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Evaluation of results of intertrochanteric femur fracture treated by hemiarthroplasty

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Abstract

Purpose of study: To assess functional outcome in patients having unstable intertrochanteric fracture treated by Hemiarthroplasty as per harris hip score.

Method: 25 cases of unstable intertrochanteric femur fracture were operated and followed up at Gcs Medical college, Hospital & Research Centre, establishing the following as Inclusion criteria: Patients more than 50 years of age with unstable intertrochanteric femur fracture(AO 31A-2.2 , AO 31A-2.3) presenting primarily or following failed osteosynthesis, who were ambulatory before fracture & Exclusion criteria: Patients who are medically unfit for anesthesia, stable fracture pattern, infection around hip, compound fracture, chronically debilitated and bed bound patient; with informed consent regarding procedure and study. Mean age of patients was 71.12 years. All patients are treated with hemiarthroplasty. Patients are followed up for a mean period of 6 months.

Results: These patients were evaluated using the Harris hip scoring system. 22 out of 25 had excellent to good outcomes.

Conclusion: Hemiarthroplasty offers good functional outcome and early weight bearing and mobilization.

Keywords: intertrochanteric fractures, unstable fracture pattern, hemiarthroplasty, harris hip scores, functional outcome

Introduction

Orthopedic practice demands complex decision making. All decisions are usually influenced by non-specific consideration such as limited facilities, financial constraints and noncompliance from the patients etc. Despite these impediments we all strive towards accuracy in our decision making. The goal of fracture treatment has shifted from just union of the fracture to the maximal functional recovery of the limb as early as possible. One of the most common fractures has been intertrochanteric femoral fractures as emphasized by this anecdote- "human beings come in the world through the pelvis and leave the world through the broken hips". Various operative procedures with different implants have been described for the treatment of the intertrochanteric fractures.

Intertrochanteric femoral fracture management is constantly evolving with advancing knowledge and better imaging modalities. For many decades; attempts have been made to overcome the difficulties which surgeons encounter in the treatment of intertrochanteric femoral fractures. To allow early postoperative weight bearing and rapid rehabilitation, some surgeons have proposed prosthetic replacement. The literature regarding this is sparse. The purpose of our study is to evaluate the functional outcomes after hemiarthroplasty for comminuted and unstable intertrochanteric fractures in the elderly population.

Material and Method

25 cases of unstable intertrochanteric femur fracture were operated and followed up at Gcs Medical college, Hospital & Research Centre, establishing the following as Inclusion criteria: Patients more than 50 years of age with unstable intertrochanteric femur fracture(AO 31A-2.2 , AO 31A-2.3) presenting primarily or following failed osteosynthesis, who were ambulatory before fracture & Exclusion criteria: Patients who are medically unfit for anesthesia, stable fracture pattern, infection around hip, compound fracture, chronically debilitated and bed bound patient; with informed consent regarding procedure and study.

Institutional ethics committee permission was taken. Mean age of patients was 71.12 years. All patients are treated with hemiarthroplasty. After induction of patient, lateral position on simple table is given with affected side up. Standard painting and draping is done. Strict aseptic precaution is followed. We have used posterolateral approach for all patients as this approach is most widely used, less interfere with abductor mechanism of hip & post op ambulation is early. Incision is started approximately 10 cm distal to the posterior superior iliac spine and extended distally and laterally parallel to fibres of gluteus maximus to the posterior margin of greater trochanter then directed distally towards the shaft of femur. Fibres of gluteus maximus are separated by blunt dissection. After exposing greater trochanter short external rotator of the thigh are identified. Femur head is approached through the fracture without detaching short external rotators. Posterior aspect of the hip joint capsule is incised and joint is exposed. The fracture anatomy was assessed and a cut was taken high up in the neck (almost subcapital level) to facilitate removal of the femoral head.

With the removal of the head, the fracture now has three main fragments namely the greater trochanter, the lesser trochanter, and the shaft with the retained portion of the neck of femur. In some cases the lesser trochanter was in continuity with neck of the femur and was reconstructed with the shaft and greater trochanter with steel wires. A neck cut was taken roughly about 1-2 cm above the lesser trochanter depending on the amount of comminution. At times, the lesser trochanter was found as a separate fragment with neck as a separate fragment; in these cases it was difficult to reconstruct the calcar. In these cases, the lesser trochanter and the greater trochanter were fixed to the shaft with steel wires; however most part of the neck had to be sacrificed. Where lesser trochanter was comminuted, the trochanter pieces were left attached to the soft tissue and the medial defect was reconstructed using a cement mantle or a calcar stem prosthesis was used. In some cases the greater trochanter was fractured en masse and was reattached to the main shaft using steel wires. In cases where the greater trochanter was coronally split a tension band was applied beneath the gluteus medius tendon and a bony tunnel was drilled in the distal greater trochanter. In some cases, the greater trochanter was found to be severely comminuted; here ethibond sutures were used to suture together the trochanter pieces and the soft tissue to make a stable construct. The gluteus medius, greater trochanter, and the vastus lateralis apparatus were maintained in continuity as a stable lateral sleeve. This was then fixed loosely to the shaft fragment with steel wires or ethibond sutures. In cases where both the greater and lesser trochanter were comminuted, they were both segregated with ethibond suture to form separate masses and were reattached to the shaft after insertion of cemented femoral stem. Thus at the end of reconstruction, the greater trochanter, the lesser trochanter, and the shaft were wired together using steel wires, while only ethibond sutures were used in cases which were severely comminuted.

