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Research Article

Evaluation of outcome of hemiarthroplasty in intertrochanteric fracture femur

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Abstract

Background: Unstable osteoporotic intertrochanteric fracture of femur is challenging to manage because of poor bone quality and difficult reduction. Internal fixation in these patients is associated with complications related to recumbence due to prolonged immobilization. The purpose of this study is to analyze outcome of hemiarthroplasty in unstable intertrochanteric fracture femur.

Objective: To Evaluate functional outcome of hemiarthroplasty in unstable intertrochanteric fracture femur using Harris Hip Score.

Material and Methods: A retrospective and prospective study was carried out on 22 patients with unstable intertrochanteric fracture femur. Fractures were classified according to AO/OTA and Evans classification. Patients were treated with Cemented Bipolar prosthesis.

Results: Out of 22 patients, 14 (63.6%) were males and 08 (36.4%) were females. The most common age group was between 71-90 years in which females were more affected. The most common fracture type was Evans type 3 and 4 and AO/OTA 31 A-2.2/2.3. The end results based on Harris Hip Score Functional end results were 45% excellent, 35% good and 20% fair. There were no poor results.

Conclusion: Primary bipolar hemiarthroplasty provides good functional outcome according to Harris hip score in elderly unstable osteroporotic intertrochanteric fracture femur however long term follows up is required.

Keywords: intertrochanteric fracture femur, hemiarthroplasty, bipolar prosthesis, osteoporotic unstable fractures

INTRODUCTION

Intertrochanteric fractures of femur are seen with increasing frequency in older population and these fractures constitute 45% of all hip fractures [1] and are the major cause of morbidity and mortality in elderly population [2].

Intertrochanteric fractures of femur depending upon various classifications described can be grossly divided into 2 groups i.e. stable intertrochanteric fractures and unstable intertrochanteric fractures, in addition to instability in old age population there also occurs the problem of osteoporosis and comminution (Figure 1).

The goal of treatment of any intertrochanteric fracture of femur in elderly is to make patient mobile early and reducing associated complications of prolonged immobilization. Rapid mobilization of these elderly patients results in decreased morbidity and mortality.

In earlier time, treatment of intertrochanteric fracture was mainly conservative in the form of prolonged bed rest in sustained traction for minimum of 12 weeks, but due to prolonged immobilization in bed this treatment resulted in complications like bed sores, urinary tract infection, pneumonia, thrombo embolic complications resulting in high morbidity and mortality.

Along with these complications there also occurred fracture related complications like malunion of fracture and shortening resulting in difficult ambulation of patient.

For these reasons later on treatment of intertrochanteric fracture mainly shifted towards fixation with devices like dynamic hip screw and Juwet nail plates. Stable fractures can be easily treated with osteosynthesis with good results however, the management of unstable intertrochanteric fracture. An elderly patient is a challenge because of difficulty in obtaining anatomical reduction and prolonged time taken for fracture healing resulting in delayed mobilization of patient.

Biologic and biomechanical changes that occur in osteoporosis make the management of fractures more difficult. Cortical bone becomes thin, cancellous bone has reduced bone mineral density and changes in trabecular pattern. Thus implant fixation is compromised. In case of comminuted fractures in cancellous areas fixation of all fragments is difficult and posteromedial void in this region makes the fracture very unstable and internal fixation fails in this type of fracture [3].

In these patients however, comminution, osteoporosis, and instability often preclude the early resumption of full weight bearing.

In an effort to mobilize these patients more rapidly, permit early weight bearing and to avoid complications of immobilization, hemiarthroplasty has been used to treat unstable intertrochanteric fractures [4,5].

The purpose of this study is to determine whether hemiarthroplasty is a treatment of choice for elderly patients in unstable intertrochanteric fracture to reduce mortality and morbidity, and also to study time of mobilization after hemiarthroplasty along with complications associated with it (Figure 2).

MATERIALS AND METHODS

This retrospective and prospective study was conducted at Arihant Hospital and Research Centre, Indore (Madhya Pradesh) from May 2015 to May 2016.The closed intertrochanteric fractures operated during period of January 2013 to August 2015 were included in this study. Total 22 patients with unstable intertrochanteric fractures were studied in the study. Patients were studied according to following criteria.

