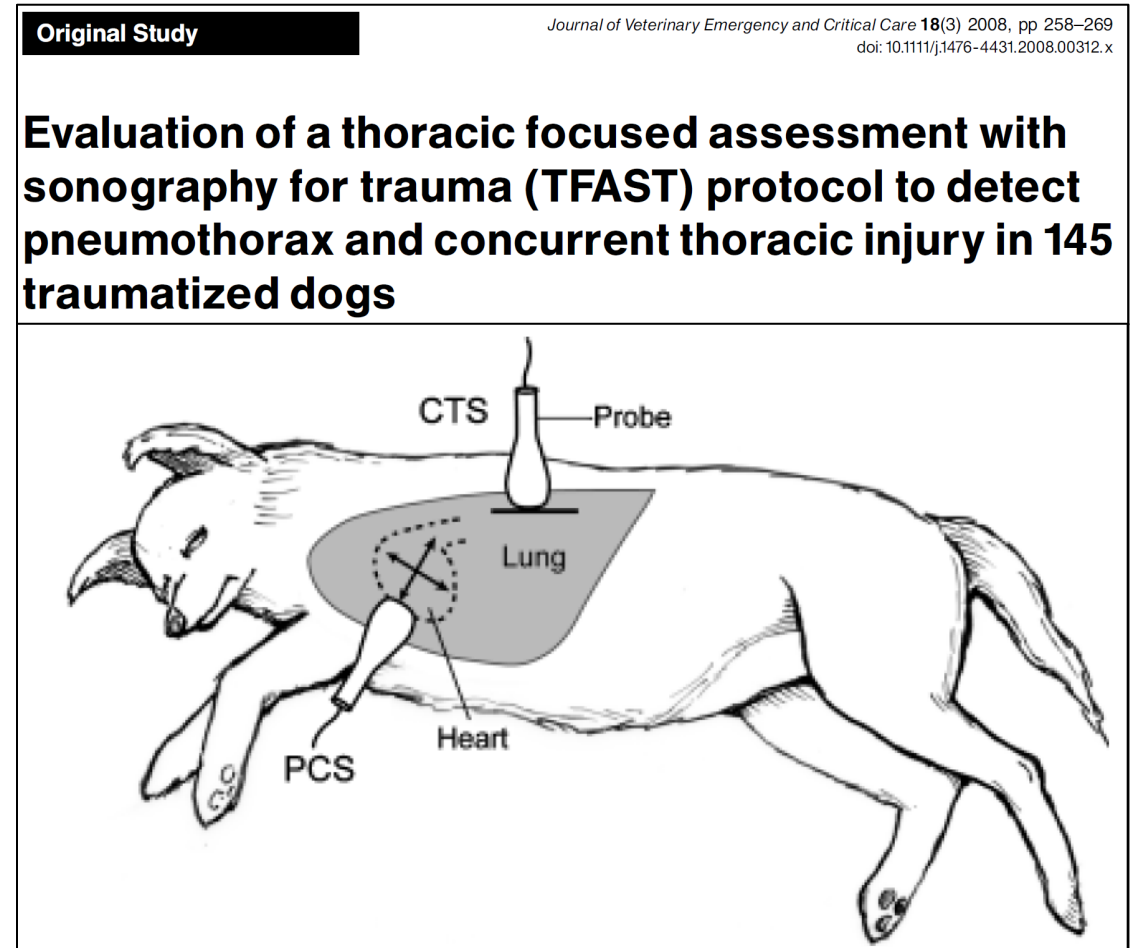


Figure 4: Cross sectional canine thoraces depicting the quantification of the degree of PTX as partial or massive by searching for the lung point. In the absence of the glide sign, lung rockets, or comet tail artifacts, the probe is moved sequentially in a ventral manner as numerically labeled from dorsal to ventral. (a) Normal thorax in which PTX has been excluded. (b) PTX has been determined at position 1 and the lung point at position 2 has determined the PTX to be partial. (c) PTX has been determined and a lung point is non-existent at any of the 3 probe positions, indicating massive PTX (CTS, chest tube site; PTX, pneumothorax).

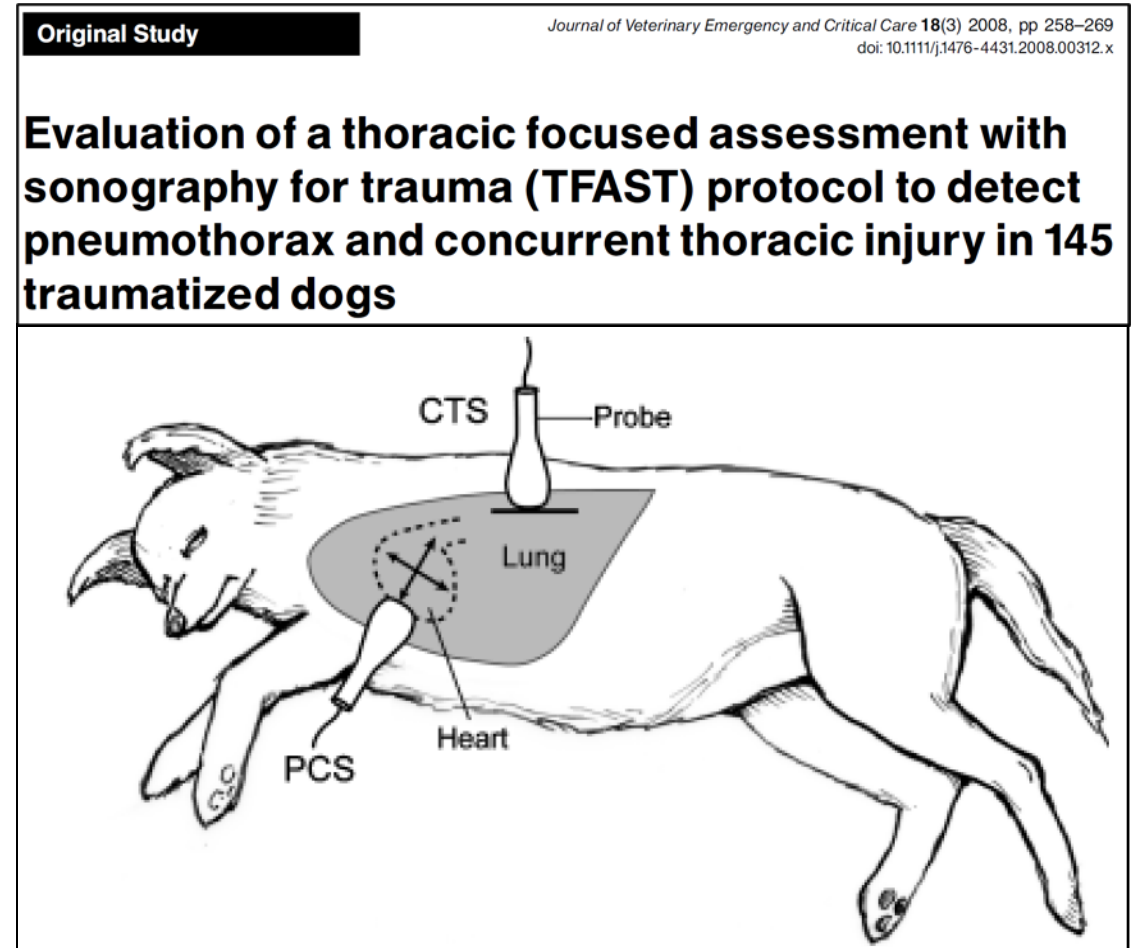
TFAST development

- Results
 - 145 dogs
 - 23% had PTX per TXR
 - Sensitivity
 - Overall 78%
 - Specificity
 - Overall 93%
 - Time ~3 min
 - Technically more demanding
 - Se improved with repetition
 - Respiratory rate effected evaluation



