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Early results of primary bipolar hemi arthroplasty in treatment of unstable intertrochanteric fractures in elderly patients: A prospective study

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Abstract

Background and Objectives: Unstable intertrochanteric fracture in elderly is a challenging surgical condition with a high risk of morbidity and mortality. The aim of this study is to evaluate the results of bipolar arthroplasty as an alternative to the standard treatment of internal fixation.

Methods: This prospective study was conducted at Department of Orthopedics, Government Medical College, Jammu from October 2014 to May 2017. Records of total 34 patients with unstable intertrochanteric fractures treated under our hospital's Orthopedic Department were analyzed.

Results: Out of 34 patients enrolled in the study, 2 patients died during the study, hence the results of remaining 32 patients were analyzed with an average follow-up of 12 months. The average age of the patient was 79.35 years (range 70-94 years). The average surgery time was 82.53 min (range 62-110 min). The average intraoperative blood loss was 409.37 cc and average stay in the hospital was 14.53 days (range 5-21 days). At 1-year follow-up with help of Harris Hip Score, 8 patients (25%) were graded as excellent, 10 patients (31.25%) as good, 10 (31.25%) as fair, 2 (6.25%) as poor, and 2 (6.25%) as failed.

Interpretation and Conclusion: Treatment of unstable intertrochanteric fractures in elderly patients with cemented bipolar hemi arthroplasty results in reduced complications of prolonged immobilization and easy rehabilitation along with rapid return to functional level.

Keywords: Unstable intertrochanteric fractures, bipolar hemi arthroplasty

Introduction

Fractures of the proximal femur in elderly patients are generally caused by a single fall and is more common in elderly females ^[1]. Unstable intertrochanteric fractures in elderly constitute one of the major reasons for morbidity in this age group ^[2]. People in this age group usually have other systemic complications such as diabetes and cardiovascular diseases. The impacts of these diseases leads to a rapid deterioration in the general condition of these patients if they are kept bed ridden. The main goals for the treatment of these fractures in elderly patients are, to restore the pre-fracture activity status, to allow early full weight bearing and to avoid possible re-operation. As a general rule, preservation of the patient's own bones is the ideal aim for the surgeons. In osteoporotic elderly patients with unstable intertrochanteric fracture this ideal aim will not bring the patient back his activity if internal fixation was done. Weak purchase of the internal fixation device due to osteoporosis and comminution of the fracture increases the incidence of failure of internal fixation such as, cutting out the screws and displacement of the bone fragments. We cannot rely on internal fixation devices to allow early full weight bearing of patient in presence of severe osteoporosis and marked comminution at the fracture site. Partial weight bearing is very difficult to be followed by these patients, so they shift to full weight bearing on the operated limb causing mechanical failure. This prospective study was conducted to evaluate the results of bipolar arthroplasty for elderly patients with unstable intertrochanteric fractures.

Materials and Methods

This prospective study was done at Government Medical College, Jammu from October 2014 to ay 2017. A total of 32 patients aged >70 years who were ambulatory before trauma who

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suffered fresh unilateral closed unstable intertrochanteric fractures and presenting to our tertiary hospital were considered. Patients having life-threatening head, abdominal, or chest injuries, those with mental illness, rheumatoid arthritis, or osteoarthritis of hip, burns, and/ or immunocompromised status were excluded from this study. Those patients with associated major lower limb injuries that would interfere with ambulation were also excluded from this study. Anteroposterior X-ray of the pelvis with both hips of the injured joint were taken (Figure 1). 100 mm scale views of the injured side taken for head size templating. Injured limb was kept in a Thomas splint with skin traction with adequate cotton padding to correct flexion deformity if any and to prevent overriding whenever present. Pre-operative routine blood and urine investigations were done. Informed consent was obtained by the patient for both the surgical procedure and participation in the study. Pre-operative medical fitness was taken in all cases. The patients were operated on elective basis after overcoming the avoidable anesthetic risks. Surgery was performed under spinal or general anesthesia. All the cases were operated using the standard posterolateral approach. After assessing the fracture anatomy and extraction of the femoral head appropriate size of cemented bipolar prosthesis was put. In cases of posteromedial comminution, reconstruction using stainless steel wires, Kirschner wires, or ethibond sutures were done before insertion of the final bipolar prosthesis. Greater trochanteric comminution was also reconstructed in the same way as far as possible. Post-operatively, adequate analgesics and antibiotics were given.

Post-operative X-rays were done (Figures 2 & 3). Operated limb was kept in 30° abduction with help of pillow between both thighs. All the patients were allowed to sit in bed on the 2nd post-operative day and walking partial weight bearing with the help of walker from 3rd day. Full weight bearing was allowed gradually as per pain tolerance. Sutures were removed 2 weeks after surgery. Patients were followed up for 3, 6, 9 months, and 1 year after surgery. Patients were assessed by both clinical and radiological examination at every follow-up. Clinical follow-up was based on Harris Hip Score with grading as <70 poor, 70-79 fair, 80-89 good, and 90-100 excellent.