INCLUSION CRITERIA

- Patients with age more than 50 years
- Patients of either gender

Fig. 1. X-ray pelvis: femur fracture

Fig. 2. X-ray showing Harry hip arthroplasty

- Patients with comminuted and unstable intertrochanteric fracture of femur
- Patient ambulatory prior to fracture
- Patients with trochanteric fractures with failed internal fixation

EXCLUSION CRITERIA

- Patients with stable intertrochanteric fracture femur
- Patients with age below 50 years
- Patients with compound intertrochanteric fractures of femur
- Patients who are medically unfit for surgery and anesthesia
- Pathological fracture

The patients were initially evaluated at the time of presentation and diagnosis was made on the basis of routine X-Rays posterio-anterior view and lateral view after careful clinical examination. Then by radiological evaluation, we classified the fracture according to AO/OTA and Evans Classification. Patients were treated with cemented bipolar prosthesis. Standard Moores posterior approach was used and surgery performed by Senior surgeon, Calcar reconstruction was done wherever necessary, Trochanteric wiring was done in 80% cases. Static exercises in bed for glutei, hamstrings and quadriceps were started on next day (Figure 3).

Breathing exercises started from next day. Ambulation with weight bearing as tolerated on affected lower limb with walker started from 1st post-operative day. Drain removal was done after 48 hours after surgery. Post-operative dressing was done on 2nd, 5th post-operative day. Suture removal was done after 12 days of surgery.

Clinical, radiological and functional evaluation was done at 6 weeks, 12 weeks and 6 months, 9 months and at the end of 1 year. The results were assessed according to Harris hip score.

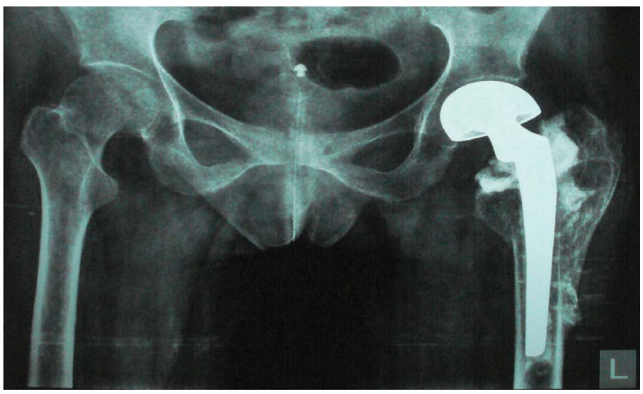

Fig. 3. Postoperative x-ray showing stability of the components

RESULTS

This study comprised of 22 unstable intertrochanteric fracture of femur treated by primary bipolar hemiarthroplasty, mostly cemented type of prosthesis used in all cases.

In our study unstable intertrochanteric fracture femur was more common in 7th-9th decade, in which females were more affected than males. Age ranging from 57-100 years with mean age is 79.54 years. Our study had female preponderance, female patients (63.4%) outnumbered male patients (36.6%).

Left side was more commonly in our patient than the right side. Left side involved in 59.1% of cases.

Slip and fall at home was most common mode of injury in our study followed by failed trochanteric fixation. In our study there were 50% cases of both 31 A2.2 and 31 A2.3 types, and most of them were unstable type of intertrochanteric fractures by Evans classification.

In our study most of the patients were having osteoporotic fractures and all were comminuted type of variety.

20 patients out of 22 cases were treated with cemented bipolar prosthesis and 2cases were treated with cemented modular bipolar type of prosthesis.

In our study all patients were operated by using Moores posterior approach and most of the patients were from urban population than rural population. Hypertension was most commonly associated comorbidity, followed by diabetes mellitus.

In this study 54.5% cases was mobilized full weight bearing walking with walker support by 3rd day. Average day of mobilization was 4th day. Functional outcome was evaluated using Harris hip score; we followed patients at 6th week, 3rd month, 6th month, 1 year follow up.

At the end of 1 year by Harris hip score evaluation; we had 7 patients with excellent result, 9 patients with good result, and 4 patients with fair result.

80% of our patients had well to excellent result according to Harris hip score which is comparable with most of the studies.

In our study we had 2 complications, first a patient had periprosthetic fracture treated by locking compression plate and 2nd patient had superficial infection treated by IV antibiotics and regular dressing.

DISCUSSION

Intertrochanteric fractures in elderly pose certain special problems. In this age group the fracture configuration is generally comminuted, with extensive osteoporosis being present. There are problems of correct and accurate placement of implant, and hold of implant, hence prolonged immobilization for achieving bony union is required. 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 requirement that need to be addressed in a balanced way.

We believe that in geriatric patients there are inherent problems of mobility due to compromised locomotor skills and associated medical problems. Unfortunately these are the patients who also have osteoporosis and severe comminution which precludes an absolutely rigid fixation, which may permit them, unrestricted mobilization in the initial post-operative period with any modality of fixation. Even guarded or limited mobilization is fraught with dangers of implant failure due to precarious fixation till fracture unites. Hence there is need for long term protection of hip, which is associated with problems of recumbency.

