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Hip hemiarthroplasty for failed treatment of intertrochanteric femur fractures: A case series

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Abstract

Introduction: Management for failed treatment of femoral intertrochanteric fracture using hip screw is a challenge for orthopaedic surgeons. Failure rates with an internal fixation range between 3% and 12%. The unfavourable factors include severe osteoporosis, unstable fracture geometry, improper placement of hip screw or nail, broken lateral wall, bone deformity, bone loss, associated greater and lesser trochanteric nonunion and repeated trauma. In this study, we reported the surgical outcomes of patients with concomitant failed internal fixation and operated by implant removal and hemiarthroplasties.

Materials and Methods: We treated 25 patients of failed hip screws in intertrochanteric femur fractures surgically by hemiarthroplasty. Mean age of patients in this study was 66.8 years. In all patients surgical exposure was done using Southern Moore approach. Greater trochanter and lesser trochanter reconstruction was done in select cases using tension band wiring and collared stem respectively. The limb length discrepancy of the previously operated limb was dealt by increasing the neck offset and the limb length was restored to as that of opposite normal limb. The hemiarthroplasties eliminated the pain from the destructed femoral head. Postoperatively patient were mobilised from day 8. The patients were advised full weight bearing from 3 weeks onwards. The patients were followed every 6 weeks for more than 1 year clinically and radiologically.

Results: All Patients were followed for more than 1 year and evaluated using Modified Harris Hip Score. Among these 25 patients, excellent/good results were seen in 21 patients (84%). No dislocation of hemiarthroplasty occurred during the postoperative follow-up. One of the patients, who remained bedridden even after surgery, developed decubitus ulcer on the back and was labelled as failure. One patient had shortening more than 2 cm due to sinking of prosthesis.

Conclusion: Hemiarthroplasty is a rational option to treat cases of failed intertrochanteric femur fractures.

Keywords: Hemiarthroplasty, intertrochanteric femur fracture, osteoporosis, southern moore approach

1. Introduction

Intertrochanteric femur fractures are defined as extracapsular fractures of the proximal femur that occur between the greater and lesser trochanter. The intertrochanteric aspect of the femur is located between the greater and lesser trochanters and consists of dense trabecular bone. The greater trochanter serves as an insertion site for the gluteus medius, gluteus minimus, obturator internus, piriformis, and site of origin for the vastus lateralis. The lesser trochanter serves as an insertion site for the iliopsoas and psoas major, commonly referred to as the iliopsoas^[1, 2]. The other two types of hip fractures are fractures of the femoral neck, which are proximal or above to trochanteric fractures, and subtrochanteric fractures, which are distal to or below the trochanters^[3]. The calcar femorale is the vertical wall of dense bone that extends from the posteromedial aspect of the femur shaft to the posterior portion of the femoral neck^[4]. This structure is important because it determines whether a fracture is stable or not. These fractures occur more commonly in the elderly population with osteoporosis due to a low energy trauma.

Classification used for intertrochanteric femur fractures
Evan's classification^[5, 6]

