

Outcome Analysis of Primary Cemented Hemiarthroplasty In Intertrochanteric Fractures Of Elderly.

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Abstract:Background: Intertrochanteric fractures are usually treated with internal fixation in young adults. In elderly, management of intertrochanteric fractures is a great problem as there is difficulty in anatomical reduction, osteoporosis, long periods in bed rest and delayed weight bearing. This usually result in high chances of deep vein thrombosis, pulmonary complications, bedsores and death of the patients.**Objective:**The study was to find the effectiveness of cemented bipolar hemiarthroplasty in treating intertrochanteric fractures of elderly, to facilitate early weight bearing, mobilisation and rapid rehabilitation after surgery and to avoid complications of internal fixation in elderly osteoporotic fractures.**Materials And Methods:**In this prospective study, conducted from 2015 to 2017, a total of 20 patients diagnosed with intertrochanteric fractures satisfying the eligibility criteria were included. Inclusion criteria: 1) Age more than 60 years. 2) Femoral intertrochanteric fractures- Evan's stable/unstable type. 3) Patient ambulatory prior to the fracture. 4) No other major injuries in the patient. They were treated with primary cemented hemiarthroplasty. There were eleven males and nine females with a mean age of 69.15 years. **RESULTS:** Functional outcome were assessed according to Harris hip scoring system. There was 25% excellent, 39% good, 30% fair and 6% poor results. Three patients died during this study period. The final mortality rate was 15%.

Keywords: Intertrochanteric, Fractures, Cemented, Hemiarthroplasty, Elderly, Early mobilisation.

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I. Introduction:

The incidence of hip fractures worldwide in 1990 was estimated to be around 1.66 million¹. By the year 2050, the expected incidence will be 6.26 million^[1-4]. This increasing incidence in these fractures is due to the increased life expectancy of the people and osteoporosis^[2].

Intertrochanteric fracture is a frequent problem in elderly patients as they were associated with substantial morbidity and mortality^[5]. They were becoming more common as the proportion of elderly people in the population is increasing^[5-8]. These elderly people usually have other systemic complications such as diabetes and cardiovascular diseases. In general, preservation of the patient's own bones is the ideal aim for the surgeons^[9]. In osteoporotic elderly patients with intertrochanteric fracture this ideal aim will not bring the patient back his prior activity status. Weak purchase of the internal fixation devices due to osteoporosis and comminution of the fracture increases the incidence of failure of internal fixation^[9-10]. The other problems associated with these are malunion, varus collapse and retroversion which results in limping due to shortening and decreased abductor lever arm^[11-12]. The main goals for the treatment of these fractures is, to restore the pre-fracture activity status, to allow early full weight bearing and to avoid possible re-operation^[13].

II. Materials And Methods:

This study was conducted in Government Thanjavur Medical College Hospital from 2015 to 2017. The objectives of the study are to find the effectiveness of cemented bipolar hemiarthroplasty in treatment of intertrochanteric fractures of elderly, and to facilitate early weight bearing, mobilisation and rapid rehabilitation after surgery.

Elderly patients with intertrochanteric fractures of femur were selected and treated with primary bipolar cemented hemiarthroplasty. Most (15) of these cases resulted from trivial fall. Few (4) had history of vehicular accident. The cases presented with swelling and pain of the hip and inability to walk. The inclusion and exclusion criteria are as follows(table:1).

Table:1

Inclusion Criteria:

1. Age : more than 60 years.
2. Femoral Inter-trochanteric fracture.
3. Evan 's Stable / Unstable fracture.
4. Patient ambulatory prior to the fracture.
5. No other major injuries in the patient.

Exclusion Criteria:

1. Age less than 60 years.
2. Open fractures.
3. Associated major trauma in the lower extremity.
4. Patients who were not independently walking before fracture.

The patients fitting into this criteria were included in the study. Clinical diagnosis of intertrochanteric femur fracture was done with shortening , external rotation of injured limb and history of inability to get up after the fall.

Emergency treatment done for adequate pain relief. Injured limb is immobilised in Thomas splint. Antero posterior radiograph of pelvis with both hips and lateral view of the injured hip were taken. Chest radiograph were also taken at the same time. Injured limb was immobilised in skin or pin traction. If the case will be assessed early, skin traction is applied. If late, then skin traction is converted to pin traction. Preoperative blood investigations including Hb%, blood sugar, renal function test, bleeding time, clotting time and liver function test were done.

These patients had cardiological, thoracic ,nephrology and anaesthetic evaluation. All these cases had age related risks of anaesthesia. All patients are operated under spinal anaesthesia. Prophylactic antibiotics given. Adductor tenotomy was done in all cases (figure-1). The patient was operated in true lateral position with injured limb kept on the upper aspect. We used posterior Moore's approach for all the patients. An incision was started 5 cm distal and lateral to the postero-inferior iliac spine and proceeded towards greater trochanter and then along the line of shaft of the femur (figure-2).

