

AFAST³ - trauma, triage, and tracking (monitoring): PART I

Indications for the AFAST₃ and AFS Exam

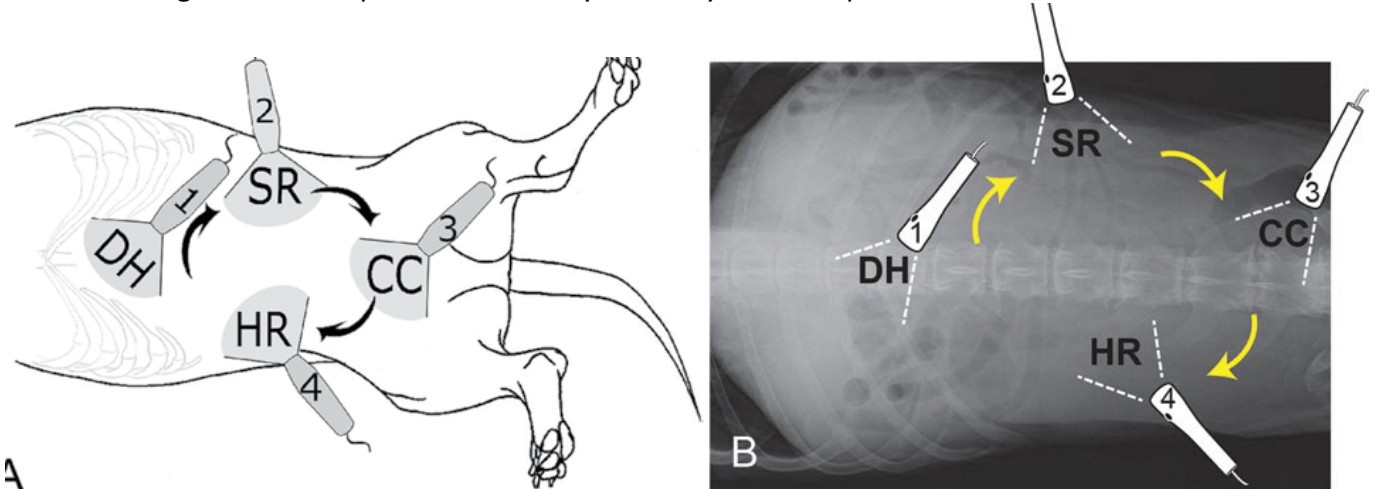
- All blunt trauma cases as standard of care for screening for intra-abdominal injury
- All collapsed (both recovered and unrecovered cases) with unexplained hypotension, tachycardia, or mentation changes
- All anemic cases
- All “ain’t doing right” (ADR) cases
- All post-interventional, post-surgical cases at-risk for bleeding
- All post-interventional, post-surgical cases at-risk for peritonitis and other effusions
- All peritonitis suspects for expedient diagnosis through the detection of free fluid (and sampling, testing as deemed appropriate)
- Add-on for abdominally-related focused or COAST³ Exams to ensure that forms of peritonitis and pleuritis, or presence of bleeding, is not missed by traditional means

Objectives of the AFAST₃ and AFS Exam

1. Perform the classic AFAST₃ views and apply the fluid scoring system
2. Apply the “small bleeder” vs. “big bleeder” concept to non-traumatic and traumatic hemoabdomen cases to better direct definitive therapy (medical vs. surgical).
 - a. Abdominal fluid score (AFS) of 1 and 2 = “small bleeders”
 - b. AFS 3 and 4 = “big bleeders.”
3. Recognize the gallbladder “halo sign” and recognize the major causes of false positives
4. Recognize pleural and pericardial effusion via the DH view
5. Recognize retroperitoneal free fluid
6. Recognize caudal vena caval size and distended hepatic veins at the DH view
7. Be familiar with false positives and false negatives at each AFAST₃ site curvilinear (or linear) probe with a range of 5–10 MHz is usually acceptable for most dogs and cats.

Positioning

- Right lateral recumbency is generally preferred
 - Standard for electrocardiographic and echocardiographic evaluation
- DORSAL RECUMBENCY IS NOT FAVORABLE
 - Lack of validation of the AFAST-applied fluid scoring system in dorsal or sternal recumbency
 - High risk to compromised hemodynamically unstable patients. Stressful.