We believe that by treating unstable intertrochanteric fractures in a selected group of physiologically elderly group of patients with compromised general health and comminuted fractures in an osteoporotic bone stock by primary hemiarthroplasty, 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 for early mobilization verses protection of hip for bony union, and also fears of implant failures and cutouts are eliminated.

In the present study we have studied 22 patients with unstable intertrochanteric fracture with comminution and osteoporosis, primarily treated with hemiarthroplasty.

In the present study maximum numbers of patients were between 71-90 years of age group with mean age being 79.55 years. In the series of Haentjen [6] the mean age was 82 years. In the series of Maru, et al. [7] the mean age was 75.6 years, in most of the studies the age group involved was between the range of 71-90 year. In the present series incidence of fracture was more in females 14 out of 22 cases i.e. 63.6% of total number of cases. In the series of Roodoop, et al. [8] there were 34 females and 20 males in the study. In the series of Sinno, et al. [9] there were 34 females and 14 males in the series of 48 patients, in most of the other studies there was equal distribution of fracture between both males and females.

In the present series most common mode of injury was slip and fall at home, accounting for 77% of cases, probably due to osteoporotic bones just slip and fall has resulted in fracture. In the series of Singh, et al. [10] 18 patients of 25 cases had fracture due to fall on level surface and less commonly due to road traffic accidents, same as that of our study. In series of Kumar, et al. [11] 15 patients out of 20 cases sustained fracture due to fall from standing height.

In the present series most common site affected was left side i.e. 59.1% of total fractures as compared to right side which is 40.9%, most of the patient were from urban population as compared to rural population.

In our series 50% of patients had hypertension as a co morbid condition followed by diabetes in 27% of cases. In series of Roodoop, et al. [8] observed on admission most of cases had hypertension, diabetes, heart disease, neurological disease, hematological disease. In the series of Vahal, et al. [12] 10% patients suffered from cardiovascular disease, 10% suffered from neurological disorder. Most of other studies in literature had one of above mentioned complication.

In our series we classified fractures according to AO/OTA classification and Evans classification, according to AO classification we had 11 patients with 31 A2.2 and 11 patients with 31 A2.3 types, Sino, et al. [9] in their article studied 48 patients treated with bipolar hemiarthroplasty and classified them according to AO/OTA classification, they had 22 patients had the A2.1 fracture type, 14 patients had A22 fracture type, 7 patients had A 23 fracture type, 3 patients had A31 fracture type, and 2 patients had A33 fracture type. Maru, et al. [7] in their study included

only AO/OTA type 31 A2.2 and A 2.3 only. Sancheti, et al. [13] in their series included only AO/OTA type 31 A2.2 and A2.3 types only, AO / OTA classification is most commonly used according to literature we reviewed.

In most of the studies Evans type 3 and type 4 fractures were included in the studies, we simplified it and classified them in 2 groups i.e. unstable type of fractures which are included in type 1 according to Evans and 2nd group we included reverse oblique type of fractures, in no other study in literature this type of grouping was done.

In our series average time of full weight bearing walking is on 3rd day of surgery, 54% of our patients walked on 3rd post-operative day with full weight bearing with walker support 98% of patients achieved mobilization by the time of discharge from hospital, in the series of Rodoop, et al. [8] 62% of patient were able to walk full weight bearing with walker in first week of surgery, 98% of patients were ambulatory at time of discharge. In the series of Vahal, et al. [12] 77% of patients achieved full weight bearing mobilization. In the series of Kayali, et al. [14] concluded that in a comparative study between fixation and hemiarthroplasty, the only one difference in favor of hemiarthroplasty was early mobilization as compared to internal fixation. In series of Kumar, et al. [11] average day of mobilization was 5th day. In the series of Sino, et al. [9] time (weeks) to independent full weight bearing and return to the prefracture level of daily activity was significantly earlier in patients who underwent bipolar arthroplasty compared to those in the internal fixation group.

In our study 19 out of 22 cases walked with normal gait at the end of 1 year follow-up while 3 patients walked with limp, results of our study are comparable to most of the other studies in literature.

We evaluated functional outcome by using Harris hip score, Harris hip scoring is most commonly used scoring system in literature to evaluate functional outcome in patients treated with hemiarthroplasty.

The Harris hip score is a validated fifteen item patient questionnaire on which scores range from 0 to 100 (<70 poor, 70-79 fair, 80-89 good, 90-100 excellent).

At the end of 1 year follow up we had 80% of patients with good to excellent outcome according to Harris hip score. 20% of our patients had fair result, in our study there was no patient with poor outcome.

