POSTOPERATIVE ADVERSE CARDIAC EVENTS AND IN-HOSPITAL MORTALITY AFTER HIP FRACTURE SURGERY IN ELDER

Muhammad Rehan Khan, Syed Azhar Sherazi, Shakeel Madni, Muhammad Ali Shah

ABSTRACT

Objectives: Hip fractures in elderly due to osteoporosis are becoming a growing major clinical and social concern. Among elderly patients, hip fractures are associated with an in-hospital mortality rate of 7–14%.To evaluate postoperative adverse cardiac events after hip fracture surgery and its association with in-hospital mortality after hip fracture surgery.

Material & Methods: This retrospective study was conducted in Orthopedic and Coronary Care Unit (CCU) of District Head Quarter Hospital, Dera Ismail Khan, between September 2014 to July 2015. Out of 150 patients who undergone hip surgery in Orthopaedic ward 20 patients presented to CCU postoperatively. Main outcome measures were post-operative adverse cardiac events and in-hospital mortality after hip fracture surgery.

RESULTS: Total mortality following the hip surgery was 15% and in-hospital 7% while twenty out of one fifty (13%) patients admitted to Coronary Care Unit (CCU) postoperatively with some adverse cardiac events included:acute coronary syndrome 5 (3.13%), Cardiac Failure 7 patients (4.38%), arrhythmias 4 (2.5%), pulmonary embolism 4 (2.5%) and cardiac death.Patients who had been admitted to CCU had In-hospital mortality of 4% in which 2% admitted with some comorbidities which was nearly 3 times greater than that for patients who had been initially considered fit for surgery with significant p value 0.042.

CONCLUSIONS: Elderly patients, after hip fracture surgery, have a higher incidence of Postoperative adverse cardiac events. Patients who had been admitted to CCU after hip fracture surgery had high In-hospital mortality, patients who had been admitted with acute medical comorbidities had nearly 3 times greater risk of death than that for patients who had been initially considered fit for surgery.

Key words: Acute Coronary Syndrome, Cardiac Failure, Cardiac Arrhythmias, pulmonary embolism, Hip Fractures, Mortality, Comorbidities.

INTRODUCTION

Hip fracture is one of the most common orthopedic conditions and is associated with significant morbidity and mortality. With a progressively aging population, the annual incidence of hip fracture is expected to increase substantially. Age-related health concerns have become important public health issues.[1] Hip fractures in elderly due to osteoporosis are becoming a growing major clinical and social concern. There are estimates that the lifetime incidence of hip fractures is 18% in women and 6% in men.[2] Among elderly patients, hip fractures are associated with an in-hospital mortality rate of 7–14%. Since hip fractures occur predominantly in elderly patients, a large prevalence of underlying coronary artery disease (CAD) might be expected.[3,4]

The worldwide prevalence of hip fracture is increasing considerably, and it is predicted to triple relative to current rates by the year 2030–2050.[1,2] The overall incidence of perioperative myocardial ischemia in elderly patients undergoing hip fracture surgery has been reported to be 35–42%. Previous studies indicated that the principal causes of in-hospital death after hip fracture were cardiac failure and myocardial infarction, which occurred early after the fracture, peaking at 2 days; bronchopneumonia, which accounted for the majority of late deaths; and pulmonary embolism, which peaked in the second week after injury. In addition, an increased risk of in-hospital mortality was found among patients with hip fracture and concomitant cardiac disease.

Heart failure and myocardial infarction are thought to be major postoperative complications in elderly patients undergoing surgery for hip fracture.[5-7] Patterns of clinical symptoms and outcomes of perioperative myocardial infarction (PMI) in elderly patients after hip fracture repair surgery are not well defined. Elderly patients, after hip fracture surgery, have a higher incidence of PMI and mortality. The majority of elderly patients with PMI did not experience ischemic symptoms and required cardiac biomarkers for diagnosis.[8]

Age, type of surgery, anesthesia and other co-

Department of Cardiology, District Head Quarter Hospital, Dera Ismail Khan

Address for correspondence:
Dr. Muhammad Rehan Khan,
Assistant Professor,
Cardiology, District Head Quarter Hospital, Dera Ismail Khan
Cell Number 0333 9987724

morbidities, mainly coronary artery disease and chronic heart failure were associated with complications and adverse outcomes.[9] Chest infection and heart failure are the most common postoperative complications and lead to increased mortality.[5]

Cardiovascular complications constitute morbidity and mortality for hip fracture patients. Relatively little data exist exploring risk factors for post-operative complications. Therefore, we evaluated postoperative adverse cardiac events after hip fracture surgery and its association with in-hospital mortality after surgery for hip fracture.

MATERIAL AND METHODS

We retrospectively evaluated all patients admitted to the Orthopedic Unit of District Head Quarter Teaching Hospital Dera Ismail Khan with a hip fracture from September 2014 to July 2015. 150 patients were screened who undergone hip surgery in Orthopaedic ward and out of 150 patients 20 patients presented to Coronary Care Unit (CCU) postoperatively with adverse cardiac events. The Hospital Information database and wards data were used to identify cases of hip fracture who undergone surgery for hip fractures and patients presented to CCU postoperatively after hip surgeries with cardiac complaints and their selected outcomes and coexisting patient medical comorbidities. Hospital discharge abstracts included information on patients' characteristics, discharge diagnoses and procedure codes according to the International Classification of disease, (ICD-10-CM).We screened all first admissions of the patients older than 55 years with primary diagnosis of hip fracture and undergone hip surgery and presented post operatively to CCU with adverse cardiac events. Cases admitted after motor vehicle accidents were excluded. Three types of operation for hip fracture were identified Dynamic Hip Screw fixation, Hemiarthroplsty and AO Screws fixation.