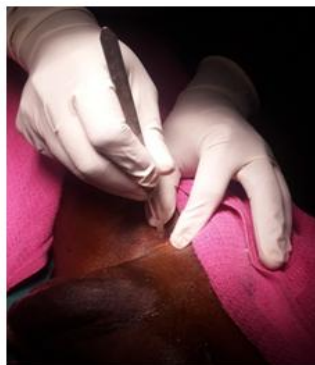


Figure-1: Adductor Tenotomy



Figure-2: Skin Incision

The fascia lata was incised in line with the skin incision and centered over greater trochanter and it is divided (figure-3). The gluteus maximus was divided along its fibres and retracted with Charnley's self retaining retractor exposing the origin of short external rotators.

Tendons of short lateral rotators were cut 1cm from the greater trochanter (figure-4) and were retracted medially protecting the Sciatic nerve in the process. The limb was gradually internally rotated (figure-25) and with application of the cautery, the proximal fragment was exposed. The reconstruction of proximal femur depends upon the type of the fracture. The distal fragment with proximal shaft of femur was retracted exposing the fracture surface. The myoma screw was inserted through the fracture surface into the neck and head of the femur , soft tissues were erased around the neck , and the head was removed using a lever (figure-5). The size of the head was measured using gauges.

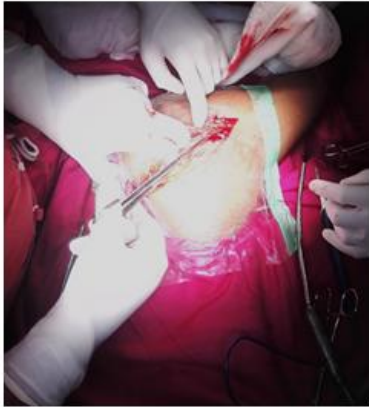


Figure-3: Incision over fascia lata

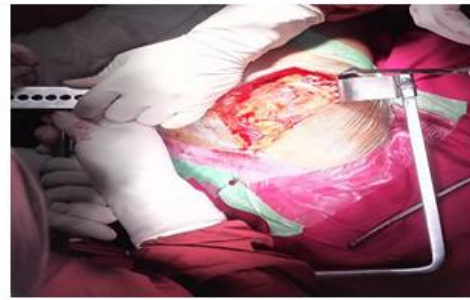


Figure-4: Application of Charnley's Retractor

A bipolar hemi-arthroplasty prosthesis of one size smaller was selected. Initial reaming of the proximal femur was done using regular intramedullary nail reamer and then using broach . The rasp was kept perpendicular to the flexed leg of the same side, to keep the prosthesis in appropriate anteversion.

Trial seating of prosthesis was done. The length of prosthesis was assessed by the relative position of the head of the prosthesis after trial seating into the medullary canal of the femoral shaft. The fragments were allowed to fall in place and relative position of the tip of the greater trochanter and the centre of the prosthesis head is measured (figure-6). The ideal length the amount of the stem of the prosthesis that should go inside the femoral shaft was measured and determined before cementing.



Figure-5: Delivery of femoral head



Figure-6: Height of prosthesis measurement

The bone cement was pushed using first generation cementing technique (figure-7). The already selected bipolar hemi arthroplasty prosthesis was inserted up to the level determined earlier (figure-8). The excess cement from the free surface around the prosthesis was removed with curette, when the cement was still semisolid. After the cement had set, the comminuted fragments of greater trochanter were allowed to fall back on to the fracture site and these were tied together with the shaft using stainless steel wires. The short external rotators were sutured back to the greater trochanter and then the superficial layers were closed with drain kept in-situ after achieving complete hemostasis.



Figure-7: Cementing technique



Figure-8: Prosthesis Insertion

All patients were given intravenous antibiotics for 5 days. Deep vein thrombosis prophylaxis with Low molecular weight heparin was started in all patients 24 hours after the surgery. The limb was kept in abduction with a pillow in between. Routine post operative physiotherapy like static exercises in bed for hamstrings and quadriceps with ankle pump exercises were started in first post operative day. Drain was removed when there was no more collection. All patients were made to weight bear with walker support and knee braces on the second post operative day. Post operative radiological evaluation was done using antero posterior radiographs of the both hips. Post operative dressings were done on 2nd, 5th and 8th days. Suture removal done on 14th post operative day and patients were discharged. Postoperative clinical assessment were done using Harris hip score.

Case illustration:

A 70 years old lady Mrs.SB, a known asthmatic presented with the history of accidental fall on 17.10.15 at her residence. She sustained left intertrochanteric fracture femur with swelling and tenderness over the proximal thigh. There was shortening and external rotation of the injured limb. Radiological evaluation was done and was diagnosed as Evan's Stable type and Boyd and Griffin type 2 (figure-10). She was immobilised in derotation boot (figure-9). Cardiologist, pulmonologist, nephrologist and anaesthetist assessment were done.



