Outcome of Traumatic Intracapsular Neck of Femur Fractures in Patients Aged Above 60 Years Treated by Total Hip Arthroplasty

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ABSTRACT

This study was undertaken to investigate the outcome of traumatic intracapsular neck of femur fractures treated with total hip arthroplasty (THA). Patients aged ≥ 60 years who underwent THA for traumatic intracapsular neck of femur fractures from January 2005 to March 2009 were included in the study. Telephone or personal interviews were conducted. There were 49 patients identified within the study period. The mean age was 74.12 years. Most patients were females (81.6%), with a male: female ratio of 1: 4.4. In total, 29 patients were available for outcome scoring. The one-month mortality rate was 4.1%, and the one-year mortality rate was 20.5%. Of the 29 patients 82.8% obtained a Zuckerman Functional Outcome Score of good (80 – 100) and 13.8% obtained a score of fair (60 – 80). THA for the treatment of traumatic neck of femur fractures in elderly is a good option with 96.6% of patients obtaining a satisfactory functional outcome, with acceptable morbidity and mortality statistics.

Key Words:

Neck of Femur Fractures, Total Hip Arthroplasty

INTRODUCTION

Femoral neck fracture is a common injury among the elderly. Its incidence is rising because of the increase in the aging population, the gradual increase in the average lifespan, and the rising incidence of osteoporosis. Total hip arthroplasty (THA) is currently an accepted treatment option for the elderly patient with a displaced femoral neck fracture¹.

This study was undertaken to investigate the outcome of traumatic intracapsular neck of femur fractures treated with total hip arthroplasty (THA). The authors hope to provide information on outcomes using the local population as a reference.

MATERIALS AND METHODS

This retrospective study conducted in a single institution in which total hip arthroplasty (THA) is the treatment of choice for traumatic femoral neck fracture in the elderly. The sample population consisted of patients who underwent THA for traumatic femoral neck fracture within the study period (1st January 2005 to 31st March 2009). Inclusion criteria are patients aged 60 years or older on the day of admission with traumatic femoral neck fractures. Exclusion criteria included: patients who had a pathological fracture secondary to any cause other than osteoporosis and those who underwent THA at another hospital but subsequent follow-up at the study centre.

The patient list was obtained from operation theatre records, operative implant records and ward census data. Admission, operative and postoperative data were collected from medical record documents such as bed head tickets (BHT), orthopaedic clinic follow-up cards and progress notes. The general data for each patient (age, sex, and place of residence), and medical and surgical histories were obtained as well as admission details, date of operation, type of implant, complications, and postoperative rehabilitation.

Operative positioning in the lateral position and anterolateral approach was used for all cases. All patients received a cemented femoral stem and press-fit, in-growth acetabular cup.

The Functional Recovery Score as described by Zuckerman^{2,3}, a reliable method for assessment functional outcome used in elderly hip fracture patients, was used to score outcomes. The minimum duration from surgery to date of outcome scoring was 7 months. Telephone or personal interviews were conducted with the patient or primary caregiver to obtain this information. This scoring system was chosen because it is a disease-specific health assessment tool reflecting the importance that the elderly place on different functional capacities required in daily life³. Further, it was designed for ease of use in clinical practice as well as in

$$\text{BADL score} = \frac{(\text{feeding} + \text{bathing} + \text{toileting} + \text{dressing})}{4} \times 0.44$$

$$\text{IADL score} = \frac{(\text{food shopping} + \text{food preparation} + \text{banking/finance} + \text{car/train/taxi/bus use} + \text{housework} + \text{laundry})}{6} \times 0.23$$

Mobility score = level of walking ability $\times 0.33$
FRS score = **BADL score** + **IADL score** + **Mobility score**

Age distribution of the study population

telephone interview and mailed questionnaire formats³. Patients who could not be contacted via telephone or mail were removed from the outcome measure study, although the demographic data was recorded for future extrapolation studies. Outcome measures included non-instrumented basic activities of daily living (BADL) [feeding, dressing, bathing, toileting]; instrumented activities of daily living (IADL) [food shopping, food preparation, banking/finance, use of car/train/bus, performance of housework, laundry work]; and, mobility [walking indoors, walking outdoors].

RESULTS

There were 49 cases of traumatic femoral neck fracture treated with total hip arthroplasty (THA) from January 2005 to March 2009 at the studied institution. Subject ages ranged from 60 to 95 years of age with a mean of 74.12 years. Nineteen (38.8%) patients were aged 60 – 69 years, 16 (32.7%) aged 70 – 79 years, 11 (22.4%) aged 80 – 89 years and 3 (6.1%) aged 90 – 95 years. Most patients were females (40 patients – 81.6%), resulting in a male to female ratio of 1:4.4. Racial distribution revealed that 49% of patients were Malays, 46.9% were Chinese and the remainder were Indians (4.1%).

Out of 49 subjects, 9 were admitted with no past history of medical illness. Sixteen subjects (32.7%) had at least one co-morbid condition; the same proportion of patients was (32.7%) also noted to have 2 co-morbid conditions. Six subjects (12.2%) had three co-morbid conditions, one patient had 4 co-morbid pathologies and lastly, one patient had 5 co-morbid pathologies. The documented co-morbid conditions include hypertension, diabetes mellitus, chronic obstructive airway disease (COAD), ischaemic heart disease, cerebrovascular accidents, end stage renal failure and others. In total, 29 patients were available for outcome scoring, whereas 10 patients were deceased and another 10 patients were not contactable. The 10 subjects who were not contactable and lost to follow-up were excluded from outcome evaluation.

