

Can Evidence-Based Guidelines Decrease Unnecessary Echocardiograms for Preoperative Evaluation of Hip Fracture Patients?

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Background/Purpose: Hip fractures are common in the geriatric population and cardiac complications are a significant cause of morbidity and mortality after operative treatment. Preoperative risk assessment is performed to aid clinicians in pre- and postoperative medical management and may include echocardiography (TTE). However, urgent preoperative TTE requires additional resource utilization, increases cost, and may delay time to operating room in some circumstances. Several clinical practice guidelines (CPGs) have been created to provide recommendations on indications for preoperative TTE. The purpose of this study was to evaluate preoperative TTE utilization at a single institution in order to determine (1) how often TTEs are obtained in accordance with current CPGs, (2) how frequently TTEs reveal cardiac disease pathology that may alter medical or anesthesia management, and (3) whether the use of CPGs to indicate preoperative TTE could reduce unnecessary utilization without potentially missing significant pathology.

Methods: A retrospective review of 100 consecutive patients age 55 years and older who sustained a hip fracture between May 2009 to November 2012 and received a preoperative TTE was performed. The percent compliance with published CPGs was recorded, evaluating adherence to guidelines from the American College of Cardiology / American Heart Association (ACC / AHA), the British Society of Echocardiography (BSE), the European Society of Cardiology (ESC), and the Association of Anesthesia of Great Britain and Ireland (AAGBI) (Table 1). TTE reports were reviewed for the presence of significant pathology, which was defined as results that could modify anesthesia or perioperative management, including new left ventricular systolic or diastolic dysfunction, moderate or severe valvular disease, and pulmonary hypertension. Finally, the performance of the individual CPGs as screening protocols were evaluated by testing their sensitivity and specificity for predicting which patients would have TTEs that identified significant pathology.

Results: Adherence to published CPGs varied from 32% to 66% (Table 1). In 14% of cases TTE revealed pathology with potential to modify anesthesia or medical management. In all of those cases, TTE was indicated according to ACC guidelines (ie, the guidelines were 100% sensitive, and no patients with pathology would have been missed if ACC guidelines were followed). Additionally, if the ACC guidelines were followed, 34 of the 86 remaining patients who had TTEs showing no pathology could have been screened out (40% specificity). None of the other guidelines were as sensitive as the ACC guidelines.

Conclusion: Preoperative TTEs in patients with hip fractures are frequently obtained outside the recommendations of established CPGs. In our series, TTEs revealed pathology likely to change management 14% of the time, but following published CPGs could reduce unnecessary TTE utilization without increased risk of missed pathology. When developing care pathways, utilization of CPGs such as the ACC guidelines to determine which patients need

TTEs should be considered, as it may decrease variability in care and reduce unnecessary resource utilization without adversely affecting patient outcomes.

Guideline	ACC/AHH	BSE	ESC	AAGBI
Indications for TTE	<ul style="list-style-type: none"> • Dyspnea of unknown origin • Worsening of known heart failure (HF) signs or symptoms • Known history of valvular dysfunction or HF without Echo in last year or worsened symptoms • Suspicion of moderate or greater valvular stenosis or regurgitation 	<ul style="list-style-type: none"> • Documented ischemic heart disease • Unexplained dyspnea • Murmur with concomitant cardiac or respiratory symptoms • Murmur in asymptomatic patient where structural heart disease is suspect 	<ul style="list-style-type: none"> • Presumed or confirmed severe valvular disease 	<ul style="list-style-type: none"> • Dyspnea at rest or low level of exertion • Murmur suggestive of significant aortic stenosis
% TTEs in accordance with guidelines	66	65	32	50
Sensitivity	100.0%	78.6%	71.4%	71.4%
Specificity	39.5%	37.2%	74.4%	53.5%

Table 1: ACC/AHH American College of Cardiology; BSE British Society of Echocardiography; ESC European Society of Echocardiography; AAGBI Association of Anesthesia of Great Britain and Ireland

The FDA has stated that it is the responsibility of the physician to determine the FDA clearance status of each drug or medical device he or she wishes to use in clinical practice.