Fig 1: Pre operative X-ray showing unstable intertrochanteric fracture on left side.



Fig 2 & 3: Post operative X-rays showing primary bipolar hemiarthroplasty done on left side.

Results

The following observations were made from the data collected during the study. Out of 34 patients, 2 patients could not complete the study as they expired due to causes unrelated to orthopedic surgery (one died due to myocardial infarction and another due to intracranial bleed following road traffic accident). Thus, a total study of 32 patients was carried out. Of 32 patients, there were 8 (25%) females and 24 (75%) males. The youngest patient in our series was 70 years and the oldest was 94 years. The average age of the patient was 79.35 years. Thirty patients (93.75%) were community ambulatory pre-operatively, and 2 (5.88%) were only household ambulatory. A total of 13 patients were operated within 3 days, 10 patients in 4-7 days, and 5 patients in 8-11 days. 4 required more than 11 days to get operated due to comorbidities. The average surgery time was 82.53 min (range 68-110 min). The average intraoperative blood loss was 409.37cc (range 125-700 cc). Nine patients needed blood transfusion. The patients average stay in the hospital was

14.53 days (range 5-30 days).

The patients started full weight bearing ambulation at an average of 5.1 days post-surgery (range 2-10 days). One patient developed a stitch abscess which was drained under local anesthesia and healed uneventfully with 1 week of intravenous antibiotics and 1 week of oral antibiotics. One patient developed pneumonia which settled down in 3 weeks with intravenous antibiotics. According to Harris Hip Score at 3 months, 5 patients were graded as excellent, 11 patients as good, 12 patients as fair, 2 patient as poor, and 2 patients as failed. At 1-year follow-up, 8 patients were graded as excellent, 10 patients as good, 10 as fair, 2 as poor, and 2 as failed. 14 patients were walking without any aid, 14 patients had a limp and used a stick for walking, 2 patients used a walker, and 2 were wheelchair bound. The patient with a poor result had stitch abscess which was drained under local anesthesia and healed uneventfully with 1 week of intravenous antibiotics and 1 week of oral antibiotics. However, the patient had a limp while walking. Of the failed

results, one patient was bed-ridden due to medical reasons and was wheelchair bound. The second patient with the failed result was not cooperative with the physiotherapy program. The patient later had attempted squatting down causing dislocation of prosthesis but refused to take treatment. The patient eventually became wheelchair bound. No loosening or late infections occurred (Table I, II, III, IV).

Table 1: Demographic and pre operative data

Number	32
Age (in years)	
Youngest : oldest	70 : 94
Sex	
Male : female	24 (75%) : 8 (25%)
AO/OTA fracture type (no. of patients)	
31A1.1	0
31A1.2	0
31A1.3	0
31A2.1	1
31A2.2	8
31A2.3	21
31A3.1	2
31A3.2	0
31A3.3	0
Time to operation (in days)	
Up to 3	13
4-7	10
8-11	5
>11	4

Table 2: Intra Operative data

	Average
Type of anesthesia	
Block : General (no. of patients) 28 : 4	
Operative time	
Minimum : Maximum (in mins) 68 : 110 82.53	
Blood loss	
Minimum : Maximum (in cc) 125 : 700 409.37	
Hospital Stay	
Minimum : Maximum (in days) 5 : 30 14.53	

Table 3: Functional results at 3 months of surgery using Harris Hip Score

Results	No. of cases (%)
Excellent	5 (15.625)
Good	11 (34.375)
Fair	12 (34.5)
Poor	2 (6.25)
Failed	2 (6.25)

Table 4: Functional results at 1 year of surgery using Harris Hip Score

Results	No. of cases (%)
Excellent	8 (25)
Good	10 (31.25)
Fair	10 (31.25)
Poor	2 (6.25)
Failed	2 (6.25)

Discussion

Literature concerning the treatment and results of comminuted intertrochanteric fracture of the hip are extensive. Massie, Hoit, Dimon and Hughston, Sarmento and Williams have done outstanding work in attempt to change an unstable intertrochanteric fracture into a stable one and fix it with a device until it heals [3, 4]. The reported complication

rate for treating unstable intertrochanteric fractures ranges from 18% to 50% [3, 4]. Despite the fact that union rates of as high as 100% have been published in cases of stable well-reduced fractures that had ideal implant placement, at the same time up to 56% of failure rate has been associated with comminuted, unstable fractures in osteoporotic elderly people with suboptimal fracture fixation [5]. Intertrochanteric fractures in the elderly pose certain special problems. In this age group, the fracture configuration is generally comminuted, with extensive osteoporosis being present. Because of extensive osteoporosis and consequent poor mechanical property of bone, frequently inability to get good purchase of screws is encountered leading to subsequent implant failure. This leads to collapse and varus malposition of femoral head causing dysfunction of abductor mechanism manifesting as limping [6].

