The Effect of Preoperative Transthoracic Echocardiogram on Mortality and Surgical Timing in Elderly Hip Fracture Patients

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Purpose: Heart disease is the most common cause of postoperative mortality in elderly hip fracture patients, and transthoracic echocardiogram (TTE) is often used to assess cardiac function prior to surgery. The purpose of our study was to evaluate the effect of preoperative TTE on mortality, postoperative complications, surgical timing, and length of stay in surgically treated hip fracture patients.

Methods: A retrospective chart review was performed on 694 consecutive hip fracture patients >60 years of age treated surgically at two local hospitals. Patients were identified by billing codes over a 30-month time period from July 1, 2009 to December 31, 2011. Hospital records were reviewed for age, sex, timing of admission, medical clearance, operation and discharge, admitting service, fracture and treatment type, medical comorbidities, American Society of Anesthesiologists (ASA) score, preoperative testing ordered (TTE), preoperative cardiac intervention, complications, and mortality. The Social Security Death Index was used for 30-day and 1-year mortality data when not available in the hospital records. Our primary outcome measure was in-hospital, 30-day, and 1-year mortality following hip fracture surgery in patients who receive preoperative TTE. Secondary outcome measures included complications (particularly cardiovascular) and time required for medical clearance and operative treatment.

Results: Preoperative echocardiogram was performed on 131 patients (18.9%). Patients admitted by the medicine service were 1.76 times more likely to receive preoperative TTE ($P < 0.01$). Patients were 2.28 times more likely to receive TTE if they had a history of coronary artery disease ($p < .001$), and 2.12 times more likely if they had a history of arrhythmia ($P < 0.001$). Five patients in the TTE group and one patient in the control group underwent cardiac catheterization prior to surgery, but none of these patients required angioplasty or stent placement. There was no difference in mortality between the TTE group and the control group in hospital (3.8% vs. 1.8%, $P = 0.176$), at 30 days (6.9% vs. 6.6%, $P = 0.90$), or at 1 year (20.6% vs. 20.1%, $P = 0.89$), respectively. There was no significant difference in major cardiac complications between groups. Average time from admission to operative treatment was 66.5 hours in the TTE group and 34.8 hours in the control group ($P < 0.001$). Average time from admission to medical clearance was 43.2 hours in the TTE group and 12.4 hours in the control group ($P < 0.001$). There was no difference in the time between medical clearance and operative treatment between the two groups (23.3 hours versus 22.4 hours, $P = 0.639$). The TTE group also had a significantly longer length of stay at 8.68 days compared to 6.44 days in the control group ($P < 0.001$).

Conclusion: Preoperative TTE did not help reduce mortality rates in elderly hip fracture patients in either short or long-term postoperative periods. In addition TTE delayed surgical treatment, resulted in no cardiac intervention, and increased length of stay. The American

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Heart Association (AHA) and the American College of Cardiology (ACC) have developed guidelines for perioperative assessment of patients in case of noncardiac surgery. TTE should not be used as a screening tool in hip fracture patients, but instead used to further evaluate active cardiac conditions.

See pages 99 - 147 for financial disclosure information.