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Mini review

Functional outcome of internal fixation *versus* hemiarthroplasty in intertrochanteric femoral fractures in elderly

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Abstract

Introduction: Intertrochanteric fractures make up 45 percent of all hip fractures and are the major cause of disability in elderly. Mainstay of treatment of intertrochanteric fractures is internal fixation but in recent years hemiarthroplasty has emerged as one of the treatment modalities for unstable fractures.

Aims and objectives: To compare the functional outcome of internal fixation and hemiarthroplasty in the intertrochanteric fractures in geriatric population.

Materials and methods: We prospectively evaluated the clinical and functional outcomes of internal fixation and hemiarthroplasty in patients with unstable intertrochanteric fractures. 55 patients underwent internal fixation and 30 patients hemiarthroplasty. The patients were followed up for six months and functionally assessed using the Harris hip score.

Results: Both the groups were comparable with respect to demographic data. Eight patients were lost to follow up and nine patients expired within six months. Harris hip score analysis revealed statistically significant difference in favor of hemiarthroplasty group within the first three months. However, this was reversed at six months analysis of Harris hip score.

Conclusion: Although cases with hemiarthroplasty achieved a better level of activity in the beginning, cases with internal fixation reached a comparable level of activity within a short period of time, faster than those treated with hemiarthroplasty, displaying a better level of activity in the end.

Keywords: hip fractures, internal fixation, hemiarthroplasty

INTRODUCTION

Hip fractures are an increasingly significant public health problem and the incidence is on the rise due to the increase in the life expectancy and osteoporosis in geriatric population. Out of 45 percent hip fractures comprising Intertrochanteric Fractures (ITF), 40 percent of these are unstable and associated with 20 percent mortality [1]. The treatment options for unstable ITF include internal fixation and hemiarthroplasty. The failure rate of unstable ITF with poor bone quality treated with internal fixation is a major concern. Also, general complications such as pulmonary embolism, Deep Vein Thrombosis (DVT) and pneumonia due to prolonged recumbence and procedure related complications as sliding, Varus displacement, nail pull out and screw breakage are encountered in the elderly patients with osteoporotic bones [2].

Implant selection remains to be conflicting issue in the surgical treatment of these fractures. Internal fixation with minimal invasive surgical method is considered more appropriate for geriatric population [3]. However, hemiarthroplasty has the advantage of load bearing ambulation in the early post-operative period. Closed reduction and internal fixation protects the fracture hematoma [4]. Internal fixation with Proximal Femoral Nailing (PFN) has less complications occurring in relation to surgical trauma, blood loss, infection and injury location [5]. There is always a dilemma in surgeon's mind between the internal fixation and hemiarthroplasty in the elderly patients.

The purpose of this study was to compare the functional outcome of internal fixation versus the hemiarthroplasty in the unstable intertrochanteric fractures in elderly patients and to formulate the future guidelines for its treatment.

PATIENTS AND METHODS

Ethical clearance was obtained from the hospital ethics committee and institutional board to conduct a prospective study of patients who would present with intertrochanteric fractures.

From July 2018 to April 2020, a total of 154 patients of intertrochanteric fractures presented to our department out of which 85 patients with unstable intertrochanteric fractures were enrolled in study. Any patient age less than 60 years, poly-trauma cases, and immobility before fracture were excluded. Preoperative evaluations were undertaken with particular regards to diagnosis, general and local condition, the disability extent and necessary investigations were done. Patients were explained in detail about the benefits and risk of both the procedures. 30 patients underwent hemiarthroplasty, 33 were treated with dynamic hip screw and 22 with proximal femoral nail. Patients were followed up for six months. At the end of study eight patients expired and seven were lost to follow up. Total of 77 patients were evaluated separately in the demographic profile, blood loss, time of operation, time of trauma to surgery. Comorbidities, mean time of stay, day of partial weight bearing, day of full weight bearing, time to union. Functional status was assessed by using Harris hip score at six months.

STATISTICAL ANALYSIS

Descriptive statistics were given as mean values for continuous data, and the Shapiro-Wilk test was used to test the normality of variables. Non-parametric tests were used to make statistical inferences for data without a normal distribution. A paired Wilcoxon test was used to explore the difference between the two-time points. Parametric tests were used to make statistical inferences for data, which was normally distributed. A paired sample t-test was used to explore the difference.

RESULTS

All the patients in our study were 60 years or older with mean age of 75.48 (60-92) years, 45 male and 32 female patients. The majority of patients belonged to Boyd and Griffin grade III and IV. Trivial fall from standing height was the mode of injury in the majority of our patients. There was no significant difference between groups in terms of demographic data, fracture pattern, comorbidities and Singh's index.

The mean operating time was more in hemiarthroplasty group (115 mins) as compared to internal fixation group (DHS-90 mins, PFN-67 mins). The mean blood loss was more in the hemiarthroplasty group (308 ml) as compared to internal fixation group (DHS-224 ml, PFN-118 ml). The mean time of stay post operatively was more in hemiarthroplasty group (7.4 days) as compared to internal fixation group (5 days). The time to full weight bearing was significantly earlier in patients who underwent hemiarthroplasty ($p<0.05$). Harris hip score at three months was significantly better in hemiarthroplasty group but the reversal was seen at six months follow up.

No statistical difference was observed in terms of complications and mortality between the two groups. In hemiarthroplasty group two patients developed bed sores, one had deep vein thrombosis, one had dislocation. In internal fixation group two patients had bed sores, one patient had deep vein thrombosis, two had superficial wound infection, and one patient had cut through of implant.

DISCUSSION

The Intertrochanteric fractures in elderly patients are commonly associated with unsatisfactory surgical outcome due to associated factors such as medical illness, osteoporosis and fracture patterns [6]. Early mobilization is emphasized in such patients to decrease morbidity and mortality in such patients. Cemented hemiarthroplasty is preferred by many surgeons in the comminuted fractures in patients with severe osteoporosis [7]. Hemiarthroplasty is associated with early mobilization and rehabilitation in these patients because we do not have to wait for fracture union in these patients as the fracture site is already removed [8]. Kayali et al. used arthroplasty and reported 86% satisfactory results in the early period [9]. They insisted that early weight bearing was the major factor responsible for decreasing postoperative complications.

In our study although having started from lower functional levels, the patients in internal fixation group reached to the same level of hemiarthroplasty group and exceeded at six months period. The highest recovery in the internal fixation group was achieved in period between three and six months during which fracture healing was obtained in internal fixation group. The mean Harris hip score in the hemiarthroplasty group at three months is 47.87 as compared to 38.90 in the PFN group and 28.96 in the DHS group. The Harris hip score at six months was 77 in hemiarthroplasty group, 82.29 in the PFN group and 82.08 in the DHS group. There is also no chance of cut out of implants in hemiarthroplasty group. But it has the disadvantage of more blood loss, more operating time and more time of stay in the hospital. Once the fracture starts to unite in patients treated with internal fixation, same level of functional capacity as that of patients treated with hemiarthroplasty is achieved as evident by improvement in Harris hip score at six months in internal fixation group but it bears the disadvantage of radiation exposure and late postoperative weight bearing.

There are several limitations to our study. There is no randomization in this study. Also the sample size is small and the time of follow-up is relatively short but in our study, the superiority of internal fixation to cemented hemiarthroplasty is statistically manifested with internal fixation being better in less blood loss, less operating time, less hospital stay and functional recovery to level before the injury.

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