

Outcome of Traumatic Intracapsular Neck of Femur Fractures in Patients Aged Above 60 Years Treated by Hemiarthroplasty

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INTRODUCTION

Fracture of the femoral neck is one of the most common types of osteoporotic fractures. Hemiarthroplasty continues to be a good option despite current calls for total hip arthroplasty in this subset of patients. The hemiarthroplasty is less expensive and easier to perform, and can be adequately carried out in smaller hospitals with basic orthopaedic facilities staffed by general orthopaedists. Functional demands of the elderly among Asians are often less compared to similar subsets of Western population on which most comparative hip studies are based.

This study was undertaken to investigate the outcome for femoral neck fractures treated with conventional hemiarthroplasty. The authors hope to provide information based on local data as a reference for our doctors and patients.

MATERIALS AND METHODS

This is a retrospective study conducted in a single institution. Surgeries were performed between 1st January 2000 and 31st December 2004. The sample population is patients who were admitted to the institution with a diagnosis of traumatic femoral neck fracture within the study period. Inclusion criteria are patients aged 60 years or older on the day of admission. Exclusion criteria included: patients who had a pathological fracture secondary to any cause other than osteoporosis and those who opted for treatment at other hospitals, but were subsequently followed up at the study centre. Patients with hip arthritis were also excluded.

The patient list was obtained from ward census data, operation theatre records and operative implant records. The patient admission, ward care, operative and postoperative data were collected from the case notes. Data collection included demographic characteristics such as preexisting medical illness, length of time in surgery, implant details, post operative care including complications, level of ambulation on discharge and clinic follow up.

Outcome was scored via a telephone interview with the patient or primary caregiver using the Functional Recovery Score as described by Zuckerman¹, a validated score specific for traumatic neck of femur. This scoring system was chosen as it is based on functional disability rather than just measurements. Patients who could not be contacted via telephone were removed from the outcome measure study although the demographic data was recorded as a record for future extrapolation studies. Outcome measures include non-instrumented basic activities of daily living (feeding, dressing, bathing, toileting); instrumented activities of daily living (food shopping, food preparation, banking/finance, use of car/train/bus, performance of housework, laundry work) and mobility (walking indoors, walking outdoors). Minimum duration post surgery to outcome scoring was 9 months.

RESULTS

There were 59 cases of traumatic femoral neck fracture treated with hemiarthroplasty during the study period. The age of study subjects ranged from 60 to 100 years with a mean age of 74.15 years. Nineteen (32.2%) patients were aged 60 to 69 years, 23 (38.9%) aged 70 to 79 years, 14 (23.7%) aged 80 to 89 years and 3 (0.5%) aged 90 to 100 years. Most patients were females (45 patients – 76.3%), and the male to female ratio was 1 to 4. Racial distribution revealed that 78% of patients were Chinese, 11.9% were Malays and the remainder were Indian.

Seventeen study subjects (28.8%) had at least one co-morbid condition, 19 patients (32%) had two, eight (1.8%) had three and two (0.3%) patients had four co-morbid pathologies respectively. Thirteen (22%) patients were admitted with no history of any medical disease. The co-morbid state of the patients were also reflected by the American Society of Anaesthesiologists (ASA) status of the study population with 8.8% having grade I, 73.7% grade II and 17.5% grade III. Patients with an ASA status of III had a poorer outcome as compared to groups I and II. The one-year mortality rate was

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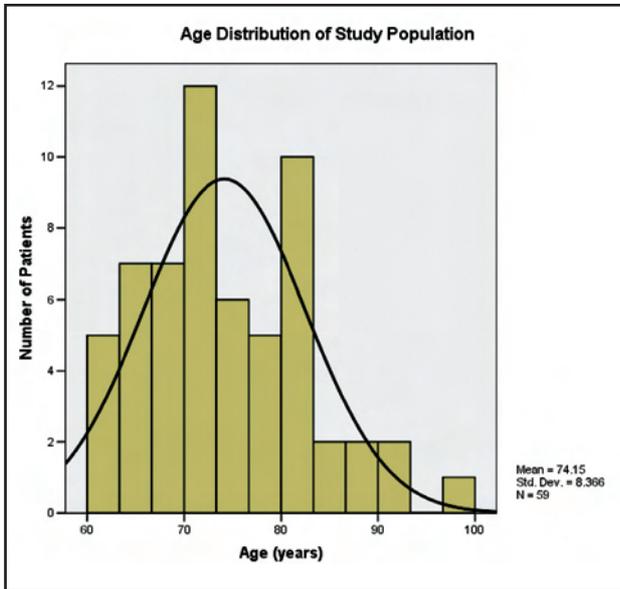


Fig. 1: Age distribution of study population.

18.9% with an inpatient mortality rate of 12% (5 patients). Causes of inpatient mortality included postoperative acute coronary events and cardiopulmonary embarrassment. The cumulative survival level at 5 years in this study was 40 %.

In total, 44 patients were available for outcome scoring. Of this, 27.3% patients obtained a Zuckerman Functional Outcome Score of good (80-100), 39.4% obtained a score of fair (60-80) and 33.3% obtained a score of poor (below 60). Women generally had a better outcome. Chinese patients had a better functional outcome, with Malays second, and Indians third ($p=0.790$). Most patients in this study were ambulating without support prior to trauma (76.3%), and the remainder were ambulating with aid. None were wheelchair or bed bound. Most patients were able to self-ambulate postoperatively with the use of walking aids (44-74.5%), with 15(25.4%) patients needing wheelchairs. Of patients who were walking independently preoperatively, 30.8% had a good outcome as compared to only 14.2% of patients who had to rely on aided ambulation.