AFAST3 Diaphragmatico-Hepatic View ('designated hitter' view)

- The probe is directed toward the patient's head
- The gallbladder "kissing" the diaphragm is imaged by keeping the probe toward the head and scanning slightly downward toward the table top

Diaphragmatico-Hepatic View and Pericardial Imaging

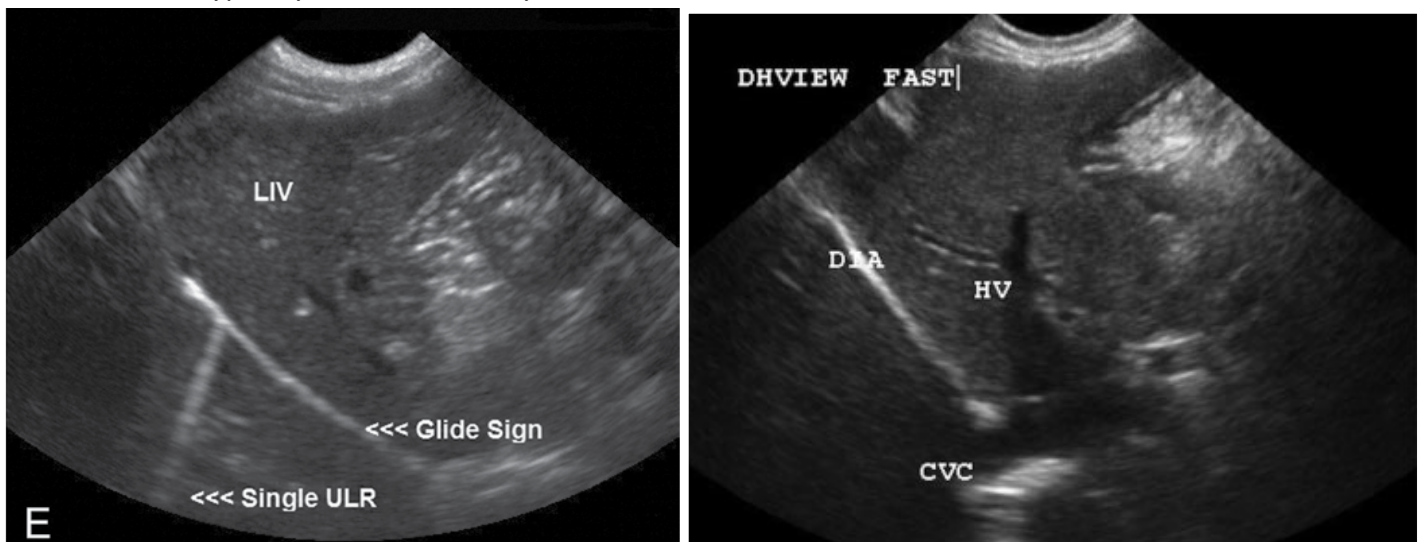
- Always look into the thorax for pleural and pericardial effusions

Diaphragmatico-Hepatic View and Ultrasound Lung Rockets

- Small # of lung rockets are present (none to one or two ULRs) along the diaphragm in normal dogs and cats
- Lung rockets and the glide sign along diaphragm can be used to determine if pneumothorax is present
 - Sensitivity, specificity unknown

Diaphragmatico-Hepatic View and Preload Volume Status, Indirect Right-Sided Cardiac Assessment

- Direct probe downward from gallbladder to image caudal vena cava as it passes through diaphragm
- If the hepatic veins are obvious the patient's volume status and right-sided cardiac function should be questioned and appropriately investigated
 - Not typically seen in normalcy



The DH view can be used for right-sided volume status during resuscitation and in at-risk patients for volume overload during fluid therapy.

Classic Diaphragmatico-Hepatic Positives

- Most common AFAST₃ -positive sites in low scoring dogs are the non-gravity dependent DH and CC views
- Triangles of anechoic free fluid between liver lobes

Pitfalls of the Diaphragmatico-Hepatic View

- Mirror image
 - Classic misdiagnosis of diaphragmatic hernia
- Acoustic enhancement
- Side-lobe
 - Side-lobe artifacts result in loss of interpretative clarity by the ultrasound machine along any luminal borders, falsely making it appear that the lumen contains sediment or other intraluminal abnormalities

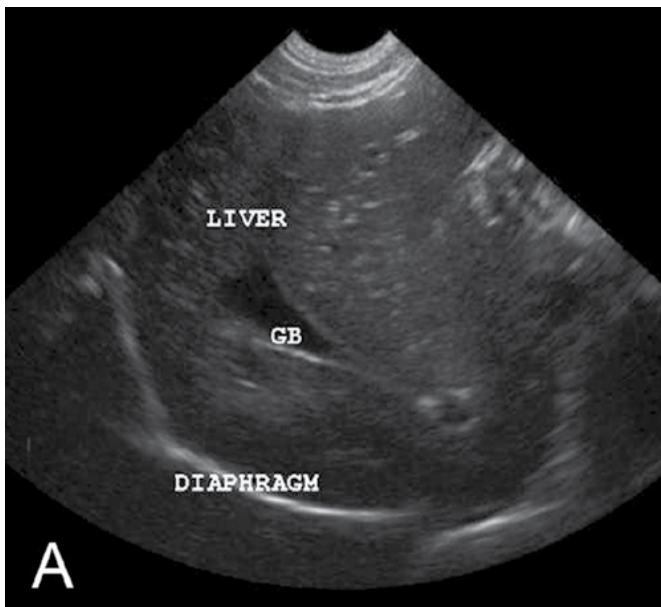
- Edge shadowing
 - Edge shadowing artifacts edge shadowing artifacts result in loss of interpretative clarity by the ultrasound machine along any luminal borders, falsely making it appear like it has defects in its wall