TFAST development

- Results
 - CTS better for PTX
 - PCS better for PCE/PE
 - SQE may complicate assessment
 - Lack of bat sign/alligator sign
 - TFAST able to detect step sign
 - Concern for BW injury, PC, DH



VPOCUS beyond trauma

Beyond Trauma

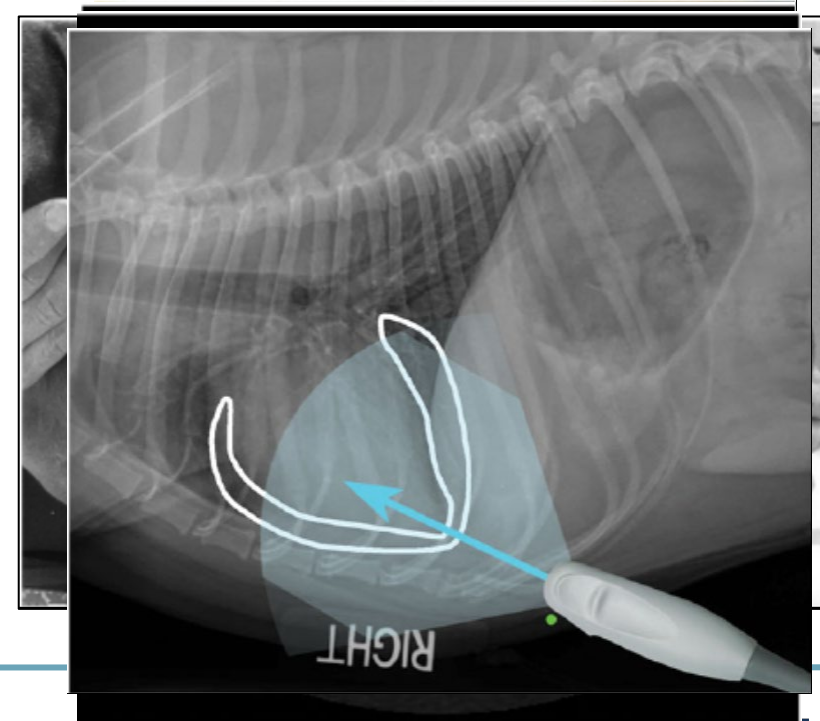
- DH view used commonly in people for PCE
 - PCS more common in veterinary medicine
- 24 dogs with PCE over 1 year
- PC
 - Labored breathing, weakness
- Positioning
 - Lateral, sternal, standing

Retrospective Study

Journal of Veterinary Emergency and Critical Care 26(1) 2016, pp 125–131
doi: 10.1111/vec.12374

The use of the diaphragmatico-hepatic (DH) views of the abdominal and thoracic focused assessment with sonography for triage (AFAST/TFAST) examinations for the detection of pericardial effusion in 24 dogs (2011–2012)

Gregory R. Lisciandro, DVM, DABVP, DACVECC



Beyond Trauma

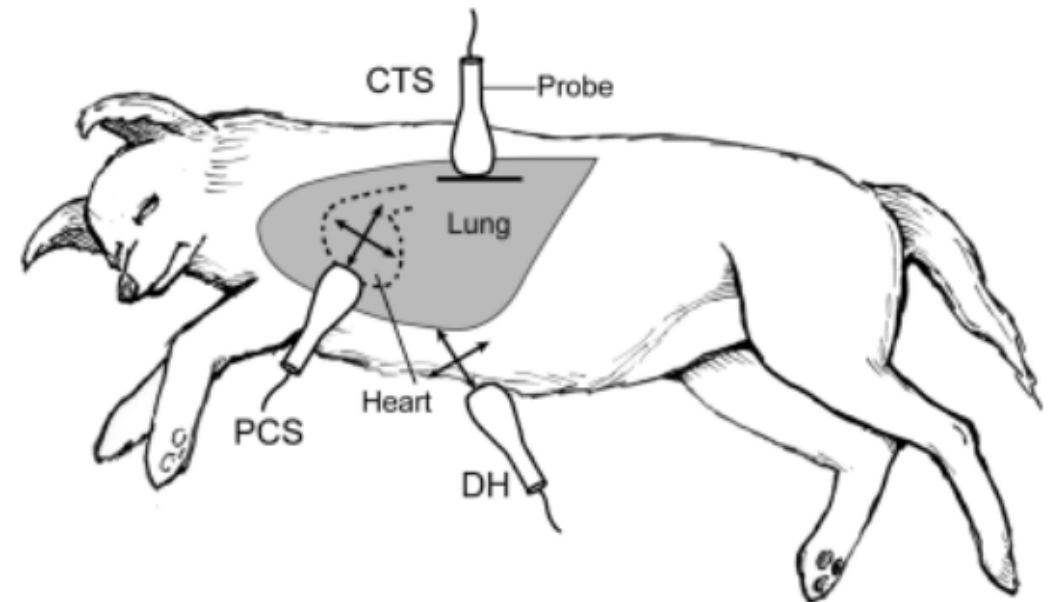
- Findings
 - 20/24 were DH positive PCE
 - 4 missed with DH
 - Seen on PCS or serial DH
 - Confirmed with echo
 - 1 false positive (DCM)
 - Utility of FAST exam/DH view for PCE

Retrospective Study

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Beyond Trauma

- 100 patients
 - 82 d, 18 c
- Training
 - Similar to *Boysen et al 2004*
 - 3hr didactic, 3hr practical
- Position
 - AFAST
 - RL or LL (presenting position)
 - TFAST
 - Same as AFAST then sternal

Original Study

Journal of Veterinary Emergency and Critical Care 26(1) 2016, pp 64–73
doi: 10.1111/vec.12376

Focused assessment with sonography in nontraumatized dogs and cats in the emergency and critical care setting

Jantina McMurray, DVM; Søren Boysen, DVM, DACVECC and Serge Chalhoub, DVM, DACVIM

- Time of scan
 - <8min, ~4min TFAST, ~5min AFAST
 - RL longer than LL

Beyond Trauma

- Results
 - AFAST/TFAST find fluid in non-traumatized d/c
 - Sign diff btw stable and unstable
 - <10% stable
 - >/= 75% unstable
 - Fluid type in NT more variable
 - RL & LL acceptable
 - Gallbladder seen in LL

Scan time max efficiency by 20 scans

Original Study

Journal of Veterinary Emergency and Critical Care 26(1) 2016, pp 64–73
doi: 10.1111/vec.12376

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- Additional
 - Narrow differentials, improve accuracy, expedite therapy
 - Performed concurrently with stabilization
 - CV and respiratory distress
 - Perform AFAST & TFAST concurrently
 - Bicavitary effusions

Table 3: Final diagnoses in dogs with free fluid identified on abdominal or thoracic focused assessment with sonography for trauma examinations

Type of fluid	Final diagnosis
Abdominal fluid	
Hemoabdomen (6)	Neoplasia (6), including splenic neoplasia (4) and hepatic neoplasia (2)
Transudate (2)	Hepatic disease (2), including biliary obstruction (1) and portal hypertension secondary to hepatopathy (1)
Nonseptic exudate (2)	Unknown (2)
Septic exudate (2)	Abdominal abscess (2), including pancreatic abscess (1) and renal abscess (1)
Unknown fluid (9)	Unknown (3), renal disease (2) including renal failure (1) and renal abscess (1), neoplasia (2) including splenic neoplasia (1) and hepatic neoplasia (1), pancreatitis (1), small intestinal linear foreign body (1)
Pleural fluid	
Chylothorax (1)	Lung lobe torsion (1)
Pyothorax (1)	Pulmonary abscess (1)
Unknown fluid (4)	Unknown (2), aspiration pneumonia (1), neoplasia (1) including splenic neoplasia (1)
Pericardial fluid	
Hemopericardium (1)	Right atrial mass (1)

Number of patients in parentheses. Unknown fluid means that centesis was not performed.

