

## Essentials of Ultrasound Course Assessment

1. Which artefact is used to diagnose gallstones?

Please select the **CORRECT** response.

- a) Mirror artefact
- b) Acoustic shadowing artefact
- c) Acoustic enhancement artefact
- d) Side lobe artefact

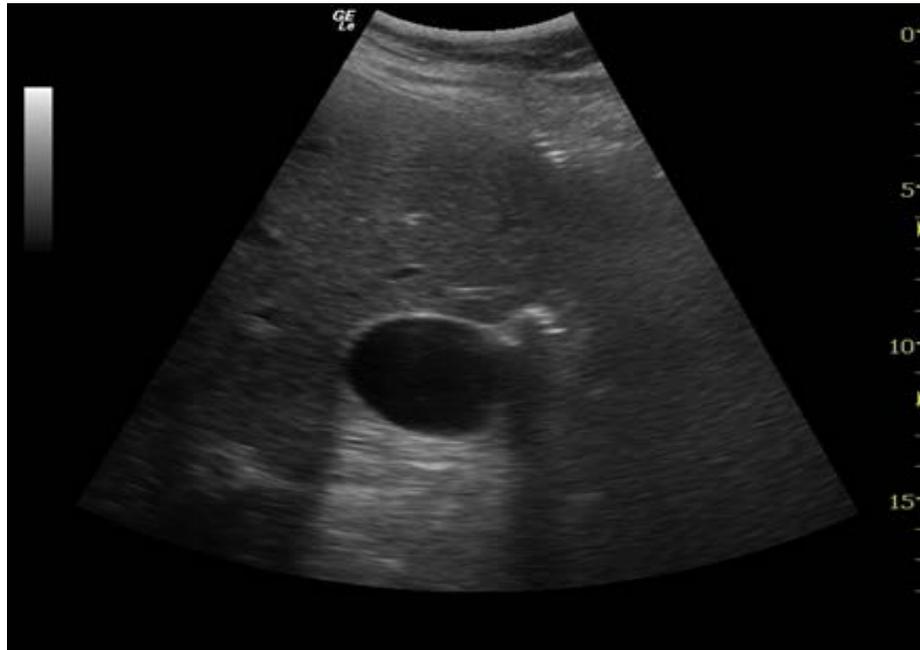
2. Which type of ultrasound scan is this probe most appropriately used for?

Please select the **CORRECT** response.



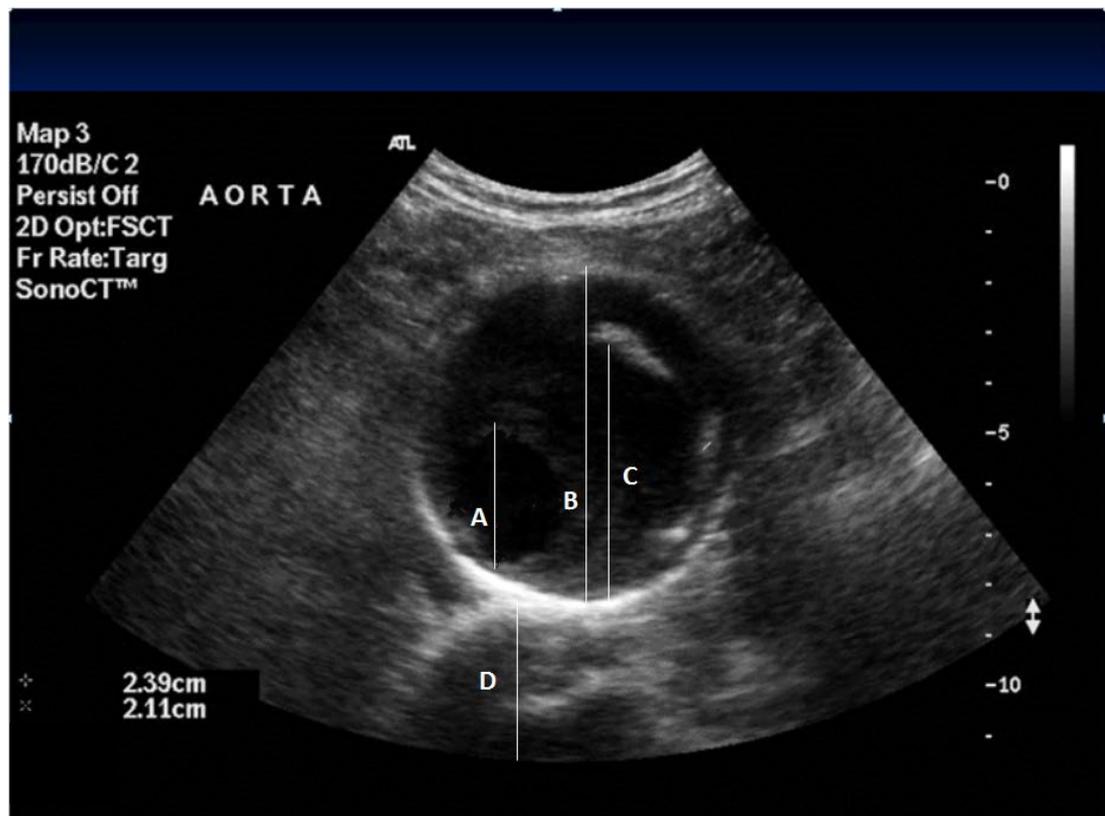
- a) E-FAST
- b) Vascular access
- c) BELS
- d) Procedural guidance