Version of the prosthesis is decided as a long axis of the leg is taken, A line is drawn perpendicular to its axis, and femoral rasping is done 20 to 25 degrees anteversion to it. The femoral canal was broached with appropriate anteversion. A trial bipolar prosthesis was then inserted and trial reduction was done. With trial prosthesis in situ traction was applied to the leg and compared with the opposite leg for limb length equality. After confirming the leg length the implant was

inserted into the femur and joint was reduced. Traction was then applied with implant in situ to achieve the desired limb length by comparing with the opposite limb on the table. Applied traction causes femur to be pulled distally and, a note of distraction between the prosthesis and the femoral cut was made and the level on the prosthesis was marked. This gives an idea about how much the femur implant should sink into proximal femur so as to achieve limb length at the time of final cementing of the implant. During the final fixation of the stem, the cemented stem was allowed to sink in the femoral canal up to the mark made on the prosthesis in the previous step and for the remaining portion a cement mantle was made so that the final limb length was equalized. This procedure was especially required in cases where the lesser trochanter was fractured separate from the neck portion. Cement was used for distal fixation also as the medullary canal was invariable found to be very wide. In cases with thicker cortex (dorr type a and b) uncemented femoral prosthesis was used. Once the prosthesis was fixed, the broken trochanter and the calcar were again retightened by tensioning the wire cables. Calcar stem prosthesis had holes in calcar region for passing wires or sutures to fix trochanters to it. The short external rotators were then sutured back using bone tunnels in the greater trochanter with the closure of the superficial layers, as routine over a suction drain after achieving hemostasis. The operative technique is illustrated in Figure 1.

All patients underwent a routine postoperative physiotherapy protocol that included early ambulation in bed and lower limb exercises with weight bearing as allowed by patient condition. The rehabilitation then progressed as tolerated by the patients. Patients were examined postoperatively at 6 weeks, 3 months and 6 months and thereafter annually follow up was advised. At each follow up visit, clinical and radiological examination was done and the patients were evaluated using the harris hip score and were graded as <70 poor, 70-79 fair, 80-89 good and 90-100 excellent. Anteroposterior radiographs of the hip were analyzed at each follow-up to note evidence of loosening. Figure 2 illustrates pre and postoperative radiographs of one such case.

Results

Mean age was 71.12 years. Unstable intertrochanteric fractures are more common in old age group. Total numbers of females (15) is higher as total numbers of males (10). In our study, right side was more involved than left side.

Hypertension, Chronic obstructive pulmonary disease and diabetes mellitus were frequently observed medical comorbidities. Since most of the patient belong to elderly age group, medical comorbidities are very common. There was 4 patient who had no medical comorbidities.

Minimum duration of stay was 8 days and maximum duration was 15 days. Mean incision length in hemireplacement arthroplasty was big (10.92cm) and so resulting blood loss was high(320ml) and in all the patients blood transfusion was required (1 bag per patient). Majority of them were AO/OTA type 31A2.2, which is a highly comminuted type of fracture, seen in elderly patients because of osteoporosis. Average Operating time was high (101 min) that means longer duration of anesthesia and resulting complex surgery.

There is no significant limb length reduction in hemireplacement (mean 0.5cm shortening). Not a single case reported limb lengthening. One case got infected and implant had to be removed and has limb shortening of 3 cm.

Ambulation was started on 2nd or 3rd post-op day after hemireplacement. Majority patients started walking without

support on 60th day. Evaluation of postoperative functional status of all patients at the 1, 3, and 6 months interval with Harris hip scoring system showed following results (Table 1); which implies that those patients who had hemireplacement had a good activity of daily living.

At final follow-up visit, a clinical-radiological examination was done and the patient was evaluated using the Harris hip score (HHS) and the scores were graded as <70 poor, 70-79 Fair, 80-89 Good and 90-100 Excellent. Scores above 80 were considered as satisfactory outcomes and those below 80 were considered unsatisfactory. Functional outcomes were considered satisfactory in 22 out of 25 patients (6 excellent, 16 good), whereas 1 patient had unsatisfactory outcomes and 2 patients died.

There were 2 early postoperative complications in hemireplacement group which included 2 superficial infections which got treated by long term antibiotic therapy according to sensitivity. Out of 25 patients, 2 patients died because of medical comorbidities, not related to surgery. 1 patient presented with deep seated infection with discharging sinus at 1 month follow up visit and had to undergo debridement surgery and prolonged antibiotic therapy; upon failure to control infection removal of the prosthesis was done and yet another debridement surgery was done. This patient had 3 cm shortening after all the procedures and is the only patient with poor harris hip score at 6 month follow up.