Original Study

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Focused assessment with sonography in nontraumatized dogs and cats in the emergency and critical care setting

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Table 4: Final diagnoses in cats with free fluid identified on abdominal or thoracic focused assessment with sonography for trauma examinations

Type of fluid	Final diagnosis
Abdominal fluid	
Transudate (1)	Neoplasia (1) including carcinomatosis (1)
Nonseptic exudate (1)	Idiopathic chyloabdomen (1)
Septic exudate (1)	Duodenal perforation (1)
Unknown fluid (3)	Unknown (2), renal failure (1)
Pleural fluid	
Chylothorax (1)	Idiopathic chylothorax (1)
Unknown fluid (1)	Pulmonary disease (1)

Number of patients in brackets. Unknown fluid means that centesis was not performed.

Expanding on VPOCUS

- Modifications to TFAST
 - Further studies on PC, PTX, AIS
- Additional utility of TFAST
 - Cardiac disease
 - Pulmonary disease
- Additional utility of AFAST
 - Anaphylaxis
 - Volume status
 - Free air

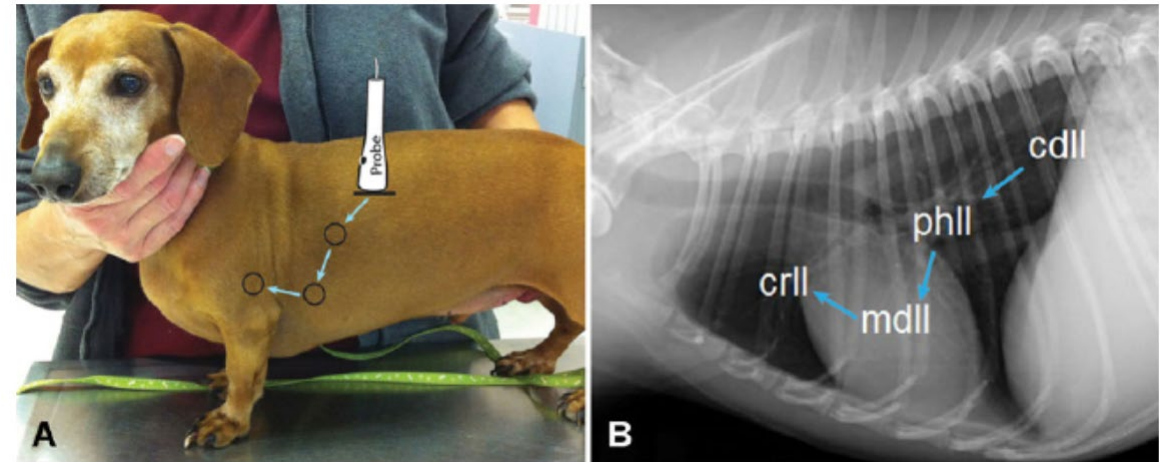
TFAST (Vet Blue) for pulmonary edema

- Frequency of B lines in normal dogs
 - Radiographically normal lungs
 - No CS of respiratory disease
- Who
 - Normal dogs and CHF dogs
- Frequency:
 - 11% normal
 - 10/11 @ 1 site only
 - 8/10 had 1/site
 - 1/10 had 2
 - **1/10 had 3**
 - >1 site, 1 per site
 - 100% CHF
 - >50% of viewed areas
 - Multiple/site

> [Vet Radiol Ultrasound](#). May-Jun 2014;55(3):315-22. doi: 10.1111/vru.12122. Epub 2014 Jan 2.

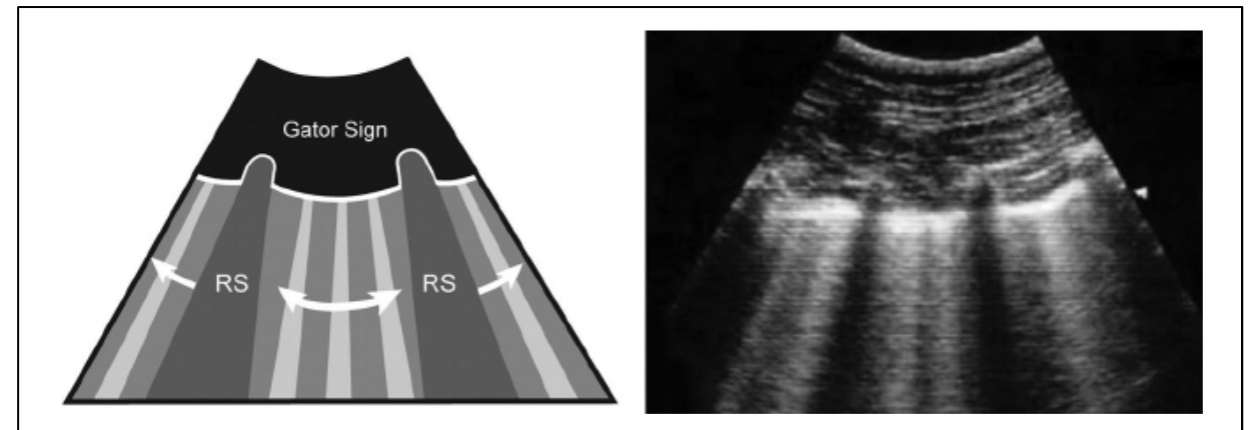
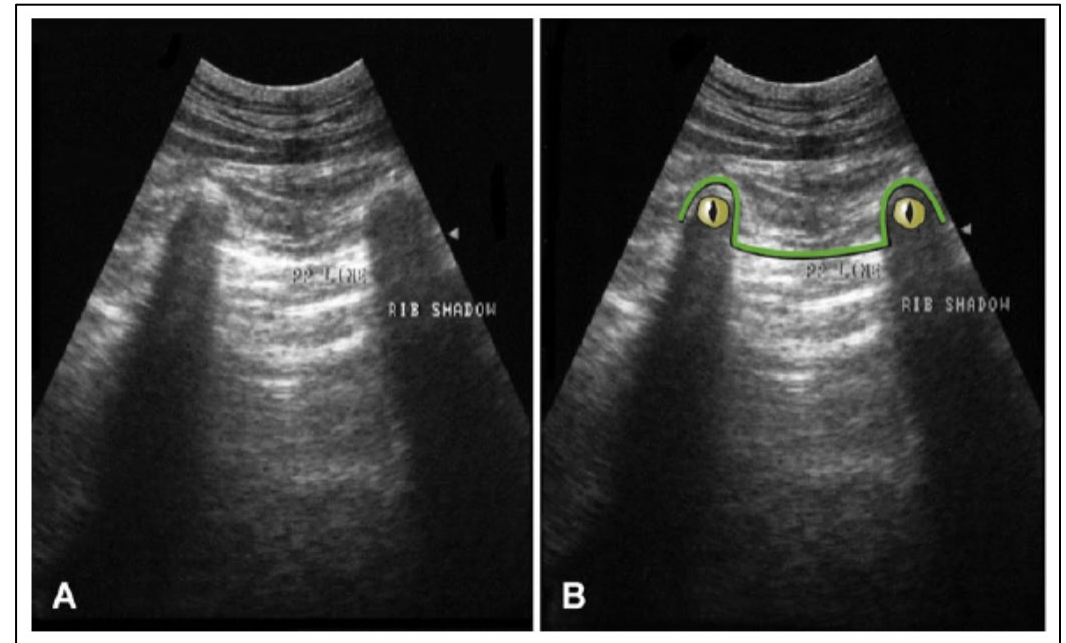
Frequency and number of ultrasound lung rockets (B-lines) using a regionally based lung ultrasound examination named vet BLUE (veterinary bedside lung ultrasound exam) in dogs with radiographically normal lung findings