3. What is the principle artefact evident in this image?  
Please select the **CORRECT** response.



- a) Acoustic shadowing artefact  
b) Comet tail artefact  
c) Drop out artefact  
d) Acoustic enhancement artefact
4. The time gain compensation (TGC) control, compensates for?  
Please select the **CORRECT** response.
- a) The time take to undertake the scan  
b) Attenuation deficits  
c) The difference in ultrasound speed in different body tissues  
d) The video image display lag time
5. Which of the following is **least likely** to improve a suboptimal US image?
- a) Changing the focal point of the transducer  
b) Altering the angle of the transducer  
c) Turning the overall gain up to maximum  
d) Moving the patient

6. Which step will most improve image resolution?  
Please select the **CORRECT** response
- a) Increasing the depth
  - b) Reducing the frequency
  - c) Moving your point of interest to the lower part of the screen
  - d) Increasing the frequency
7. A 72 year old gentleman with a known abdominal aortic aneurysm (AAA) is brought in by ambulance to your ED with sudden onset of right sided flank pain. You decide to perform an urgent USS to assess the AAA?  
Please select the **CORRECT** response.
- a) Ultrasound is not the appropriate investigation to determine if there has been a leak of this gentleman's AAA.
  - b) An AAA is diagnosed when the diameter exceeds 25mm
  - c) Most AAAs are above the level of the renal arteries
  - d) Ultrasound is sensitive for diagnosis of a retroperitoneal haematoma
8. With regards the following transverse ultrasound view of the mid abdominal aorta.



Which label represents the **CORRECT** measurement of the abdominal aorta?

- a) A
- b) B
- c) C
- d) D

9. With regards interpretation of the above transverse ultrasound view of the mid abdominal aorta.

Please select the **CORRECT** response.

- a) Label A represents the correct measurement of the IVC
- b) If this patient presented with back pain, syncope and hypotension a CT scan prior to operative management would be appropriate.
- c) The image consistent with a ruptured AAA, because label D represents extramural haematoma
- d) One pitfall of diagnosis of AAA with ultrasound is measurement of the wrong structure

10. With regards ultrasound for abdominal aortic aneurysm.

Please select the **INCORRECT** response.

- a) Ultrasound is highly sensitive and specific for diagnosis of an AAA
- b) When starting in ultrasound imaging of the aorta you should expect to have a 10-20% rate of non-diagnostic images
- c) The aorta is considered aneurysmal when it reaches 5cm in diameter
- d) The correct measurement of the diameter of the aorta is from outer wall to outer wall

11. With regards distinguishing the IVC from the aorta.

Please select the **CORRECT** response.