As there are problems of correct and accurate placement of the implant and hold of the implant, hence prolonged immobilization for achieving bony union is advised. On the other hand, there is a need for rapid full weight-bearing mobilization of this group of patients as they are generally medically compromised due to age and associated diseases. In addition, these patients may not have adequate psychomotor skills required for graded and protected weight bearing. Hence, there are two conflicting requirements that need to be addressed to, in a balanced way. We believe that treating unstable intertrochanteric fractures in a selected group of physiologically elderly group of patients with compromised general health and comminuted fractures in osteoporotic bone stock by primary hemi arthroplasty, the phase of fracture healing is essentially bypassed and a stable, mobile, relatively pain-free joint is immediately provided.

This eliminates the need for prolonged immobilization and permits early ambulation. This gives an edge over internal fixation/osteosynthesis in which there is a dilemma between the need of early mobilization versus protection of the hip for bony union. And also, the fears of implant failures and cutouts are eliminated. Essentially in these patients, there is a need for rapid pain-free full weight-bearing mobilization to restore them to their pre-injury level of activity. There are multiple studies showing good results with hemi arthroplasty. Liang *et al.* [7] in their study of unstable intertrochanteric fractures concluded that it is an effective method to treat the unstable intertrochanteric fractures in elderly patients with hemi arthroplasty. The result was satisfactory.

It can decrease the complications, reduce the mortality, improve the patients living quality, and reduce the burden of the patient's family. Grimsrud *et al.* [8] studied 39 consecutive patients of unstable intertrochanteric fractures treated with a cemented bipolar hemi arthroplasty. They concluded that these fractures can be treated with a standard femoral stem and cerclage cabling of the trochanters. The technique allows safe early weight bearing on the injured hip and had a relatively low rate of complications.

Rodop *et al.* [9] in a study of primary bipolar hemi arthroplasty for unstable intertrochanteric fractures in 54 elderly patients obtained 17 excellent and 14 good results after 12 months according to the Harris Hip Scoring system. In a comparative study of hemi arthroplasty versus internal fixation, Kayali *et al.* [10] reached the conclusion that clinical results of both groups were similar. Hemi arthroplasty patients were allowed full weight-bearing significantly earlier than the internal fixation patients. Hemi arthroplasty can be an alternative treatment for unstable intertrochanteric fractures in elderly patients so as to achieve earlier mobilization. Stern and

Goldstein ^[11] reported on 29 patients with intertrochanteric fractures treated with Leinbach prosthesis with excellent results. Proponents of conventional internal fixation have raised the issues of increased blood loss, infection, and dislocation associated with bipolar hemiarthroplasty. However, Stappaerts *et al.* ^[12] found that there was no difference between two groups except high requirement of blood transfusion in replacement group. In our study, 9 out of 32 patients (28.12%) required intraoperative or post-operative blood transfusion.

Haentjens *et al.* ^[13] found a significant reduction in incidence of pressure sore and pneumonia in patients undergoing prosthesis replacement surgery. In our study, as our emphasis was on faster rehabilitation; out of total 32 patients, only 1 patient (3.12%) developed pressure sore and another 1 patient (3.12%) developed pneumonia. The Indian perspective of using primary hemiarthroplasty as treatment option for unstable intertrochanteric fractures is explored by few authors. Sancheti *et al.* ^[14] concluded that hemiarthroplasty for unstable osteoporotic intertrochanteric fractures in elderly results in early ambulation and good functional results.

Kumar *et al.* ^[15] also concluded that unstable intertrochanteric fractures in elderly are better treated with cemented hemiarthroplasty than with internal fixation. Besides an early ambulation and less hospital stay, cemented hemiarthroplasty provides stable and mobile hips. Weight bearing can be started earlier than in other methods of treatment, which prevents any recumbency related complications. In our study, all the patients were initiated on static exercises on the first post-operative day for the glutei, hamstrings, and quadriceps and the patients were allowed full weight bearing by 2-10 days. In our study, early walking with full weight bearing was possible in most 32/34 patients with unstable intertrochanteric fracture who were previously mobile with or without support within 10 days of surgery. In the present series, the incidence of complications was significantly less possibly due to faster rehabilitation.

Conclusion

Hemiarthroplasty using bipolar prostheses for the unstable intertrochanteric fractures of the femur in elderly has good clinical results; in terms of early post-operative ambulation. This will have a direct effect on the general condition and the post-operative rehabilitation. Patient selection is very important as we are directing this to the elderly people with sub-normal bone quality having unstable intertrochanteric fractures. So, bipolar hemiarthroplasty should be considered as one of the modalities of the treatment of unstable intertrochanteric fractures in elderly. The sample size is small and the follow-up is also relatively of shorter duration. Considering fewer Indian studies on the comparison of primary bipolar hemiarthroplasty vis-a-vis conventional internal fixation in elderly patients with unstable intertrochanteric fractures, a larger prospective study would be needed.

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