# FOCUSED ABDOMINAL ULTRASOUND. PRINCIPLES AND PITFALLS

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**Definition**

Focused Assessment with Sonography in Trauma (FAST) is a quickly performed screening technique aimed at exploring the deep peritoneal recesses to detect large collections of free fluid, as an indirect sign of acute hemorrhage and injury to visceral organs[1, 2].

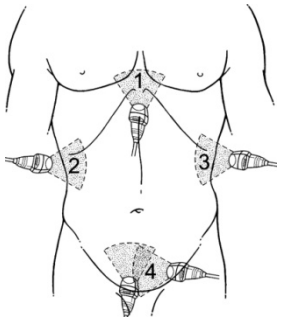
**Principles**

FAST is performed as part of the first or second survey of the trauma patient in the admission area to determine whether immediate surgery is needed before the patient undergoes a further evaluation with CT.

The following four standard views are obtained with the patient in supine position:

Pericardial: Transverse view of the subxiphoid region to show pericardial effusion and the left lobe of the liver.

Perihepatic: Longitudinal view of the right upper quadrant to show the right lobe of the liver, the right kidney, and the space between the two (the Morison pouch).




Perisplenic: Longitudinal view of the left upper quadrant to show the left kidney, the spleen, and the space between them.

Pelvic: Transverse and longitudinal views of the suprapubic region to show the urinary bladder and retrovesical or rectouterine pouch, the pouch of Douglas.

A positive FAST is free fluid detected in one or more of the four views, whereas a negative FAST means no free fluid detected. For hemodynamically unstable patients, a positive FAST should be followed by laparotomy, whereas a negative result suggests a search for other sources of hemorrhage. FAST can easily be repeated in the unstable patient, when suspicion of intraperitoneal hemorrhage is high. For stable patients a positive FAST result suggests CT, whereas a negative result suggests observation, follow-up FAST or CT[3].

**Pitfalls and limitations**

FAST sensitivity has been reported ranging widely: 0.64–0.98[4-7], and is even more decreased in patients with pelvic fractures[8]. Specificity is high, at 0.86–1.00.

Pitfalls leading to false positive results[9]:

- Iatrogenic free fluid
- Pelvic physiologic fluid (female)
- Loops of fluid filled bowel

Pitfalls leading to false negative results[9]:

- Incomplete or empty bladder
- Echogenic clot
- Contained injury
- Small amounts of free fluid, volumes less than 400 ml[10, 11]

FAST results are also dependent on patient habitus and injury (e.g. subcutaneous edema) and operator experience. FAST is performed in the emergency unit with fully enlightened room, other simultaneous procedures, reduced space, portable equipment and short time of scanning, leading to decreased accuracy of the examination.

Despite scanning in the areas for the liver, spleen and kidneys, sonograpy in trauma settings has showed low sensitivity for organ-specific diagnosis[12]. Therefore, when performing FAST, the focus is exclusively on detection of free intraperitoneal fluid. Hypotensive patients with mesenteric or bowel injuries can present without free fluid.

Sonography in general is not able to show spinal and pelvic fractures or diaphragmatic ruptures and has limited accuracy for vascular, pancreatic, adrenal, bowel and mesenteric injuries.

**Recommendations**

FAST is recommended as a part of the initial evaluation of trauma patients. Only experienced radiologists or other physicians with high ultrasound work-load should perform the FAST. Standard scans should be quickly performed and stored, without delaying the transfer of the patient to CT or

the operating room. A positive FAST in hemodynamically unstable patients should lead to immediate surgery.

**Reference List**

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