- a) The aorta lies posterior to the IVC
- b) The IVC is thin walled and has no calcification
- c) The aorta collapses with inspiration
- d) It is possible to distinguish the IVC (from aorta) as it never pulsates

12. With regards ultrasound detection of an AAA.

Please select the **CORRECT** response.

- a) The measurement of the diameter of an AAA should include any thrombus seen.
- b) The presence of abdominal gas assists the identification of the aorta
- c) Asymptomatic AAA at the size of 3.5cm are considered for operative repair
- d) The sensitivity of detection of an AAA by ultrasound is 65%

13. With regards ultrasound image optimisation for diagnosis of an AAA

Please select the **CORRECT** response.

- a) Changing to a linear probe (higher frequency) from curvilinear probe will improve diagnosis of an AAA
- b) Turning up total gain may improve diagnosis of an AAA
- c) Application of firm and constant pressure with the probe may improve diagnosis of an AAA
- d) Identification of the vertebral body is not helpful when attempting to detect an AAA.

Extended matching answer question: EFAST clinical scenarios

Please consider the following clinical scenarios and select the answer (from the table) that would be the **MOST APPROPRIATE** plan for the ultrasound finding provided.

**Young male patient, high speed MVA, brought in by ambulance. Abdominal, pelvic and chest injuries sustained. Triage category 1.**