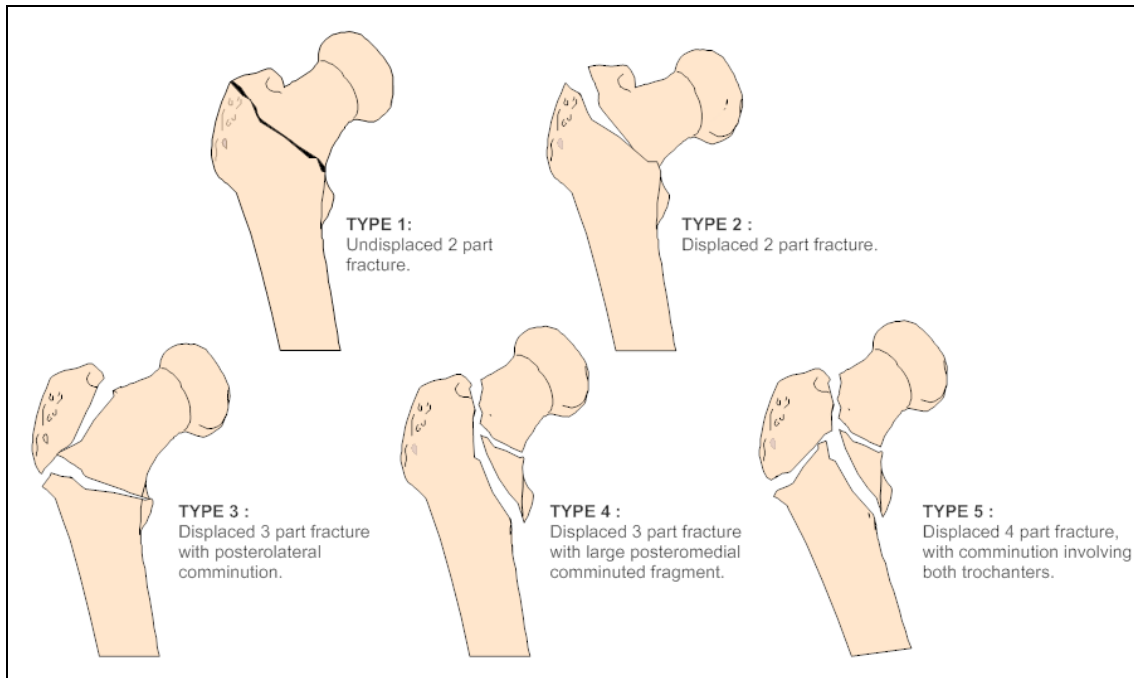


Fig 1: Evan's classification

Intertrochanteric fractures in elderly population are usually managed by closed reduction and internal fixation. There have been many advances in internal fixation techniques to deal with poor quality of bone and severely comminuted intertrochanteric fractures so as to allow early ambulation [7]. Despite such advances in internal fixation of intertrochanteric fracture, there are increasing incidence of delayed union, malunion and nonunion of the intertrochanteric fracture [8]. The present study aims at evaluating the outcome of hemiarthroplasty in failed cases of intertrochanteric femur fracture.

2. Material and Methods

A prospective study was conducted from March 2016 to May 2019 in the Department of Orthopaedics, Grant Government Medical College, after getting permission of the ethical committee. Twenty five patients in the age group of 55 to 75 years with a history of previously operated for intertrochanteric femur fracture and re-trauma were admitted and included in the study after obtaining proper valid informed consent.

All patients were given primary treatment in the form of skin traction over Bohler Braun splint, analgesic, anti-inflammatory medications, and strict bed rest and head low until a patient is posted for surgery. All patients were posted for surgery only when all preoperative fitness for surgery was obtained, blood investigations were within normal limits and operative site was clean. Patients were operated under spinal anaesthesia in the lateral position.

2.1 Operative technique

The surgical approach used in our study was Southern Moore approach. After careful scrubbing, painting, and draping of the fractured side a 10-15 cm long curved incision is made centred on the posterior aspect of greater trochanter. Fascia lata is incised and fibres of gluteus maximus and vastus lateralis are split. The implant previously used is removed. The hip is internally rotated to stretch and visualise short external rotators of hip {fig 2}. At this stage sciatic nerve is at risk for injury, care is taken to prevent it. After inserting stay sutures, external rotators are incised close to the bone and

reflected backwards. Now the posterior capsule is incised and the hip is posteriorly dislocated. The femoral head is removed {fig 3} and medullary cavity is prepared and reamed for cementing and stem insertion. After confirming appropriate size of head and stem, implant is inserted {fig 4} and the joint is reduced. To deal with the problem of limb length discrepancy in these patients, the neck offset was increased accordingly and length of the limb was restored to as that of opposite normal limb. The greater trochanteric reconstruction with tension band wiring is done in some select cases. In cases where lesser trochanter was also comminuted, it was replaced by collared stem. Capsule and short external rotators are sutured. Wound is closed in layers under vacuum drain [9, 10, 11, 12].

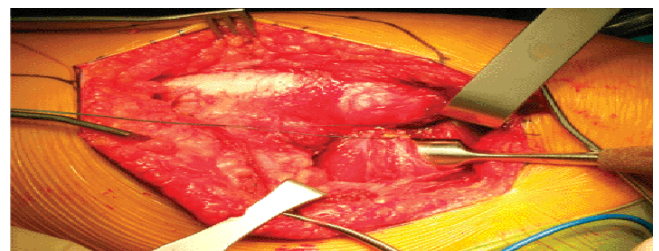


Fig 2: Intraoperative photograph showing short external rotators



Fig 3: Intraoperative photograph showing femoral head removed



Fig 4: Bipolar prosthesis for hemiarthroplasty



Fig 5: Anteroposterior (a) and lateral (b) views of hip in a 65 year old female having failed hip screw implant. (c) Immediate postoperative Xray of same patient operated with implant removal and hemiarthroplasty and greater trochanter reconstruction with TBW, K wires.

