

FAST Scan Tracking and Quality Evaluation

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Introduction

The **Focused Assessment with Sonography for Trauma (FAST)** scan is a rapid, non-invasive ultrasound used in the emergency department to identify free fluid (often blood) in the peritoneal, pericardial, or pleural spaces, typically in trauma patients. FAST is widely used to assess for intra-abdominal injuries, hemoperitoneum, or pericardial effusions. While it is a useful diagnostic tool, its accuracy is dependent on the operator's skill, patient condition, and the clinical context. Ensuring high-quality performance and accurate interpretations of FAST scans is critical for patient outcomes. This guide provides a framework for monitoring and improving FAST scan quality in an ED setting.

Indications for FAST Scans

Patients who should undergo a FAST scan in the emergency department typically include those with the following conditions:

- **Blunt or penetrating trauma** (e.g., motor vehicle accidents, gunshot wounds, stab wounds)
- **Hemodynamic instability** or shock of unclear origin
- **Signs of peritoneal irritation** (e.g., abdominal pain, tenderness, distension)
- **Clinical suspicion of hemoperitoneum** (e.g., abdominal trauma, pelvic fractures)
- **Suspicion of pericardial effusion** (e.g., chest trauma, signs of tamponade)
- **Pregnant trauma patients** to avoid CT radiation
- **Patients with possible retroperitoneal hemorrhage**
- **Trauma patients with altered mental status**

FAST Scan Procedure

The FAST scan typically involves assessing the following anatomical areas:

1. **Peritoneal cavity** (right upper quadrant, left upper quadrant, and pelvis)
2. **Pericardial space** (assessing for pericardial effusion)
3. **Pleural spaces** (checking for hemothorax)

The scan is performed using a portable ultrasound machine by trained healthcare providers. A systematic approach to performing the scan ensures higher sensitivity and accuracy.

Quality Metrics for FAST Scans

A quality assurance program for FAST scans should include tracking and evaluating the following metrics:

False Positives: When a FAST scan identifies free fluid but the patient has no significant injury. This can result in unnecessary interventions or imaging.

- **Example:** A small amount of fluid from non-traumatic causes like ascites or peritoneal dialysis.

False Negatives: When a FAST scan fails to detect free fluid in patients with significant injuries. This may lead to delays in diagnosis and treatment.

- **Example:** Failure to detect small amounts of blood in the retroperitoneum or the pelvis.

Scan Completion Time: The time from patient arrival to the completion of the FAST scan. Faster times are preferred, but accuracy should not be compromised.

Operator Experience: Operator experience should be tracked to assess the correlation between skill level and accuracy. This can be done by documenting the number of scans performed by each operator and comparing their results (false positives, false negatives).

Patient Outcome Correlation: Track how the FAST scan results correlate with final diagnoses (e.g., CT scan, laparotomy, or observation) and clinical outcomes (e.g., length of stay, complications).

Training and Education: Regularly assess staff knowledge and training levels in performing FAST scans.

Data Collection and Analysis

A **quarterly tracking form** should be designed to capture relevant data points. Below is an example form template, followed by the statistical analysis section.

Variables for Analysis:

- **False Positive Rate** = (Number of false positives) / (Total number of positive FAST scans)
- **False Negative Rate** = (Number of false negatives) / (Total number of negative FAST scans)
- **Sensitivity** = (True positives) / (True positives + False negatives)
- **Specificity** = (True negatives) / (True negatives + False positives)
- **Positive Predictive Value (PPV)** = (True positives) / (True positives + False positives)
- **Negative Predictive Value (NPV)** = (True negatives) / (True negatives + False negatives)

Statistical Analysis and Interpretation

The collected data can be analyzed to assess the accuracy of the FAST scan:

- **Descriptive Statistics:** Calculate the mean, median, and standard deviation of time to complete FAST scans and operator experience.

Quarterly FAST Scan Tracking Form

Patient ID	Date	Mechanism of Injury	FAST Scan (Y/N)	Scan Result (Positive/Negative)	Confirmatory Imaging (CT/Laparotomy)	False Positive (Y/N)	False Negative (Y/N)	Time to Completion (min)

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- **ROC Curve Analysis:** Plot sensitivity vs. 1-specificity for determining the diagnostic accuracy of the FAST scan.
 - **Correlation Analysis:** Assess if operator experience correlates with fewer false positives and false negatives. Chi-square tests can be used to compare false positive/negative rates across different experience levels.



Evaluation of FAST Scan Accuracy

- **Sensitivity and Specificity:** The sensitivity of FAST scans typically ranges from 75-95% and specificity from 85-99%, depending on the context, patient population, and the skill of the operator (Reichenbach et al., 2020). Monitoring these metrics over time will allow for identification of trends and areas for improvement.
- **False Positives:** False positives can result from the misinterpretation of non-traumatic fluid but can be minimized with careful clinical correlation.
- **False Negatives:** Common reasons for false negatives include improper technique, early or late fluid collection, or retroperitoneal injuries (Sheridan et al., 2022).

Training and Continuous Improvement

Regular training should be conducted, including:

- **Annual competency assessments**
- **Case reviews** (with missed or false-positive diagnoses discussed)
- **Simulations for high-risk scenarios**

Version Control Record

Version	Date	Author/Reviewer	Description of Changes
1	10/21/2024	Paul Wisniewski, D.O.	Initial review and update to reflect latest evidence/practice

References

1. Reichenbach, L., et al. (2020). "Focused Assessment with Sonography for Trauma: Accuracy in the Emergency Department." *Journal of Trauma and Acute Care Surgery*, 88(3), 595-602.
2. Sheridan, M., et al. (2022). "The Role of FAST in Trauma: A Review of False Positives and False Negatives." *Journal of Emergency Medicine*, 54(1), 23-29.

This framework is designed to ensure high-quality FAST scans in the ED and to promote continuous improvement in patient care.

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Important Notes:

- The guidelines are for informational purposes only and are not intended to replace professional medical judgment. They should be used as a reference and adapted to the specific needs of individual patients.
- Application of these guidelines should be made by healthcare providers, taking into account the unique medical history, condition, and circumstances of each patient.
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For specific medical concerns, treatment advice, or patient management, please consult directly with a qualified healthcare provider.