DISCUSSION

Mean age for the current study was 74.2 years. Most patients were between 70-79 years of age (38.9%). Hamid *et al*² reported similar age distribution in their studies conducted in Malaysia. Increased incidence in the older subgroup may possibly reflect a combined effect of patient characteristics such as osteoporosis (in females due to the cumulative effects of menopausal and advancing age, and in males due to advancing age) and other co-morbid conditions. The male-female ration of 1:4 was comparable to the Hamid² study in which a similarly higher incidence of fractures in females was reported. Factors implicated in the increased incidence

of hip fracture in women include osteoporosis, in particular postmenopausal osteoporosis. Oestrogen is bone protective and this effect is lost post-menopause causing rapid bone loss with rates exceeding that of males and that of simple senile osteoporosis. Fractures were found to be most common Chinese. Although this probably reflects the distribution of population around this hospital, the explanation may not be unifactorial and may possibly involve multiple issues.

The mortality rate for this study population was 18.9% during the first post-operative year. This included five inpatient deaths (12%). It should be noted that mortality within one year might well be higher as some patients were not found at follow-up. Wachtl³ and Aharonoff⁴ have reported similar one-year mortality rates of 17% and 11% respectively. These findings imply that one in five patients treated for a hip fracture with hemiarthroplasty will die in one year. This emphasizes an important consideration when deciding treatment. Different groups of surgeon researchers often offer differing treatment ranging from a relatively costly total hip replacement to a less expensive hemiarthroplasty for these fractures. Surgeons should be mindful of the high one year mortality and should carefully evaluate the patient's state of general health, physiological age; demands on the implant should be evaluated as a whole and not in isolation ensuring that the patient is offered the most suitable fixation and not a blanket treatment based on institutional practice. Gebhard⁵, Skinner⁶, Ben Squires⁷ reported that the mortality of patients with hip fractures is greater than the national average for age controls but that there was no difference in mortality between groups treated with hemiarthroplasty or total hip replacement.

Both the ASA status and pre-morbid ambulation state possibly have predictive value in stratifying the group of patients most at risk of poor functional outcome in addition to consideration of early mortality and higher complication rates. This stratification may allow the clinician to statistically select patients suitable for more aggressive preoperative, postoperative and home rehabilitation regimes to increase chances for an optimum result. Fisher⁸ studied the outcome of hip fractures in the elderly considering the effect of orthopaedic and geriatric medicine co-care. He found a statistically significant reduction in postoperative medical events as well as rehospitalisation rates within 6 months. This study revealed several correlations between the outcomes and general health status of the study subjects. It is indicative of the potential of predictive factors such as premorbid ambulatory state and may allow for future stratification of patient groups that will require a more aggressive rehabilitation for optimum outcome.

The functional outcome score as described by Zuckerman revealed that 66% of patients undergoing a hemiarthroplasty obtained a fair to good outcome. Of this subgroup, 27.3%

were placed in the good category while 39.4% were placed in the fair category. This indicates that in an Asian population, the outcome of traumatic femoral neck fractures treated by hemiarthroplasty is generally satisfactory. This probably can be attributed to a patient population with a higher physiological age than that of a similar population group from the west. Asians typically retire by the age of 55-60 years and usually lead a sedentary lifestyle thereafter. The physiological demands on the implant of an Asian are less compared to that of a Westerner. Most authors have studied the outcome of hemiarthroplasty looking at the demands in terms of ambulation, general mobility and physiological age. Many such studies have been conducted in mobile and socially independent patient groups that markedly differ from the current study population. Squires *et al*³ compared the outcome of the total hip replacement with hemiarthroplasty in the mobile and socially independent patient with displaced fractures of the femoral neck, and suggested that total hip replacement is appropriate in mobile and socially independent patients. However, the author sounded a note of caution noting that there is a higher rate of dislocation when using the total hip arthroplasty. There is no definitive conclusion as to the more appropriate treatment for the less mobile population. Gerhard⁵ cautioned that the better outcome results obtained with the total hip replacement should be assessed in concert with the troubling higher rate of dislocation and deep and persisting infection found in some studies. He suggested that pre-fracture mobility state be an important factor in the decision as to the type of fracture fixation.

Preoperative ambulatory status also correlated well with outcome. In our study, most patients who were walking independently pre-trauma had a better outcome than those

who needed aid to walk. Of patients walking independently before injury, 30.8% of patients had a good outcome as compared to only 14.2% of patients who had to rely on aided ambulation. As an extension, the long-term mortality was also found to correlate well with the pre-morbid ambulation as a facet of multifactorial causation. Pre-fracture mobility is also often a predictor for short-term complications⁹. The outcome measure used for the current study is a more functional measure of outcome assessment as compared to traditional measures of assessment. The functional outcome scoring system is specific for outcome assessment in traumatic hip fracture patients and this is important as this subset of patients differ from those who already have hip arthritis.

Limitations of this study include the fact that this is a retrospective study resulting in inability to control and optimize information retrieval. The study population was heterogeneous with no control group. There was no single factor controlled except for age. The small number of subjects and loss of patients to follow up decrease the statistical power of the study. However this disadvantage is offset by the statistical similarity of the patients lost to follow up and those available for outcome scoring.

CONCLUSION

Hemiarthroplasty is a good option for fracture of the neck of the femur in the elderly with 66% percent of patients obtaining a satisfactory outcome. Treatment options noted in Western literature should not be followed verbatim without considering the physiological and cultural differences in the Asian population.

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