

Accuracy of Emergency Medicine Resident

Performed Point-of-Care Ultrasound

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Background and Objective

Point-of-Care Ultrasound (POCUS) Background:

- Used by Emergency Medicine (EM) physicians as a non-invasive diagnostic tool
- Reduced lengths of hospital visits, decreased time to care, and increased cost-effectiveness^{1,2,3}
- Proficiency required by accreditation board to complete an EM residency
- Utilized more often by attending physicians than resident physicians
- How competency is gained and optimal way to teach POCUS is still unknown

Objectives:

- Uncover the accuracy and proficiency of EM residents at POCUS

Methods

- Conducted a retrospective chart review on patients over 18 years of age presenting to the emergency department at University Medical Center in New Orleans, LA
- Included patients who had a POCUS interpreted by a resident from 12/1/2020 to 6/1/2021
- Separated the POCUS scans into three modalities:
 - Focused Assessment with Sonography for Trauma (FAST)
 - Cardiac,
 - Aorta
- Excluded patients who did not receive a gold standard confirmatory study (Table 1 and Chart 1)
- Compared the resident's interpretation of the POCUS to the results from the confirmatory study
- Calculated sensitivity and specificity using SAS 9.4 (Table 2)
- Further stratified the abdominal component of the FAST exam by the Post Graduate Year (PGY) of the interpreting resident (Table 3)

Gold Standard Comparisons

| POCUS Modality | Primary Comparison | Secondary Comparison |
|----------------|-----------------------|----------------------|
| FAST | CT Scan or Laparotomy | Clinical Observation |
| Cardiac | Echocardiogram | N/a |
| Aorta | CT Scan | N/a |

Table 1. Gold Standard Confirmatory Studies, CT: Computed Tomography

Methods (cont.)

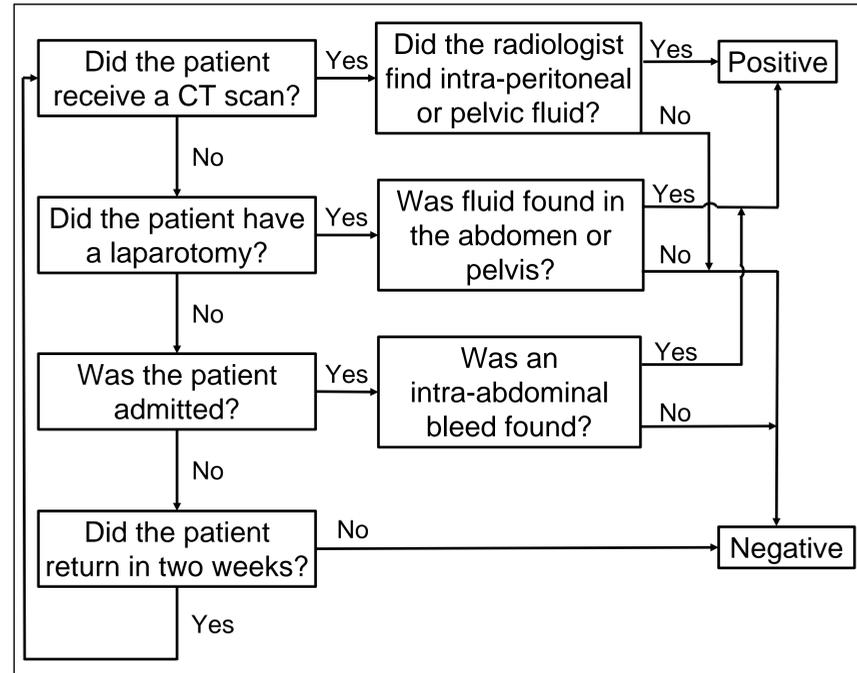


Chart 1. Abdominal FAST Gold Standard Flow Diagram

Results

| Modality | Indication | Sample Size | Sensitivity | Specificity |
|----------|----------------------------------|-------------|--------------|---------------|
| FAST | Peritoneal Fluid | 405 | 70% (30/43) | 95% (344/362) |
| | Pericardial Fluid | 404 | 0% (0/4) | 99% (395/400) |
| | Pleural Fluid | 91 | 33% (5/15) | 99% (75/76) |
| Cardiac | Left Ventricle Systolic Function | 99 | 91% (43/47) | 63% (33/52) |
| | Pericardial Effusion | 86 | 100% (16/16) | 90% (63/70) |
| Aorta | Abdominal Aortic Aneurysm | 36 | 83% (5/6) | 100% (30/30) |

Table 2. Residents' Performance at FAST, Cardiac, and Aorta POCUS

Results (cont.)

| Academic Status | Sample Size | Sensitivity | Specificity |
|-----------------|-------------|-------------|---------------|
| All Residents | 405 | 70% (30/43) | 95% (344/362) |
| PGY4 | 57 | 78% (7/9) | 100% (48/48) |
| PGY3 | 59 | 83% (5/6) | 98% (52/53) |
| PGY2 | 92 | 70% (7/10) | 89% (73/82) |
| PGY1 | 197 | 61% (11/18) | 96% (171/179) |

Table 2. Residents' Performance at FAST POCUS stratified by PGY Status

Conclusions

- Residents performed POCUS with a sensitivity and specificity comparable to attending physicians for most of the modalities^{4,5,6}
- Residents obtained this competency early in their training
- Discrepancies in detecting pericardial effusion during FAST exams and during cardiac exams may be attributed to a lack of patients presenting with such pathology
- Results highlight the importance of adequate training opportunities for residents
- Resident directors should supply simulations where residents can practice interpreting images with uncommon pathologies

Acknowledgements

The authors would like to acknowledge the rest of Dr. Moreno's research group and Marisa Naccari for their support on this project. Funding for this project was provided by LSUHSC School of Medicine, Office of the Dean.

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