Gregory R Lisciandro ¹, Geoffrey T Fosgate, Robert M Fulton



B- lines

- Vertical, narrow-based, hyperechoic lines from pleural interface
 - Must move with respiration
 - Z, e-lines
- Represent interstitial lung fluid
 - “wet lung”
 - Represent AIS
 - Alveolar/interstitial syndrome
- Previously referred to as
 - Lung rockets (3 or more b-lines)
 - Comet tails (bigger category)
 - Include z-lines, e-lines



TFAST for pulmonary edema

- Vet student performed exam
 - Brief training w/ DACVR
- Control dogs
 - Neg HW, normal TXR, normal echo, no respiratory CS
- Affected group
 - TXR, echo, PE consistent with PE
 - Neg HW, no hx of resp CS

Performed easily with minimal restraint, was quick, easily learned to perform, tolerated well by patients

TRANSTHORACIC LUNG ULTRASOUND IN NORMAL DOGS AND DOGS WITH CARDIOGENIC PULMONARY EDEMA: A PILOT STUDY

NATHALIE RADEMACHER¹, ROMAIN PARIAUT¹, JULIE PATE, CARLEY SAELINGER, MICHAEL T. KEARNEY, LORRIE GASCHEN

Vet Radiol Ultrasound, Vol. 55, No. 4, 2014, pp 447–452.

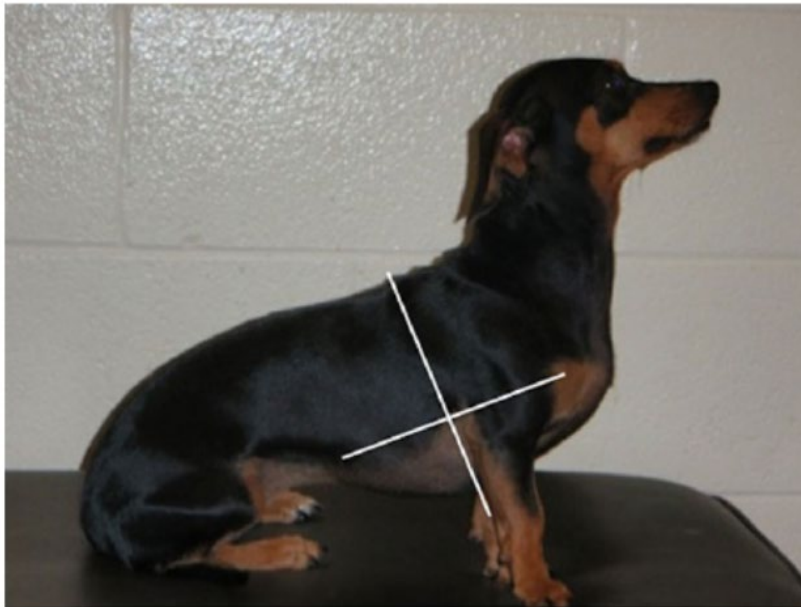


FIG. 1. Diagram illustrating criteria used for dividing each dog's hemithorax into four quadrants, using the sixth intercostal space as the limit between the cranial and caudal quadrants and the elbow as the limit between dorsal and ventral quadrants. Quadrants were examined using predominantly horizontal scans, moving the probe over the thoracic wall in a sliding motion.

TFAST for pulmonary edema

- Results
- B-line frequency
 - CHF dogs
 - 100% had b-lines
 - At least 3 quadrants had score of 10
 - Coalescing b-lines
 - 5/9- b lines in all 8 quadrants
 - 4/9- b lines in at least 5 quadrants
 - More b-lines right vs left
 - Control
 - 31% had b-lines
 - ~1 b-line/dog

TRANSTHORACIC LUNG ULTRASOUND IN NORMAL DOGS AND DOGS WITH CARDIOGENIC PULMONARY EDEMA: A PILOT STUDY

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Vet Radiol Ultrasound, Vol. 55, No. 4, 2014, pp 447-452.

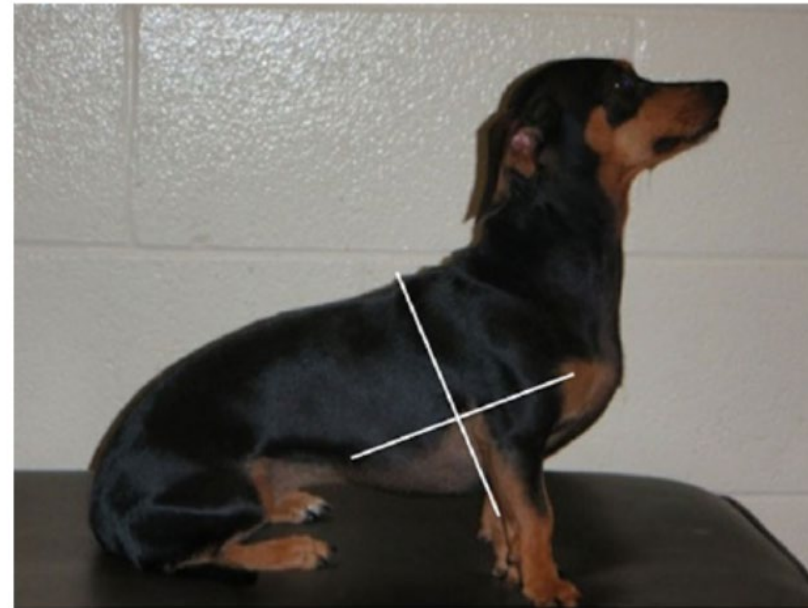


FIG. 1. Diagram illustrating criteria used for dividing each dog's hemithorax into four quadrants, using the sixth intercostal space as the limit between the cranial and caudal quadrants and the elbow as the limit between dorsal and ventral quadrants. Quadrants were examined using predominantly horizontal scans, moving the probe over the thoracic wall in a sliding motion.