FALSE POSITIVES

- Gallbladder and its biliary system can look like free fluid and anechoic sharp angles
- Hepatic and portal veins (not normally obvious) can look like free fluid
 - Color flow Doppler can be used to distinguish the venous system from free fluid

FALSE NEGATIVES

- Repeat AFAST₃ serially in ≤ 4 hours post-admission or after resuscitation and rehydration
 - Standard of care/rule of thumb



Mistaking the gallbladder and its ductal system for free fluid. Shown is an anechoic triangle

The AFAST3 Spleno-Renal View

- SR view includes the spleen (peritoneal cavity) and the left kidney (retroperitoneal space)
- Retroperitoneal fluid is not part of the abdominal fluid score

CLASSIC POSITIVES

- Free fluid looks like anechoic triangles formed between the spleen and colon

ARTIFACTS

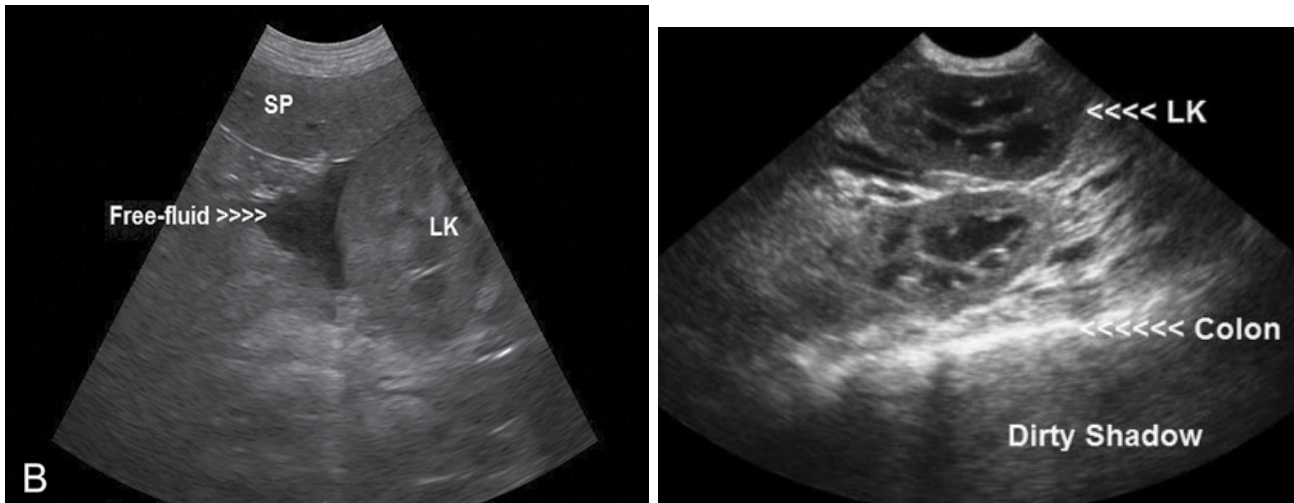
- SR view has few artifacts, most of which are colon related

FALSE POSITIVES

- Minimal - Classic positives at the SR view are anechoic (black) triangles, **not linear stripes**

FALSE NEGATIVES

- Serial exams increase sensitivity
- Repeat AFAST₃ serially in ≤ 4 hours post-admission or after resuscitation and rehydration
 - Standard of care/rule of thumb



QUESTIONS

1. In low scoring dogs at which sites are you most likely to find fluid on your AFAST3 exam?
2. Name 4 common artifacts encountered at the DH site.

ANSWERS:

1. CC, DH
2. Artifacts

Pitfalls of the Diaphragmatico-Hepatic View

- Mirror image
 - Classic misdiagnosis of diaphragmatic hernia
- Acoustic enhancement
- Side-lobe
 - Side-lobe artifacts result in loss of interpretative clarity by the ultrasound machine along any luminal borders, falsely making it appear that the lumen contains sediment or other intraluminal abnormalities
- Edge shadowing
 - Edge shadowing artifacts result in loss of interpretative clarity by the ultrasound machine along any luminal borders, falsely making it appear like it has defects in its wall