Fig:9



Fig:10



Fig:11



Fig:12



Fig:13

She was operated on 17.11.15. The time interval between injury and date of surgery was one month. She was operated under spinal anaesthesia. 39mm size bipolar prosthesis was used (figure-11).

Post operative antibiotics were continued for 5 days. Low molecular weight heparin was started on first postoperative day. Static glutei, hamstrings, quadriceps and ankle pump exercises were started on first postoperative day. Antero posterior radiograph of pelvis with both hips were taken(figure-12). The patient was started to weight bear on second postoperative day(fig-13).

III. Results:

The details of all cases are preceded in the master chart. All 20 patients included in this study were ambulant before the injury. The average age was around 69.15 years ranging from 60 to 75 years. 16 patients had associated medical comorbidities (hypertension – 9, diabetes – 6, bronchial asthma – 1). One patient had restrictive lung disease with bilateral fibro-thorax. One patient was HBsAg positive. They were operated within an average of 21.5 days. The delay was mainly to get anaesthetic fitness for surgery. The average surgery duration was 95 minutes (range 80 to 110 minutes). The average intra operative blood loss measured about 290ml. One patient had intraoperative iatrogenic fracture. 14 patients had one unit of blood transfusion intra or post operatively. Two patients had bedsore pre operatively which healed after ambulation and antibiotics. All 20 patients walked on the second postoperative day with walker support. There were four cases of superficial infection which was successfully treated with antibiotics. All cases were ambulant when discharged. The minimum follow up period is three months and the maximum follow up is one and half years.

The functional outcome of the patient were assessed by Harris Hip score and the score was interpreted as follows

1. <70 - Poor
2. 70 – 79 – Fair
3. 80 – 89 – Good
4. 90 – 100 – Excellent

Five patients had excellent results, nine had good outcomes, five cases had fair results and one patient had poor results. Three patients died in their follow up period while one patient died due to myocardial infarction, the cause of death in other two cases were unknown. The final mortality rate in this study is about 15%. Nine cases were independently ambulant in their latest follow up. Seven patients had limp and they were walking with sticks. There were no significant thigh pain, no gross limb length discrepancy and no dislocation reported in the follow up.

IV. Discussion :

20 elderly patients with intertrochanteric fractures were treated by primary cemented bipolar hemiarthroplasty. The purpose of this study is to evaluate the functional outcome of the patients treated with bipolar hemiarthroplasty. Proximal femoral fractures accounts for 30% of all hospital admissions. Intertrochanteric fractures represents about 45% of all hip fractures. The people affected were usually above 60 years of age. The incidence of intertrochanteric fractures were found to be increasing day by day as the life expectancy of elderly is on rise¹⁻⁴. In 1923, John Buchwald said “we all come into this world under the brim of the pelvis but quite a few of us will leave through the neck of the femur”. This statement even after 90 years remains true.

Optimal management of these fractures in elderly people remains a challenge. Internal fixation devices like cephalo-medullary nails and sliding hip screws were used in the treatment of intertrochanteric fractures. These fixation devices were associated with screw cut-out, plate pullout, excessive sliding leading to shortening and implant breakage. The major concerns in internal fixation in this age group were osteoporosis and comminution associated with the fracture. After fixation in these osteoporotic bones, early active mobilization and full weight bearing were delayed in order to prevent the secondary displacement of the fracture fixation. Most elderly patients have difficulty in following partial weight bearing protocol, hence early active mobilization and walking rehabilitation were postponed until there is bony consolidation in radiographs. Obviously complete fracture union in elderly patients after fixation usually takes three to five months.

The problems reported as associated with internal fixation were non anatomic reductions requiring revision surgery, prolonged bed rest, protected weight bearing, secondary loss of reduction due to unstable fixation in osteoporotic bones. The complications associated with prolonged bed rest were DVT, bed sores, pulmonary infections and urinary tract infections¹⁰⁻¹³.

Early postoperative mobilization and full weight bearing are the major factors improving the quality of life and reducing postoperative complications and mean length in the hospital stay. Thus internal fixation devices restricts mobilization in vital period of initial weeks.

Coxo-femoral bypass or prosthetic replacement of the proximal femur as proposed by N.S.Laud is a practicable alternative, as it provides adequate stability and allows early mobilization and full weight bearing in the immediate post operative period, thus decreasing the complications of prolonged bed rest.

The stability of fracture, quality of the bone and early mobilization determines the success in the treatment of the intertrochanteric fractures. Thus the major obstacle of non-weight bearing as in internal fixation devices was avoided in hemiarthroplasty and this in turn reflects on the final outcome of the treatment.

In a series of 20 patients, we had good results with immediate weight bearing in 19 cases except for one case of iatrogenic fracture. This avoids the room atmosphere and the patient can walk in the corridor of the hospital as soon as the surgery is over and he recovers from the anaesthesia.

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