TFAST-further looks

- LUS vs TXR vs TCT
- PC
 - >3 b-lines
 - Presence of c-lines
- Impacted by SQE
- Results
 - LUS 19/21 (CT confirmed PC)
 - TXR 14/21

Diagnosis of pulmonary contusions with point-of-care lung ultrasonography and thoracic radiography compared to thoracic computed tomography in dogs with motor vehicle trauma: 29 cases (2017-2018)

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Susan M. Newell DVM, MS, DACVR¹ | Justine A. Johnson DVM, DACVECC¹

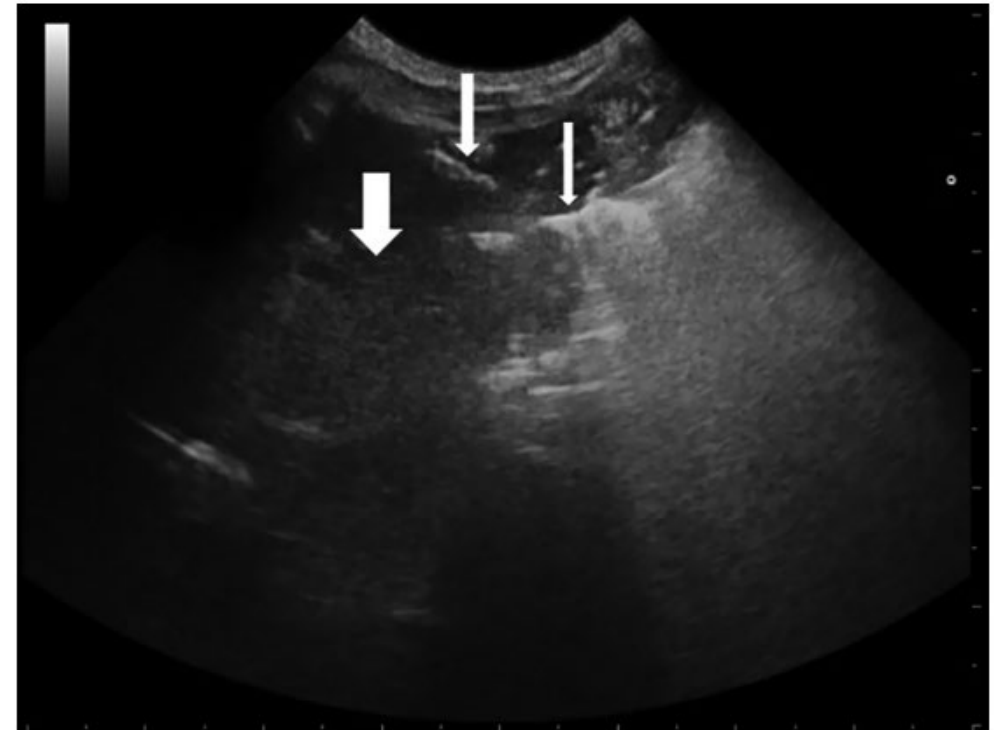


FIG 5. Lung consolidation: substantial alveolar consolidation without air bronchograms (liver-like pattern) (thick white arrow), air bronchogram shown longitudinally (medium white arrow), and B-lines arising from bronchi (thin white arrow). The small white punctate foci are transverse (“end on”) bronchograms (not labelled)

VPOCUS for cardiac disease

- VetBLUE method
- CPE
 - 2/4 positive sites (>3b-lines/site), bilaterally
- 61 CPE, 39 NCD
- At least 1 post site
 - 55/61 CPE
 - 26/39 NCD
- Dog Se 83%, Sp 70%
- Cat Se 87%, Sp 89%
 - Rads Se 85%, Sp 87%

Accuracy of point-of-care lung ultrasonography for the diagnosis of cardiogenic pulmonary edema in dogs and cats with acute dyspnea

Jessica L. Ward DVM

JAVMA • Vol 250 • No. 6 • March 15, 2017

- May be of most benefit in differentiating cats w/ lower airway disease from CPE

VPOCUS for cardiac disease

- LUS, NT proBNP, FCU
 - LA:Ao and PCE
- Strongest LUS criteria
 - >1 strong site bilaterally
 - Se 78.8%, Sp 83.3%
- LA subjective enlargement
 - Se 97%, Sp 100%
- PCE
 - Se 60%, Sp 100%
- NT proBNP
 - Se 93%, Sp 72%

Received: 17 December 2017	Revised: 3 March 2018	Accepted: 22 May 2018
DOI: 10.1111/jvim.15246		
STANDARD ARTICLE		Journal of Veterinary Internal Medicine ACVIM American College of Veterinary Internal Medicine
Evaluation of point-of-care thoracic ultrasound and NT-proBNP for the diagnosis of congestive heart failure in cats with respiratory distress		

VPOCUS for cardiac disease

Received: 17 December 2017 | Revised: 3 March 2018 | Accepted: 22 May 2018
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Journal of Veterinary Internal Medicine **ACVIM**
American College of
Veterinary Internal Medicine
Open Access

STANDARD ARTICLE

Evaluation of point-of-care thoracic ultrasound and NT-proBNP for the diagnosis of congestive heart failure in cats with respiratory distress



FIGURE 2 Still B-mode focused cardiac ultrasound short axis images of the base of the heart showing a normal left atrium (A), and a subjectively enlarged left atrium (B,C). The normal ratio of the diameter of the LA to the diameter of the Ao should be $\sim 1 : 1$. In addition to an enlarged LA : Ao ratio, a scant amount of PCE is visualized in C




VPOCUS for cardiac disease


- Did not show improved diagnostic accuracy above PE and medical history
- Did not include LUS
 - Would this help?

Received: 22 December 2017 | Revised: 28 April 2018 | Accepted: 3 June 2018
DOI: 10.1111/vec.12930

ORIGINAL STUDY

Investigation of focused cardiac ultrasound in the emergency room for differentiation of respiratory and cardiac causes of respiratory distress in dogs