Discussion

The management of unstable osteoporotic intertrochantric fractures in elderly is demanding because of difficult anatomical reduction, poor bone quality, and sometimes a need to protect the fracture from stresses of weight bearing. Internal fixation in these cases commonly involves prolonged bed rest or limited ambulation, to prevent implant failure due to osteoporosis. This might result in increased chances of complications like pulmonary embolism, deep vein thrombosis, pneumonia, and decubitus ulcer. High failure rates have been noted in these situations [1]. On the other hand, using Hemireplacement, patients are ambulated immediately, they are encouraged to walk, move and exercise the involved limb and limit bed rest.

Hemiarthroplasties can avoid many of the problems associated with internal fixation [2]. Tronzo pioneered the use of prostheses for the primary treatment

of comminuted intertrochanteric fractures [3]. In our study average duration of surgery was 101 min and average blood loss was 320 ml. Sancheti *et al* had an average duration of surgery of 71 minutes and average blood loss of 350 ml in his study which included only the patients of hemireplacement [4]. Kayali *et al* found no significant difference in operating time, blood loss and transfusion requirements in his study [5].

Time to postoperative ambulation with walker in our study was 8.29 days which was 4.2 days in the study of K H Sancheti [4]. In the study of Shin Yoon Kim [6], the difference between walking time with our was not significant. Allowing early ambulation in hemireplacement greatly improves the rehabilitation, functional outcome, activities of daily living and quality of life in patients, significantly reducing the morbidity of recumbency. Lack of coincidence with the other studies may be due to the fact that we did not allow early walking in the patients operated for the fear of early fall and dislocation.

Harris hip score was evaluated at 1, 3 and 6 months. There was 6 excellent, 16 good, and 1 poor results. Mean Harris hip score of Sancheti *et al* was 84.8 [4], which coincides with the functional outcome of our study. In a study by Kadam R; 21 out of 22 had excellent to fair outcomes with primary cemented bipolar hemiarthroplasty [7].

There were 2 (8%) immediate postoperative complications in hemireplacement group. Both patients developed superficial infection which was treated with injectable antibiotics. The immediate postoperative complications in the study of Shin yoon kim were 1 dislocation, 1 deep vein thrombosis, 1 foot drop, and 1 superficial infection, with a complication rate of 13.79% [6]. The dislocation rate in Shin yoon kim *et al* was 7.6%. There were no dislocation or periprosthetic fractures in other study. Stem loosening, acetabular erosions and such other complication need a long term follow up which is the limitation of our study. Conflicting reports about postoperative mortality in cases with primary hemiarthroplasty are cited in the literature. In our study, mortality rate was 8%.



Fig 1: Surgical technique of hemiarthroplasty; 1a: skin incision and superficial dissection, 1b: sizing of head, 1c: canal preparation and cementing, 1d: method to verify version of prosthesis

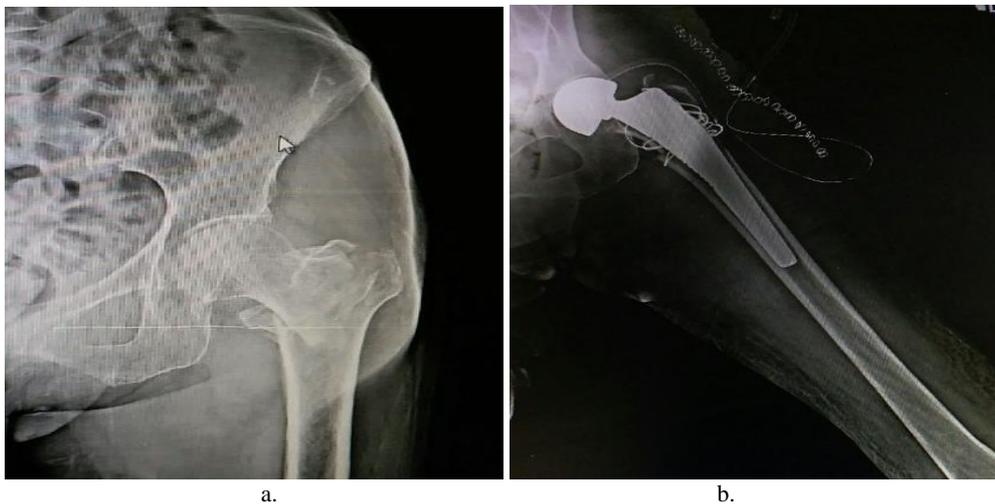


Fig 2: Pre and Post operative radiographs of Hemiarthroplasty in Intertrochanteric fracture; 2a preoperative radiograph, 2b: postoperative radiograph



Fig 3: Early mobilization after hemiarthroplasty in Intertrochanteric femur fractures

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Table 1: Average harris hip score of patients on follow up

Duration Of Follow Up	Average Harris Hip Score
1 Month	62
3 Months	74.7
6 Months	85.35

Conclusion

In our study of 25 patients, 22 had excellent to good outcomes with hemiarthroplasty. Hence Hemiarthroplasty offers good functional outcome and early weight bearing and mobilization.

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