Emergency Physician Use of Bedside Ultrasound

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Abstract

Objective: To evaluate the most common uses of bedside ultrasound in the emergency department and accuracy of bedside exams when compared with formal radiological studies. To also evaluate the percentage of cases that are performed by resident vs. attending physicians.

Methods: A single page survey was distributed at several community ED's in the greater Chicago Metropolitan area. Results: 203 studies were completed. 185 (91.1%) were diagnostic. 44 (21.7%) were FAST exams. 137 (67.5%) had formal imaging performed. 119 (86.9%) had matching results for bedside and formal radiological studies.

Conclusions: Bedside ultrasound was found to be primarily used by emergency medicine residents for FAST exams. Overall emergency medicine physicians are accurate in their detection of disease processes with bedside imaging. It was also found that ultrasound is likely being underutilized for the purpose of guidance of central line placement.

Introduction

In this study, we looked at the utilization of bedside ultrasound in several community emergency departments. Our goal was to determine the frequency of use of bedside ultrasound, evaluate the most common uses for bedside ultrasound, and the accuracy of bedside exams compared with formal radiological studies. We also evaluated the percentage of cases that involved resident vs. attending physicians and how that affected the use/accuracy of bedside ultrasound.

Although there is a growing trend of utilizing bedside ultrasound in the emergency department for diagnostic and therapeutic purposes, we believe this modality is currently underutilized in a majority of community emergency departments. Although many recent graduates of emergency medicine programs who have received formal bedside ultrasound training, there are large numbers of attending emergency physicians who have never received any such training.

It is our experience that bedside ultrasound will be used mostly for procedural guidance, specifically for the purpose of obtaining vascular access through central line insertion. Based upon prior studies, we anticipate approximately 85% of formal imaging will correlate with the bedside ultrasound and that the majority, approximately 70%, will be performed by residents.

Methods

• Prospective survey study
• Approved by the Midwestern University Institutional Review Board
• Multiple community based emergency departments in the greater Chicago metropolitan area
• Participant hospitals included Swedish Covenant Hospital, St. James Hospital, St. Anthony’s Hospital and St. Margaret Mercy Hospital
• All emergency medicine attending and resident physicians
• A single page survey
• Questions focused on why the ultrasound was being utilized, if any formal study was performed in addition, that the bedside and formal results were and the level of training of the bedside sonographer.
• Voluntary survey, no incentives were offered
• No informed consent was obtained from patients, as this was a survey of physician practice and did not have an impact on patient management in any way.
• Data was collected from May 1, 2011 to September 30, 2011 in all participating EDs.
• Excel spreadsheet used to compile data which was then analyzed by statistician at Midwestern University.

Results

203 studies were fully completed during the study period. 155 were completed by residents (76.4%), 48 were completed by attending’s (23.6%). PGY 5 residents completed the majority of the studies. The PGY 5 residents completed the fewest studies. See (Figure 1) for full breakdown by level of training.

The majority of the studies completed were for diagnostic purpose 185 (91.1%). Procedural studies only made up 17 (8.1%) of all studies completed. Of note only 1 study, (0.5%) was reported as both procedural and diagnostic.

The greatest percent of studies were FAST exams which totaled 44 (21.7%). Followed by evaluation of pregnancy 34 (16.7%). Ultrasound for detection of pneumothorax was the least reported utilization 1 (0.5%). See (Figure 2) for full breakdown by type of study performed.

Formal Imaging was obtained on 137 (67.5%) with no formal imaging on 66 (32.5%). 17 studies were performed for procedural guidance would thus not necessarily need formal studies, however 4 procedural studies did report having formal imaging. Thus 53 diagnostic studies did not have formal imaging completed.

Of the 137 with both bedside and formal imaging, 119 (86.9%) matched results and 18 (13.1%) did not match. 66 studies had no formal imaging of these 14 were procedural with no further imaging. Of the remaining 52 studies 16 (30.8%) were FAST exams, 12 ECHO and 12 pregnancy evaluations (23%) each, and 6 were RUQ exams, (11%). See Figure 3.

Discussion

Resident physicians completed the majority of ultrasounds performed. We believe that this is due to the nature of the sites enrolled in the study. All sites are part of Midwestern’s Emergency medicine residency and thus the residents for learning. We believe this to perform the majority of procedures including ultrasound.

PGY 5 residents were the group that had the least number of studies submitted; we believe that this is due to the fact that there are significantly fewer residents involved in combined, thus 5 year, programs.

The majority of studies performed were for diagnostic purposes. This was in opposition to our study hypothesis. We believe that this result is due to ultrasound being a very useful tool for diagnosis in the emergency department; this is supported by the lack of availability of formal ultrasound at non-traditional hours. Second, these results show that there is likely under-utilization of ultrasound, particularly for central line placement in the emergency department.

The greatest percent of studies performed were FAST exams, which mirror the results seen in other studies performed by other researchers. This is an expected result as the majority of such exams are performed on trauma patients to quickly evaluate the need for transfer from a community hospital to a trauma center. The least commonly performed studies were pneumothorax and deep venous thrombosis (DVT) evaluation. We believe that some of this could be due to many pneumothorax studies being performed for a FAST, as the recent evolution to the eFAST, many people incorporate this into their FAST exam. We believe that the low rate of DVT studies is likely due to lack of training and comfort of the emergency department physicians with the exam.

Of the studies performed that did not have formal testing, the majority were instances where it would not be necessary. It was reported that 66 studies didn’t have formal imaging, however, when the procedures were excluded only 53 studies were left without formal studies. There were 4 procedural studies that did report formal imaging, these were primarily for central line placement, where a chest radiograph was performed. Procedural studies that did report formal imaging, these were for central line placement, where a chest radiograph was performed. Procedural studies that did report formal imaging, these were for central line placement, where a chest radiograph was performed. Procedural studies that did report formal imaging, these were for central line placement, where a chest radiograph was performed.

Echocardiography and pulmonary evaluation. Echo evaluation in the emergency department is mostly for detection of cardiac activity during cardiopulmonary arrest (code situations). Most of these patients likely died and thus the echocardiograph and pulmonary evaluation was performed. The most common results showed that there is likely under-utilization of ultrasound, particularly for central line placement in the emergency department.

References