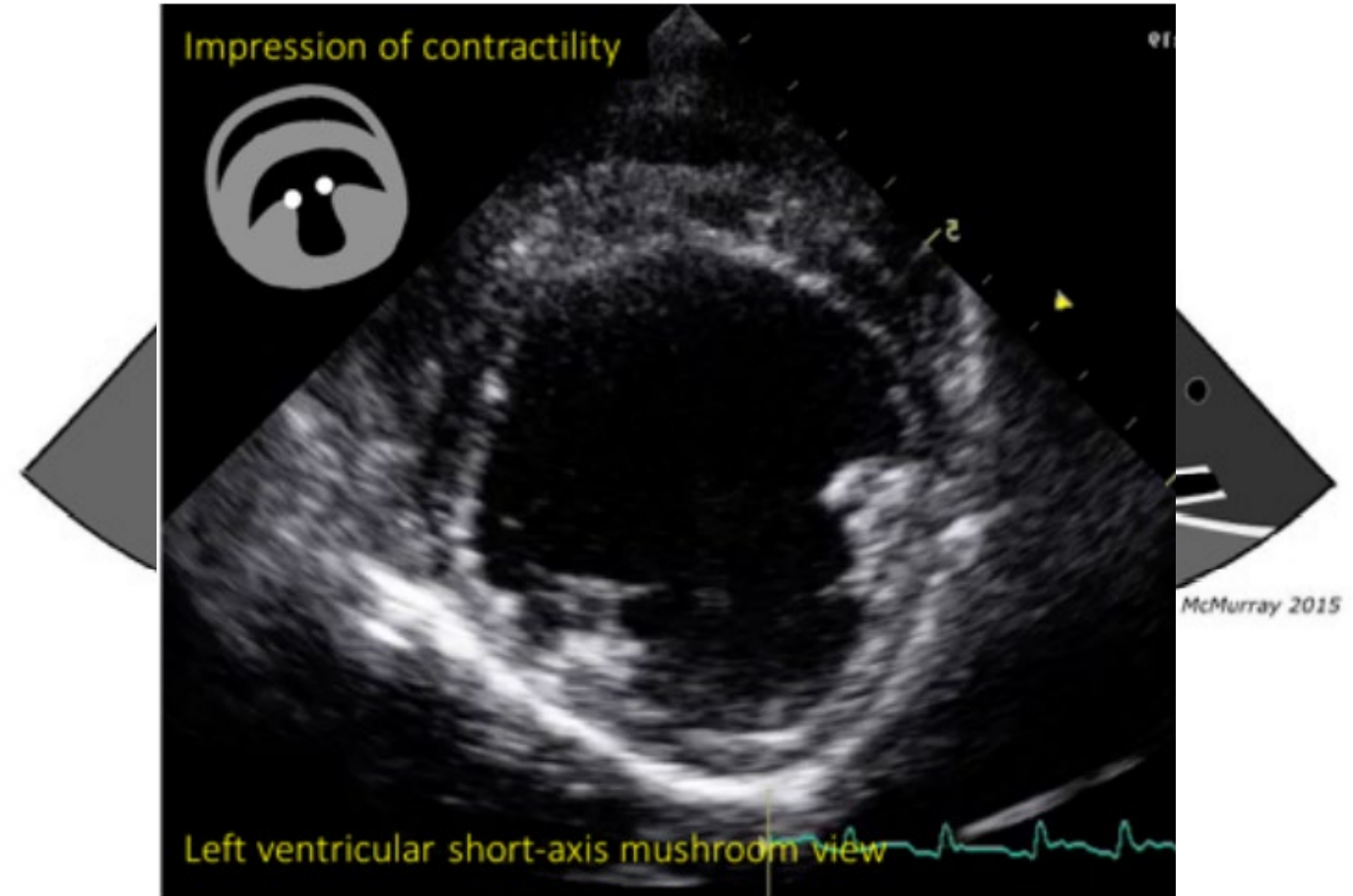
Melanie J. Hezzell MA, VetMB, PhD, DACVIM  | Cassandra Ostroski DVM, DACVECC  | Mark A. Oyama DVM, DACVIM | Benjamin Harries VMD | Kenneth J. Drobatz DVM, MS, DACVECC | Erica L. Reineke VMD, DACVECC 

Journal of Veterinary Emergency and Critical Care 

Expanding on VPOCUS

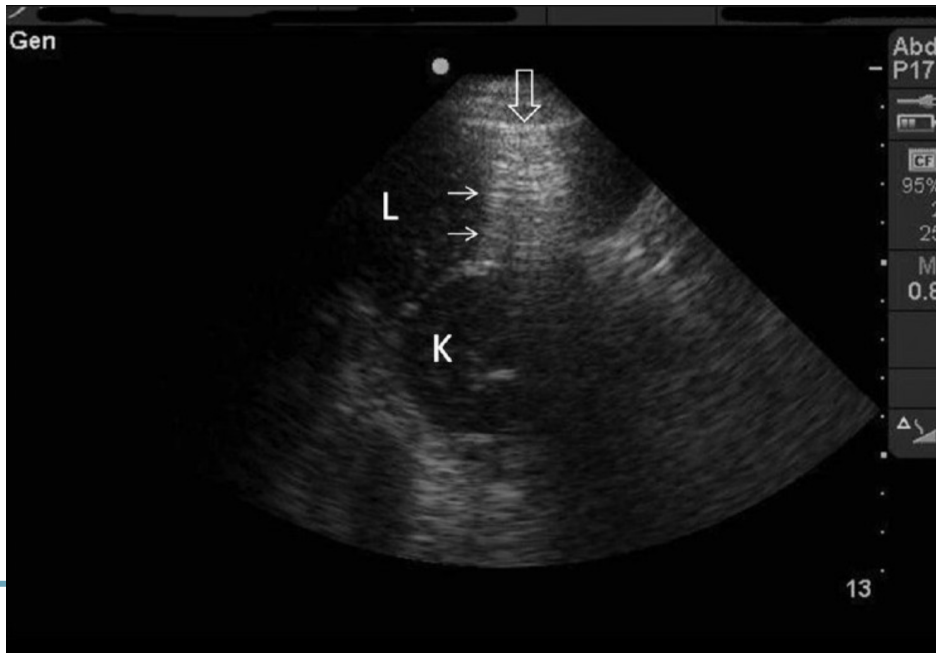
Cardiovascular

- Pericardial effusion
- LA size
 - LA:AO ratio
 - RPSA
- CVC assessment
 - DH view, slide right
 - CVC varies 20-60% w/ inspiration
- Contractility
 - RPSA- “mushroom view”
 - Difference in



Expanding on VPOCUS

- Anaphylaxis
 - Fluid overload
 - Right heart disease/PCE
 - Hypoalbuminemia
- Free abdominal air
 - Reverberation artifact
 - Technically demanding



J Emerg Trauma Shock. 2011 Oct;4(4):511-3. doi: 10.4103/0974-2700.86649

Original Study

Journal of Veterinary Emergency and Critical Care 19(6) 2009, pp 536–544
doi: 10.1111/j.1476-4431.2009.00474.x

Elevation of alanine transaminase and gallbladder wall abnormalities as biomarkers of anaphylaxis in canine hypersensitivity patients

Jonnie E. Quantz, DVM; Macon S. Miles, DVM, DACVIM; Ann L. Reed, DVM, DACVR and George A. White, DVM, DACVECC

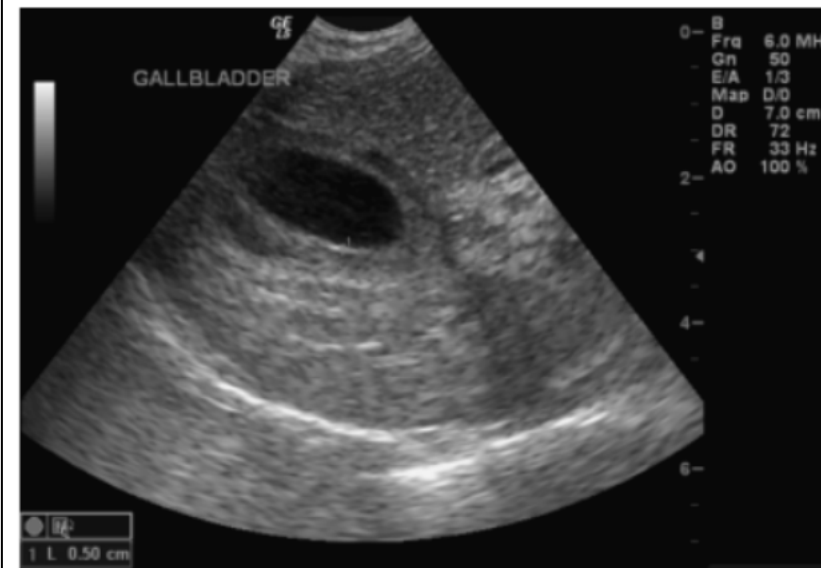


Figure 3: Ultrasound image of the gallbladder in a patient diagnosed with anaphylaxis after a single hymenoptera sting. Gallbladder wall is thickened (0.5 cm) and striated (alternating echogenic and sonolucent layers).

