Preoperative Echocardiograms in Geriatric Hip Fracture Patients Does Change Management: You Just Don’t Know About It

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INTRODUCTION: Current orthopaedic literature has demonstrated little to no benefit of a preoperative transthoracic echocardiography (TTE) protocol in decreasing postoperative complications in geriatric hip fracture patients. However, these studies focus on postoperative complications as an endpoint and fail to incorporate real-time adjustments made by anesthesia based on TTE results. We sought to prospectively capture the rates of adjusted anesthesia care based on TTE results in geriatric hip patients undergoing surgical intervention.

METHODS:

We prospectively recruited 43 patients ≥60 years of age that consented to TTE before surgical fixation of a hip fracture at a level-I trauma center. Patients were included if they met the recruitment criteria to obtain a TTE (Table 1). TTE results were reviewed by the treating anesthesiologist who answered the following questions pertaining to the patient's care:

Did the results of the cardiac US change/impact (a) strategy for patient monitoring (b) strategy for fluid management (c) dosing of anesthetic medications (d) use or dosing of vasopressor or ionotropic medications (e) decision on the patient's postoperative level of care? Answering 'yes' to a-e was characterized as adjusted care.

The primary outcome measure was frequency of adjusted care based on the above answers. Additionally, short-term complications, defined as those that occurred during the index hospital admission or within 30 days of the surgery were collected. Pearson's chi-square and Fischer's exact tests were utilized to compare postoperative complications among participants with or with adjusted care.

RESULTS: Of the 43 participants included, preoperative TTE resulted in adjusted care in 58% (n=25) of patients. There were no differences in demographics between the two groups (Table 2). The most common adjustments in care were changes to anesthetic medication dosing (n=20) and fluid management strategy (n=14). Out of 25 participants with adjusted care, 16 (64%) developed at least one postoperative complication within 30 days of surgery versus 12/18 (67%) participants whose TTE did not lead to adjusted care (p=0.856) (Table 3). The most common complications were acute blood loss anemia requiring transfusion (n=11) and acute kidney failure (n=8). When comparing rates of healthcare resource utilization between those who had adjusted care versus those that did not, there were no significant differences in unplanned reoperation (12% vs. 6%, p=0.628), unplanned readmission (20% vs 17%, p=1.000), adverse (non-home) hospital discharge (60% vs. 56%, p=0.771), or hospital length of stay (9.7 ± 4.8 days vs.11.3 ± 5.7 days, p=0.330).

DISCUSSION AND CONCLUSION:

As a result of TTE, patient care was adjusted in more than half of the cases, highlighting the importance of this intervention in patients with compromised cardiopulmonary function undergoing hip fracture surgery. This change in clinical care needs to be considered when evaluating the impact of this intervention on postoperative outcomes.

Table 1. Recruitment Criteria to Obtain Preoperative TTE.

1) Age ≥60 years
  AND
2) Patient has an active cardiac condition (≥1 of the following)
  – Unstable coronary syndrome or recent MI/PCI
  – Known CHF with changes in symptoms or new/unexplained dyspnea on exertion
  – New arrythmias
  – New murmur or known severe valve disease
  – Hemodynamically unstable
  OR
3) Patient is frail with an 11-item modified frailty score of 0.27 or greater + has had prior MI/PCI

MI/PCI: myocardial infarction/percutaneous coronary intervention; CHF: chronic heart failure.

Table 2. Patient Demographics.

	Overall	Adjusted Care	Non Adjusted Care	
	n = 43	n=25	n=18	P-Value
Age (mean, SD)	75.6 (10.2)	77.4 (10.7)	73.1 (9.3)	0.174
Age				0.242
60–69	15 (34.9%)	8 (32.0%)	7 (38.9%)	
70–79	15 (34.9%)	7 (28.0%)	8 (44.4%)	
≥80	13 (16.3%)	10 (40.0%)	3 (16.7%)	
Sex				0.738
Female	25 (58.1%)	14 (56.0%)	11 (61.1%)	
Male	18 (41.9%)	11 (44.0%)	7 (38.9%)	
Race				0.665
Black or African American	26 (60.5%)	15 (60.0%)	11 (61.1%)	
White or Caucasian	15 (34.9%)	8 (32.0%)	7 (38.9%)	
Unknown	2 (4.7%)	2 (8.0%)	0 (0.0%)	
BMI (mean, SD), kg/m²	24.6 (5.2)	24.5 (4.7)	24.8 (6.0)	0.847
Time to OR from ED (mean, SD), hrs	36.0 (28.5)	41.4 (26.2)	42.4 (31.0)	0.218
Time to OR from CUS (mean, SD), hrs	1.3 (0.7)	1.4 (0.8)*	1.3 (0.5)	0.872
Total Operation Time (mean, SD), mins	68.5 (55.1)	59.3 (36.3)	81.3 (73.1)	0.199

*One patient excluded because of outlier value.
BMI: body mass index; OR: operating room; ED: emergency department,;SD: standard deviation

Table 3. Complications and Healthcare Resource Utilization.

	Overall	Adjusted Care	Non Adjusted Care	
	n = 43	n=25	n=18	P-Value
Any Complication (≥1)	28 (65.1%)	16 (64.0%)	12 (66.7%)	0.856
Specific Complications				
30-Day Mortality	1 (2.3%)	1 (4.0%)	0 (0.0%)	1.000
Myocardial Infarction	1 (2.3%)	1 (4.0%)	0 (0.0%)	1.000
Cardiac Arrest	2 (4.7%)	1 (4.0%)	1 (5.6%)	1.000
Transfusion	11 (25.6%)	7 (28.0%)	14 (22.2%)	0.736
Deep Vein Thrombosis	3 (7.0%)	1 (4.0%)	2 (11.1%)	0.562
Pulmonary Embolism	2 (4.7%)	1 (4.0%)	1 (5.6%)	1.000
Pneumonia	2 (4.7%)	2 (8.0%)	0 (0.0%)	0.502
Fail to Wean <48 Hours	2 (4.7%)	0 (0.0%)	2 (11.1%)	0.169
Unplanned Intubation	3 (7.0%)	1 (4.0%)	2 (11.1%)	0.562
Acute Kidney Failure	8 (18.6%)	6 (24.0%)	2 (11.1%)	0.434
Stroke/CVA	0 (0.0%)	0 (0.0%)	0 (0.0%)	–
Surgical Site Infection	3 (7.0%)	2 (8.0%)	1 (5.6%)	1.000
Superficial	3 (7.0%)	2 (8.0%)	1 (5.6%)	1.000
Deep	2 (4.7%)	1 (4.0%)	1 (5.6%)	1.000
Sepsis	2 (4.7%)	1 (4.0%)	1 (5.6%)	1.000
Septic Shock	0 (0.0%)	0 (0.0%)	0 (0.0%)	–
Urinary Tract Infection	5 (11.6%)	0 (0.0%)	5 (27.8%)	**0.009**
Wound Dehiscence	0 (0.0%)	0 (0.0%)	0 (0.0%)	–
Resource Utilization				
Reoperation	4 (9.3%)	3 (12.0%)	1 (5.6%)	0.628
Unplanned Readmission	8 (18.6%)	5 (20.0%)	3 (16.7)	1.000
Adverse Hospital Discharge	25 (58.1%)	15 (60.0%)	10 (55.6%)	0.771
Hospital LOS (mean, SD), days	10.3 (5.2)	9.7 (4.8)	11.3 (5.7)	0.330

LOS: length of stay.