**Observations: GCS 15, P 120, BP 70/35, SpO<sub>2</sub> 96% (high flow oxygen), RR 20**

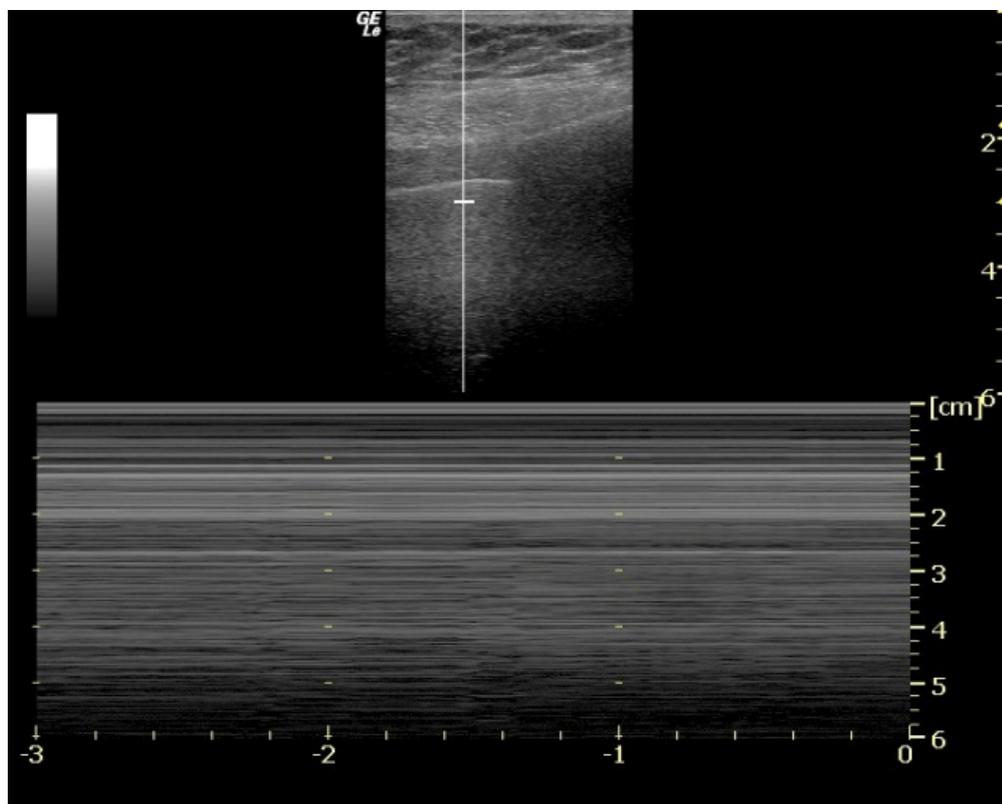
**Answer Table:**

<b>Answer</b>	<b>Clinical Assessment</b>	<b>Plan</b>
<b>A</b>	Intra-abdominal haemorrhage	<i>Resuscitate. Continue to consider concurrent causes of shock. Directly to OT for a laparotomy.</i>
<b>B</b>	Possible intra-abdominal haemorrhage, but very early; possible alternative cause of shock	<i>Resuscitate, repeat EFAST, search for alternative causes of hypotension, and liaise with surgeons - ? OT or CT (if stabilised)</i>
<b>C</b>	Unable to establish presence of free fluid	<i>Resuscitate. Repeat EFAST by more experienced operator. Review mobile X-rays for cause of hypotension. Liaise with surgeons – consider CT (if stabilised) or OT</i>
<b>D</b>	Hypotension probably from pelvic fracture; cannot exclude intra-abdominal injury	<i>Resuscitate. Manage pelvic fracture (pelvic binding, interventional radiology); repeat EFAST; May require laparotomy.</i>
<b>E</b>	Hypotension probably a combination of intra-abdominal bleeding and pelvic fracture	<i>Urgent OT with management of abdominal bleeding, packing of the pelvis, damage control resuscitation, ICU, followed by definitive management of the pelvic fracture</i>
<b>F</b>	Likely cardiac tamponade	<i>Urgent cardiothoracics review; Resuscitate. Repeat EFAST. May require ED thoracotomy, pericardiocentesis. Urgent OT for thoracotomy</i>
<b>G</b>	Likely tension pneumothorax	<i>Urgent chest decompression (finger thoracostomy, ICC). Urgent cardiothoracics review; CT (if stabilised) or OT.</i>
<b>H</b>	Normal EFAST. No traumatic cause for hypotension.	<i>Rapid search for other cause of hypotension.</i>

Match the following ultrasound findings with the **MOST LIKELY** clinical scenario and plan

14. Large amounts of abdominal free fluid with normal bilateral lung and xiphisternal views on EFAST. Normal pelvic x-ray.
15. Trace of pelvic free fluid with normal bilateral lung and xiphisternal views on EFAST. Open book pelvic fracture on pelvic x-ray.
16. No abdominal free fluid, no pericardial free fluid, normal left lung ultrasound, no right lung sliding identified, with stratosphere sign evident on EFAST.

17. No abdominal free fluid, normal bilateral lung views, large amount of pericardial fluid evident on EFAST.
18. Inadequate view obtained on EFAST.
19. Good EFAST views in all components. Trace of pelvic free fluid, no pericardial fluid, normal bilateral lung US.
20. With regards EFAST examination in trauma. The following M-mode lung ultrasound shows:  
Please select the **CORRECT** response.



- a) The 'seashore' sign, which indicates a pneumothorax
- b) The 'seashore' sign, which indicates normal lung and no pneumothorax
- c) The 'stratosphere' sign, which indicates a pneumothorax
- d) The 'stratosphere' sign, which indicates normal lung and no pneumothorax

21. With regards EFAST examination in trauma

Please select the **CORRECT** response.

- a) It is possible to distinguish free blood from ascites or urine in the peritoneal cavity
- b) Ultrasound of the lungs is not as reliable as a supine CXR to detect a pneumothorax
- c) An empty bladder does not affect the ability to detect pelvic free fluid
- d) Depending on operator, up to 10% of scans may be indeterminate

22. With regards EFAST examination in trauma. This RUQ view shows:

Please select the **CORRECT** response.



- a) A liver laceration
- b) Inadequate views of the RUQ to interpret the EFAST image
- c) Free fluid in Morrison's pouch
- d) Blood in the pouch of Douglas