Revisiting FAST

FAST-further looks

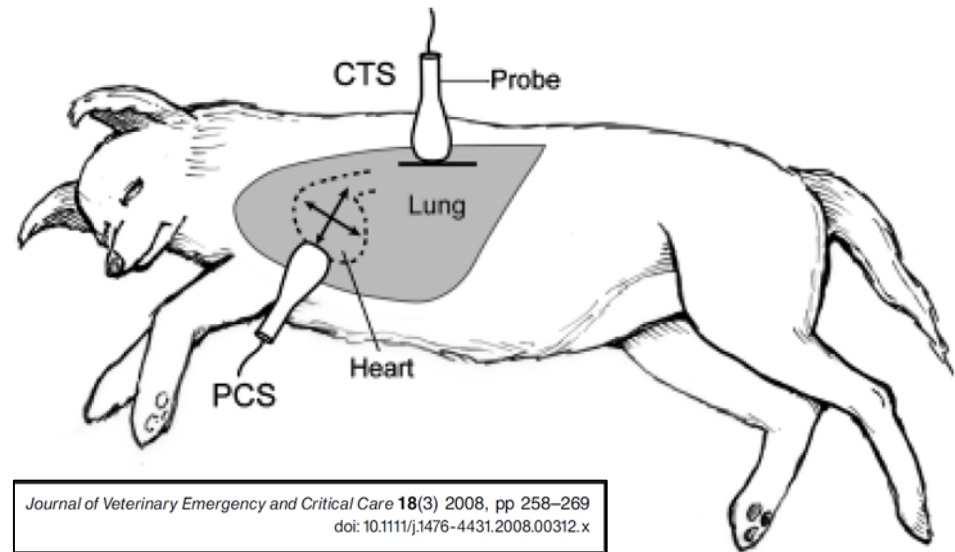
- AFAST/TFAST vs whole body CT
 - Evaluating fluid, PTX
- ER vs radiology residents vs CT
 - 1hr didactic
 - 1 hands on practice
- Position
 - Right lateral (LL if required)

Original Study

Journal of Veterinary Emergency and Critical Care 28(5) 2018, pp 429–435
doi: 10.1111/vec.12732

Evaluation of the agreement between focused assessment with sonography for trauma (AFAST/TFAST) and computed tomography in dogs and cats with recent trauma

Andrea M. Walters, DVM, MS, DACVECC; Mauria A. O'Brien, DVM, DACVECC;
Laura E. Selmic, BVetMed (Hons), MRCVS, DACVS; Sue Hartman, RT(R)CT;
Maureen McMichael, DVM, DACVECC and Robert T. O'Brien, DVM, MS, DACVR



FAST-further looks

- TFAST weak for PTX
- AFAST strong for effusion
- TFAST moderate for effusion

Original Study

Journal of Veterinary Emergency and Critical Care 28(5) 2018, pp 429–435
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Maureen McMichael, DVM, DACVECC and Robert T. O'Brien, DVM, MS, DACVR

Table 2: Summary of agreement between FAST scans and CT performed in 15 animals (13 dogs and 2 cats) following blunt or penetrating trauma. FAST scans were performed either by emergency room clinicians (ER department) or by radiology residents (radiology department), and kappa scores were calculated assuming the results of the CT as a gold diagnostic standard

Imaging modality	Department	FAST negative CT positive	FAST positive CT negative	Kappa
AFAST (presence of peritoneal effusion)	ER	1	0	0.82
	Radiology	1	2	0.53
TFAST (presence of pleural effusion)	ER	3	0	0.53
	Radiology	4	0	0.36
TFAST (presence of pneumothorax)	ER	5	2	-0.06
	Radiology	6	1	-0.12

FAST, focused assessment with sonography for trauma; AFAST, abdominal focused assessment with sonography for trauma; TFAST, thoracic focused assessment with sonography for trauma; CT, computed tomography; ER, emergency room.

TFAST-further looks

- TCT compared to LUS
 - Emergent presentation of various causes
- House officers w/ didactic training
- Low Se of LUS for AIS
 - High Sp
- Good Se for PE
- Low Se for PTX
 - 1/3 detected
- Low Se for CMM
 - ¼ detected
 - 1 false positive (PTE)

Diagnostic accuracy of a lung ultrasound protocol (Vet BLUE) for detection of pleural fluid, pneumothorax and lung pathology in dogs and cats

L. COLE¹*, M. PIVETTA² AND K. HUMM³*

Journal of Small Animal Practice (2021) **62**, 178–186

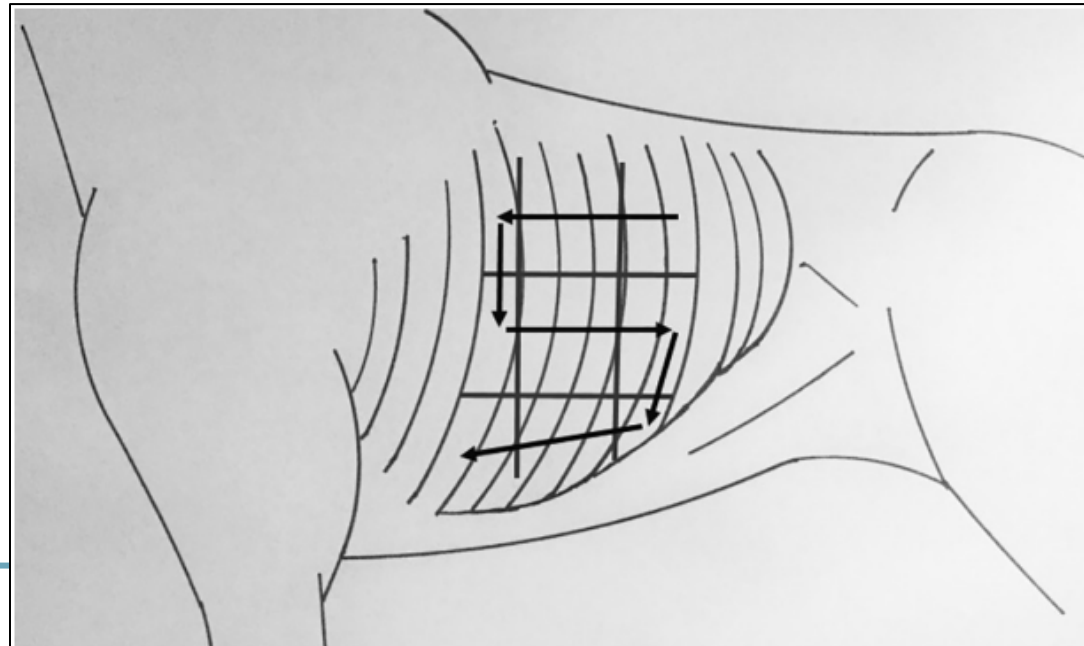


VPOCUS continued evolution

- Vet-FAST ABCDE
- One sonographer
 - 5 years training
- FAST Procedure
 - Position
 - RL,LL,S- how present
 - Repositioned during exam
 - Prep
 - Shave neck, chest, abd
 - Alcohol vs sterile saline
 - Gel for ON
 - Order
 - **↑** N-C-A-H-VC (LLR)
- Post FAST
 - RL TXR/AXR +/- DV view

Veterinary-focused assessment with sonography for trauma-airway, breathing, circulation, disability and exposure: a prospective observational study in 64 canine trauma patients