2.2 Post-operative care

Operative wound was dressed and checked on the 3rd postoperative day, and sutures were removed after 10–14

days. Active hip and knee range of motion exercises were started from 5th postoperative day and protected weight bearing was started from 8th post-operative day. The average stay in hospital was 12.5 days, with shortest being 12 days and longest of 21 days. Full weight bearing was started after 3 weeks from post-operative period. The patients were followed every 6 weeks for more than 1 year clinically and radiologically.

2.3 Complications

There was one case who remained bedridden even after surgery, developed decubitus ulcer on the back and was labelled as failure. There were two cases of superficial operative site infection which were treated with short course of oral antibiotics. One patient had more than 2 cm shortening due to sinking of prosthesis. There was no case of loosening of the prosthesis, break in the cement. At follow-up progress and complications, if any, were noted and treated accordingly.

3. Results

A prospective study of 25 patients having failed treatment of intertrochanteric femur fractures was carried out in Grant Government Medical College and Sir JJ Group of Hospitals. All patients were operated by implant removal and hemiarthroplasties. Greater trochanteric reconstruction with tension band wiring in some select cases.

Lesser trochanter reconstruction was done using collared stem. Patients in this study were in the age group of 55-75 years with mean age of patients being 66.8 years. Patients were evaluated according to Modified Harris hip score [13]. Mean Harris hip score was 78.5. Out of 25 patients the Harris hip score was more than 80 (good) in 21 patients, between 71-80 (fair) in 3 patients and less than 70 (poor) in 1 patient.

Majority of patients thus showed good to fair functional outcome with the proposed treatment.

Table 1: Evaluation using Harris hip score

Harris hip score	Results
100-91 (Excellent)	6
90-81 (Good)	15
80-71 (Fair)	3
<70 (Poor)	1

4. Discussion

Patients with failed internal fixation of intertrochanteric fractures present with significant functional disability and pain [14]. In these elderly patients with osteoporosis, treatment options which allow early ambulation are limited. Hip hemiarthroplasty can provide a good alternative for early ambulation and restoration of normal life in this group of patients [15]. While selecting hip hemiarthroplasty as a treatment option for these patients it must be kept in mind that this procedure is technically challenging in this particular class of patients. Poor bone quality, loss of bone stock, presence of holes after removal of hardware combined with distorted bony landmark and severe fibrosis can increase the risk of mechanical complication like fractures and cortical perforation [16]. When trochanteric nonunion is present, the severe fibrosis at the site can lead to difficult visualisation and exposure. These patients need exposure around the head and neck with 360° visualization of acetabular before extracting the head and neck fragment. It is mandatory to keep the capsular flaps and labrum whenever bipolar arthroplasty is being performed [17]. The choice of implant-whether cemented

or uncemented, total hip replacement or bipolar hemiarthroplasty will depend upon the age of the patient, activity level, co-morbidities, quality of bone stock and acetabular damage. For patients with acetabular damage total hip replacement is the better option. Haidukewych and berry^[16] studied the results of hip arthroplasty in 60 patients of failed internal fixation. Of the 60, there were 32 total hip arthroplasty and 28 hemiarthroplasty. At a mean follow up of 65 months, 39 (89%) of the 44 surviving patients had no or mild pain, 91% were able to walk, 59% were ambulating with one arm support or less.

The limitations in our study were the small number of cases and the shorter time of follow-up. Large multicentric trials may further show the efficacy of hip hemiarthroplasty surgeries in failed intertrochanteric femur fractures.

5. Conclusion

To conclude, hip hemiarthroplasty for failed intertrochanteric fractures requires meticulous preoperative planning and surgical technique. The exposure of hip through Southern Moore approach makes the procedure easy for removal of implant. It also allows safe accessibility to the nonunion of greater trochanter and intertrochanteric which lies amidst scarred tissue due to the previous surgery^[18]. Anatomic re-attachment of the greater trochanter is one of the most important determinants of stability in these hips along with posterior capsular closure. The fact that we have had no dislocations in our study can be attributed to this technique. Implant selection depends on age of patient, level of activity, co-morbidity, and available proximal bone. Bipolar hemiarthroplasty is an excellent option in elderly patients with co-morbidities without acetabular damage. Patients were allowed to bear weight post-operatively as tolerated and all except one were ambulatory at final follow up. Thus, hip hemiarthroplasty is a good alternative option for these failed intertrochanteric femur fractures^[19].

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