Rodoop, et al. [8] in a study of primary bipolar hemiprosthesis for unstable intertrochanteric fractures in 37 elderly patients obtained 17 excellent (45%) and 14 good (37%) results after 12 months according to the Harris hip scoring system. Sancheti, et al. [13] in study of primary bipolar hemiarthroplasty for unstable intertrochanteric fractures, a total of 32 out of 35 patients (91%) had excellent to fair functional results and 2 had poor result with respect to the Harris hip score (mean 84.8 ± 9.72, range 58-97).

Patil, et al. [14] in their study, operated 126 elderly patients with comminuted intertrochanteric fractures femur, with cemented bipolar prosthesis and encirclage wiring for greater trochanter, through transtrochanteric approach, Mean Harris hip score at the end of 2.9 years was 80.5, which showed significant improvement as compared to preoperative status.

Puttakemparaju, et al. [15] in their study at African journal of trauma, they studied 20 patients of more than 65 years of age with unstable intertrochanteric fracture femur treated with bipolar hemiarthroplasty, they evaluated functional outcome in these patients using Harris Hip score, Mean Harris hip score was 78.2 at the end of 6 months and 83.25 at the end of 24 months, at the end of 2 years functional outcome was good according to Harris hip score.

Chaudhari, et al, [16] in their study, studied 25 patients with unstable intertrochanteric fracture femur with communition treated with cemented bipolar hemiarthroplasty using transtrochanteric approach, all patients evaluated using Harris hip Score. In their study 25 cases were taken. The mean Harris hip score at one year was 80.54 ± 19.74. Excellent to good results were obtained at one year in 17(68%) cases and fair in 4 (16%) cases, poor in 2 (8%) of patients.

Table 1. Distribution of patients according to mean Harris Hip Score at 6 weeks, 3 months, 6 months, 9 months and 12 months

Time interval	No.	Harris Hip Score (Mean ± SD)	't' Value	P Value
6 weeks	22	80.41 ± 4.26	-10.247, df=20	0.000*
3 months	21	82.52 ± 4.75		
3 months	21	82.52 ± 4.75	-4.056, df=19	0.001*
6 months	20	83.50 ± 5.02		
6 months	20	83.50 ± 5.02	-5.480, df=19	0.000*
9 months	20	84.90 ± 5.17		
9 months	20	84.90 ± 5.17	-6.096, df=18	0.000*
12 months	19	86.53 ± 5.73		
Paired 't' test applied. *P value < 0.05 was taken as statistically significant				

Our results were comparable with most of the studies in the literature we have gone through (Table 1).

COMPLICATIONS

We had 2 complications in our study, first patient suffered from periprosthetic fracture at the end of 6 weeks after surgery. Patient was operated with open reduction and internal fixation with locking compression plate, and was kept non-weight bearing for 6 weeks, on subsequent evaluation fracture united, and at the end of 1 year patient had fair outcome on Harris hip score.

Second patient suffered from superficial infection, patient had serous discharge from wound started at 7th post-operative day, patient was treated with alternate day dressings, and antibiotics coverage for 2 weeks, patients wound healed well on follow up and patients' recovery was satisfactory. 2 patients in our study died, both patients suffered from myocardial infarction, cause in both cases was not related to operative procedure. In our study no patient suffered from complications like, implant loosening, dislocation, bed sores, pneumonia, most of which are complications related to prolonged immobilization.

Patil et al [14] in their study 1 patient suffered from implant loosening, 1 patient suffered from dislocation, and 1 patient had infection which was managed accordingly. Sancheti et al [13] in their study 1 patient suffered from infection which was treated antibiotics for 2 weeks, 1 patient could not walk as he was a case of Alzheimer's and could not cooperate. Our study was comparable with most of the studies in the points discussed as mentioned above.

CONCLUSION

Intertrochanteric fractures of femur are seen with increased frequency in elderly and make for 45% of fractures in elderly patients. Stable intertrochanteric fractures are satisfactorily treated with the help of internal fixation and there is no problem of bone healing in stable intertrochanteric fracture.

Unstable intertrochanteric fractures of femur are seen mainly in elderly patients with osteoporosis and special problem associated with them is comminution, age related medical illness.

Primary hemiarthroplasty provides a relatively stable pain free mobile joint and it is a better modality of treatment in osteoporotic elderly

people who sustain unstable intertrochanteric fractures of femur. Early mobilization is possible with hemiarthroplasty, the technique bypasses the phase of fracture healing and provides immediate stability and mobility thereby avoiding the problems of recumbency.

The rate of revision surgery and complications is low with hemiarthroplasty as compared to fixation. Primary bipolar hemiarthroplasty provides good functional outcome according to Harris hip score however long term follow up is required.

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