A. ARMENISE^{1,*}, R. S. BOYSEN[†], E. RUDLOFF[‡], L. NERI[§], G. SPATTINI[¶] AND E. STORTI^{||}

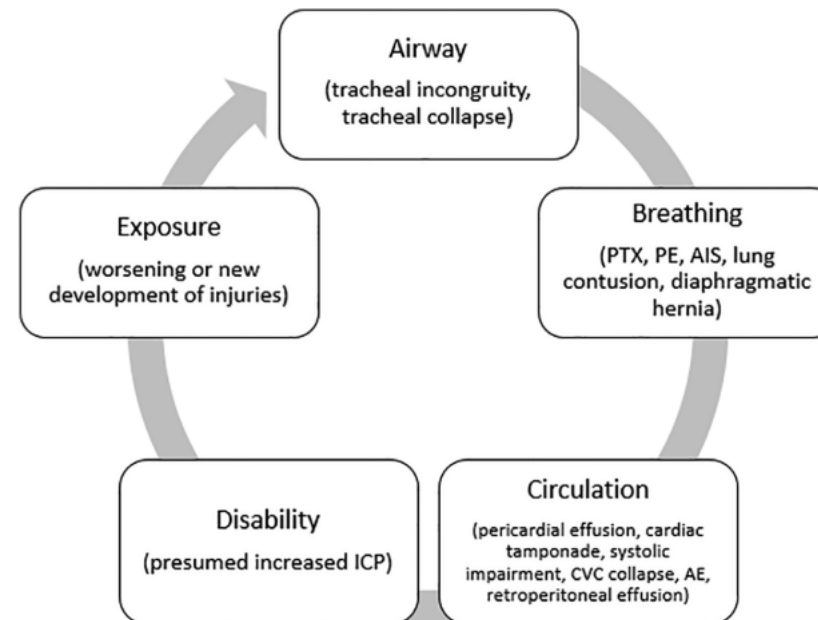


VPOCUS continued evolution

- Quick -<10 min
- Good Se of LUS for PTX
 - Better than TXR
 - Impact of SQE
- Good Se for AIS/PC
 - Equivalent to TXR
- PE and PCE
- New findings
 - DH RPH TT
 - CF ONST(↑ICP)

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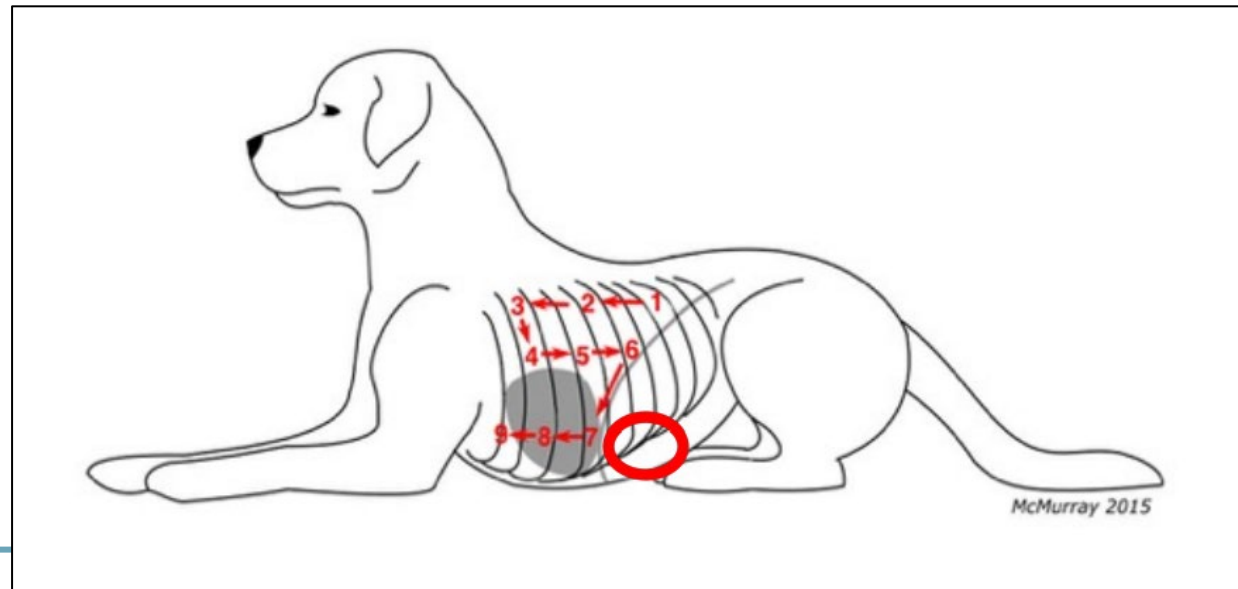


VPOCUS continued evolution

- Became basis for Calgary lung ultrasound protocol
 - Boysen, Chalhoub- University of Calgary
- Site 1
 - PTX, AIS
- Sites 2-6
 - AIS, PE
- Sites 7-9
 - PE, AIS
- DH
 - PE, PCE, CVC

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So why such variability between studies?

- Number of sonographers/study
- Experience of sonographers
 - Lisciandro, Armenise- High Se PTX
 - Other studies- Low Se PTX
- Gold standard for PTX
 - CT
 - Centesis
- Modality of TFAST
 - Area of chest evaluated
- Take away
 - Although easy to perform, experience helps with TFAST
 - More so than appreciated w/ AFAST
 - Multimodal diagnostic approach improves Se and Sp
 - Should strongly consider AFAST/TFAST as extension of PE and initial evaluation in unstable ER patients
 - CV or respiratory
 - Vague/nondescript
 - Serial monitoring important

How often is FAST being utilized?

The use of veterinary point-of-care ultrasound by veterinarians: A nationwide Canadian survey

Jennifer Pelchat, Serge Chalhoub, Søren R. Boysen

Abstract – This survey assessed how veterinary point-of-care ultrasound (VPOCUS), including abdominal and thoracic focused assessment with sonography for trauma (AFAST, TFAST), is used across Canada. Seventy-four veterinarians completed an online survey; 88% (65/74) used ultrasound, 94% (61/65) performed AFAST, and 69% (45/65) performed TFAST. Reasons for not performing VPOCUS included no machine/poor quality machine, lack of experience/confidence, and lack of training/education. Abdominal effusion, and pleural and pericardial effusion were the most frequently diagnosed AFAST and TFAST pathologies, respectively. Lung and cardiovascular ultrasound examinations were infrequently performed. Subpleural consolidation was rarely included in VPOCUS. Most respondents performed VPOCUS, with AFAST being more frequently and confidently performed than TFAST. More training, education, and standardization of techniques appear to be key elements to help build confidence and experience, particularly with regard to TFAST applications and diagnosis.

Veterinary POCUS/FAST examinations

- Rapid test methods
 - Can be performed concurrently with stabilization
- Minimal training requirements
 - TFAST/cardiovascular improved with experience
- Minimally invasive
- Inexpensive
- Provide diagnostic and therapeutic information
 - Guide next steps
 - Help differentiate stable from unstable

- Utility
 - Any trauma patient
 - Cardio/respiratory instability
 - Collapse/unstable
 - Acute abdominal pain
 - Post operative monitoring
 - Concern for
 - Pericardial effusion (PCE)
 - Pneumothorax (PTX)
 - Pleural effusion (PE)
 - Intra-abdominal free fluid

Veterinary POCUS/FAST examinations

- Another viable method of improving patient care and quality of medicine
- Does not replace but compliments other diagnostic modalities
- Increased utility in trauma, triage, unstable patients
 - Not just ER setting
 - Respiratory distress cats (cardiovascular vs airway)
 - Vague disease- help to make the diagnosis
- Requires making the decision to incorporate into you practice
 - Experience increases sensitivity

Questions?