Adverse Cardiac Events were: Acute Coronary Syndrome, Cardiac failure, arrhythmias, pulmonary embolism, and death due to cardiac cause during hospitalization. Acute Coronary Syndrome included: ST elevated MI,Non ST elevated MI and unstable angina, Acute MI was defined as patients with an elevated total creatinine kinase and MB-fraction; diagnostic electrocardiographic changes including ST-elevation and Q-wave changes; and elevated troponin levels. Left ventricular failure was defined per Framingham major and minor criteria[23]. A diagnosis required either two major or one major and two minor criteria. Arrhythmias were defined as patients having evidence on electrocardiogram or telemetry of a new ventricular or atrial rhythm disturbance that had not been previously documented in the medical record. Pulmonary embolism diagnosis was made on elevated D dimers, CT chest and echocardiography with findings of RV dilataion and hypokinesia with sparing of LV apex, thrombus in Pulmonary artery on short axis view at. A cardiac death was defined broadly as a primary cause of death as documented on the patient's death certificate.

Postoperative adverse cardiac events evaluation were done by an consultant in CCU, with physical examination, electrocardiogram, echocardiography and creatine kinase with MB fraction until postoperative day 6, day of discharge and death. Serial electrocardiograms, enzymes, and chest radiographs were obtained as indicated. Our main outcome measures were postoperative adverse cardiac events and in-hospital mortality after hip fracture surgery.

RESULTS

All 150 hip-fracture patients admitted from September 2014 to July 2015 were included. Hip fracture operations' types were distributed as follows: closed reduction and AO Screws fixation 10%, Dynamic Hip screw 70%, Hemiarthroplsty 20%. Mean age was 70.26 ± 8.71 years and age ranging from 55 to 96. Male were 60 (40%) and female were 90 (60%).

Of the 150patients who underwent surgery, 140 (98.7%) waited for >2 days to be operated and 80 (53.7 %) waited for >4 to be operated. The mean pre-operative stay was 4.84 ± 2.00 days with range of 1–12 days. Surgery delay time was not affected by the admission day of the week—patients hospitalized on Sunday (weekend) were operated within the same time-frame as those admitted on the weekdays.

20 out of 150 (13%) patients admitted to Coronary Care Unit (CCU) postoperatively with some adverse cardiac events including acute coronary syndrome 5 (3.13%), Cardiac Failure 7 (4.38%), arrhythmias 4 (2.5%), and pulmonary embolism 4(2.5%) and cardiac death4 (2.5%).

In hospital mortality was 7%, when we compared preoperative delay with in-hospital mortality in patients who had surgery within 2 days, those who were operated within 2 to 4 days and those who waited for more than four days (0.6%, 1.3% & 3.8% respectively) with significant p value of 0.058. Patients who had been admitted with an acute medical comorbidity had In-hospital mortality of 4.4%, which was nearly 4 times greater than that for patients who had been initially considered fit for surgery. Patients who had been admitted to CCU had In-hospital mortality of 2% in which 1.9% admitted with some comorbidities which was nearly 3 times greater than that for patients who had been initially considered fit for surgery with significant p value 0.042.

DISCUSSION

Major cardiovascular complications following noncardiac surgery occur in over one million patients per year; many of these occur in elderly patients.[10] Patients undergoing hip surgery are likely to experience an adverse cardiac event. Heart failure is thought to be

major postoperative complication in elderly patients undergoing surgery for hip fracture,[5] and our study confirms this.

Congestive heart failure is present in 10 % of individual over 65years of age and is the leading cause of postoperative morbidity and mortality following surgical procedures. Preexisting congestive heart failure is associated with a two to four fold increase in postoperative cardiovascular complications. Risk factors for postoperative heart failure included pre-operative symptomatic cardiac disease, male sex and age >90 years in elderly patients with hip fracture undergoing operative repair.[5]

The most common cardiac complications associated with surgery in elderly patients are myocardial ischemia and myocardial infarction. The mortality associated with perioperative MI is approximately 30%.[11] Preexisting hypertension, diabetes mellitus and history of cardiac or renal failure contribute to higher incidence of perioperative MI, cardiac death or ischemia in elderly patients.[11,12] Arrhythmias have shown to increased postoperative cardiac morbidity in elderly patients. Post-operative atrial arrhythmias are seen in 6.1% of elderly patients undergoing non cardiac surgery.[13]

Patients with more comorbidity on admission had a greater risk of postoperative complications and increased mortality. This is consistent with results of previous smaller retrospective studies.[14,15] The obesity paradox and low functional reserve in underweight patients may influence the development of post-operative cardiac events in this elderly hip fracture population.[1] Cardiovascular disease and chronic lung disease predispose patients to the most common and serious postoperative complications. These patients may be a target group for specialist preoperative medical assessment.[5] Overall, age, type of surgery, type of anesthesia, and some comorbidity, especially coronary artery disease and chronic heart failure, have a major role in the prediction of complications and adverse outcomes in geriatric patients.[9] To reduces mortality; attention must focus on optimizing health status preoperatively, preventing postoperative complications, and, when these complications develop, providing optimal specialist medical care.

Our study has several potential limitations due to small sample size, retrospective study design. We lacked data on socio-economic, functional status prior to hip fracture and comorbid conditions were recorded from hospital discharge, these factors may have affected patient selection for surgery, time to surgery and outcome of these elderly patients.

CONCLUSION

Elderly patients, after hip fracture surgery, have a higher incidence of Postoperative adverse cardiac events. The majority of elderly patients did not experience ischemic symptoms and required cardiac biomarkers for diagnosis. . Patients who had been admitted to CCU after hip fracture surgery had high In-hospital mortality, patients who had been admitted with acute medical comorbidities had nearly 3 times greater risk of death than that for patients who had been initially considered fit for surgery.

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