The one-month mortality rate was 4.1% and the one-year mortality rate was 20.5%. There was one perioperative mortality, the patient passed away on the first post-operative day due to acute coronary syndrome. Through records traced from the Malaysian National Registration Department, 6 out of the 10 deceased subjects passed away at home due to old age. Three subjects passed away in the hospital due to septicemic shock, with sources of sepsis including pneumonia, infected implant, urinary tract infection and infected pressure sores.

Only eight out of the 29 subjects were available for follow up at 3 years or more post-surgery. Among the 29 subjects who were available for outcome scoring, 82.8% of subjects obtained a Zuckerman Functional Outcome Score of good (80 – 100) and 13.8% obtained a score of fair (60 – 80). One subject (3.4%) obtained a score of poor (below 60), but it should be noted that the subject had underlying dementia and history of cerebrovascular accident.

Femoral head sizes ranged from 28 to 40mm. Only 2 out of 49 (4.1%) primary THAs performed for femoral neck fractures needed revision performed on an inpatient basis due to hip dislocation.

DISCUSSION

Recent literature provides strong support for the use of arthroplasty to treat displaced fractures of the femoral neck. Although hemiarthroplasty does offer advantages over internal fixation, the functional results achieved with either of these treatments failed to match the result of total hip arthroplasty⁴⁻⁸.

The mean age for subjects in this study was 74.12 years. Most patients (38.8%) were aged 60-69 years and 32.7% of patients aged 70-79 years. The male-female ratio was 1: 4.4. These findings were comparable to the report by S Harjeet *et al*⁹ who conducted a study in Malaysia on outcomes of traumatic intracapsular neck of femur fractures treated with hemiarthroplasty in patients aged above 60 years.

In the present study, fractures were found to be most common among Malays (49%), followed by Chinese (46.9%) and Indians (4.1%). These findings were different from figures reported by Lee J K *et al* [10] who conducted a study to look at ethnic differences in the incidence of hip fractures between the three races in Malaysia. They found out that 63% of patients presenting with hip fractures were Chinese, followed by Malays (20%) and Indians (13%)¹⁰. The different findings in our study probably reflect differences in the catchment area for our hospital as compared to that of the Lee study.

Results from this study showing that the one-month mortality rate was 4.1% and one-year mortality rate was 20.5% are comparable to the study published by Clayer *et al*.¹¹ in which they reported a one-month mortality rate of 8.4% and one-year mortality rate of 24% in their study on 405 patients who had surgery for fracture of the femoral neck (including the trochanteric region)¹¹. These findings imply that one in five patients treated for hip fracture with total hip arthroplasty will die in one year. However, Clayer *et al*.¹¹ also reported that even though these mortality rates are higher as compared to a population of the same age and sex over the first 6 months, by 1 year it parallels the control population. In comparison, Gebhard *et al*¹², Skinner *et al*¹³, Ben Squires *et al*¹⁴ reported that the mortality of patients with hip fractures treated with hemiarthroplasty is greater than the national average for age controls but there was no difference in mortality between groups treated with hemiarthroplasty or total hip replacement.

Traditionally, the main deterrent to performing THA for treatment of hip fractures has been the reported dislocation rate between 2% and 20%¹⁵⁻¹⁹ and perceived excessive cost compared to other treatments. In this study, the dislocation rate was 4.1% for primary THA performed for femoral neck fractures. In both of the dislocated THAs, a femoral head size of 28mm was used. In reviewing the literature, it is

striking that few papers have analyzed the use of THA for the treatment of displaced femoral neck fractures or evaluated the risk factors for dislocation in this group of patients. In a retrospective, single-centre study examining the use of THA in patients with arthritis, Berry *et al*¹⁸ found that both operative exposure and head size contributed to dislocation risk. Compared to 32-mm heads, 22- and 28-mm heads had a relative risk of 1.7 and 1.3, respectively. David *et al*¹⁹ also recommended the use of femoral head of ≥ 32 mm to reduce dislocation rates.

The issue of cost was recently addressed by Keating *et al*⁵ in a randomized comparison of fixation, hemiarthroplasty, and THA. They found that although fixation was initially less costly, this short-term advantage was eroded by higher costs for subsequent hip-related admissions in the following 2 years post-fixation. Though cost equivalent at 2 years, longer follow-up may actually favour THA. Blomfeldt *et al*⁶ followed a cohort of patients randomized to either open reduction/internal fixation or THA and found that in the fixation group the complication rate increased from 36% to 42% and the reoperation rate increased from 42% to 47% from 2- to 4-year follow-up. Complication and reoperation rates in the arthroplasty group remained unchanged over the same period. Furthermore, economic analyses have suggested that the long-term cost of treating failures of internal fixation and hemiarthroplasty in patients who survive 2 years or longer after their initial hip fracture is higher than for THA²⁰.

Utilization of the functional outcome score as described by Zukerman^{2,3} revealed that 96.6% of patients undergoing THA obtained fair to good outcome. Of this subgroup, 82.8% were placed in the good category and 13.8% in the fair category. This indicates that in Asian population, the outcome of traumatic neck fractures treated by THA is satisfactory.

Limitations of this study include the fact that this is a retrospective study resulting in inability to control information retrieval. In addition, there was no control group and there was no single controlled factor except for age. The small number of subjects and loss of patients to follow-up also decreased the statistical power of the study.

CONCLUSION

Total hip arthroplasty for the treatment of traumatic fracture of the intracapsular neck of the femur enables an excellent return to function with acceptable morbidity and mortality. It is a good option in the elderly with 96.6% of patients obtaining a satisfactory outcome. THA also has the advantages of providing reliable pain relief and is associated with good long-term survival of the prosthesis.

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