Intertrochantric femur fracture in elderly treated with bipolar vs dhs - a prospective study

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Abstract: Background: Intertrochantric femur(IT) fracture is a common fracture in old age. The cause of morbidity and mortality in IT femur is malunions, nonunions, respiratory tract infection and bed sores etc. treatment modality like DHS is time tested but with availability of better hemiarthroplasty techniques and implant mortality and morbidity can be reduced. We aimed at evaluating the advantages and disadvantages of hemiarthroplasty over dynamic hip screw for management of IT fracture femur.

Methods: 60 yrs and above patients who were admitted and operated between feb 2010 to feb 2012 and had fulfilled the inclusion criteria were enrolled for this study.Case selection was random. Bipolar Hemiarthroplasty:Total numbers of patient 16 of mean age of 80.2 yrs and F:M ratio is 9:7. Mean follow up period of 1.1 yrs. DHS: Total numbers of patients 21 of mean age of 70.1 yrs and F:M ratio of 6:15.mean follow up period of 1.2 yrs. Harris Hip Scoring System assessed post operatively.

Results: Bipolar group:1 had superficial wound infection, no one had deep infection or pulmonary infection.1 had bed sore . After 6 months fair result in 2 patients, good result in 4 patients and excellent result in 10 patients. Eventually all had good to excellent result after 1 yr. DHS Group :3 had bed sore,.1 had lacunar infract.1 was admitted for physiotherapy at 6th month for gait training and muscle strengthening.1 had palpable implant and pain in hip, implant removal was done after 1 yr,. After 6 months,2 had poor results, 2 had fair results,13 had good results and 2 had excellent result at the end of 1 yr patient who follow up all had good to excellent results.

Conclusion: Functional recovery was delayed with internal fixation group. Early post operative harris hip score were good in patients treated with hemiarthroplasty as compared to internal fixation group but at the end of 1 year score was comparable.Post operative complications were more internal fixation group than hemiarthroplasty group and were comparable with other studies.

Thus in conclusion, primary hemiarthroplasty does provide a stable, pain-free, and mobile joint with acceptable complication rate as seen in our study; however a larger prospective randomised study comparing the use of dynamic hip screw devices against primary hemiarthroplasty for unstable intertrochantric fractures will be needed.

Keywords: IT fracture in elderly, bipolar hemiarthroplasty, DHS, successful, decrease morbidity .

Thesis question : How can mortality and morbidity in elderly patient having IT femur fracture can be reduced?

Thesis answer : The use of bipolar hemiarthroplasty meticulously can reduce the morbidity and mortality in elderly.

THESIS SUMMARY

Introduction

There were an estimated 1.66 million hip fractures worldwide in 1990. Intertrochanteric fractures are common problem in the elderly population and are associated With high rate of morbidity and mortality. Increased rate of these fractures is due to increased life expectancy of the people and due to increased incidence of osteoporosis in the old age. Before the advent of the term osteoporosis sir Astley cooper wrote "that regular decay of nature which are easily detected in the dead body and one of the principal of these is found in the bones, for they become thin in their shell and spongy in their texture." This osteoporosis is the main feature leading to this fracture. Usually people affected are between 60 and 80 years of age. John Buchwald in 1923 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. 90% of the intertrochanteric fractures in the elderly result from a simple fall.

Some of the factors found to be associated with a patient include-

•Advancing age, Increased number of comorbidities, Increased dependency in activities of daily living, A history of other osteoporosis related ("fragility") fracture. In the early days these fractures was treated with conservative treatment in traction or non - rotating boot for 6-8 weeks as fracture surface is large and the wide area of bone involved is cancellous. But there are certain complications of conservative treatment including hazards of immobilization, External rotation deformity, Varus deformity, Shortening. This led to the era of internal fixation of inter-trochanteric fracture. It is now accepted that internal fixation is the best method because it allows early mobilization and prevention of complications due to prolonged immobilization Osteoporosis and instability are one of the most important factors leading to unsatisfactory results Treatment with primary bipolar hemiarthroplasty rather than internal fixation could perhaps return these patients to the pre-injury level of activity more quickly thus obviating the postoperative complications caused by immobilization or failure of the implants6. I am doing the study of cases of intertrochanteric fracture managed with hemi-arthoplasty or internal fixation using dynamic hip screw as routinely DHS is used in our institute and it is already established modality of treatment for intertrochantric femur fractures and compare the results. , the role of the intramedullary devices in unstable osteoporotic and severely comminuted intertrochanteric fractures is still to be defined.

Aims and Ojectives

l)To study results of internal fixation in unstable intertrochanteric fracture.

2)To study results of hemiarthroplasty in unstable intertrochanteric fracture.

3)To compare the results of internal fixation and hemiarthroplasty in unstable intertrochanteric fracture.

4)To study complications of internal fixation and hemiarthroplasty in unstable intertrochanteric fracture.

Methods

STUDY AREA:

The present study was conducted at kharshetji behiramji municipal general hospital,bandra,Mumbai-400050,which is the secondary care multispeciality hospital under municipal corporation of greater Mumbai and affiliated to King Edward Memorial hospital,parel,Mumbai. It caters to suburban population of metropolitan area of Mumbai covering 4 sub-urban with total population of around 5-10 lakhs.these sub-urban areas are Santacruz,Khar road,Bandra and Mahim.

Study population: All male and female patients aged at least 60 yrs and above with type 3,type 4 evans intertrochantric fracture femur

Sample size: 60 yrs and above patients who were admitted and operated between feb 2010 to feb 2012 and had fulfilled the inclusion criteria were enrolled for this study.

Type of study : Prospective cum Retrospective, comparative study.

Inclusion Criteria – 1. Age of patient at least 60 yrs and older. 2.Femoral intertrochanteric fracture confirmed on antero-posterior and lateral hip radiographs. 3. Should be unstable fracture (Evans type 3, 4, 5). Reverse oblique type 4. Patient ambulatory prior to fracture, though they may have used an aid like a cane or a walker. 5. No other major trauma in patient.

Exclusion Criteria - 1. Age less than 60 yrs 2. Associated major injuries of lower extremity. 3 Any infection around the affected hip (soft tissue or bone). 4 Stable fracture (Evans type 1, 2).

The patients fitting into the criteria were included in the study.

Clinical diagnosis of unstable intertrochanteric fracture was done with external rotation, shortening, and history of inability to get up after fall. Emergency treatment in form of analgesics is given. Antero-posterior x-ray of pelvis with both hips with opposite hip in maximum internal rotation and lateral view of the injured joint taken and 100mm scale views of the injured side taken for head size templating. Chest x-ray taken at the same time. Injured limb is kept in a Thomas' splint with skin traction with adequate splintage to correct flexion deformity if any and to prevent overriding whenever present. Preoperative routine blood and urine investigations done.

Operative protocol:

Pre-operative templating done before surgery for identification of size of prosthesis. Anesthesia: Spinal + Epidural

Antibiotics Protocol: 1 dose of Inj. Cefuroxime axetil 1.5 gm + Inj. Amikacin 500mg on previous night and same dose repeated just before starting surgery. lnj. Cefuroxime axetil 750 mg IV 8 hrly +Inj. Amikacin 500mg IV 12 hrly for 5 days and Oral 2"" generation cephalosporin for 8 days. Position: lateral or fracture table. Preparation: With betadine scrub, saline, betadine solution, spirit and sterilium. Later draped using stockinet and sterile disposable adhesive drapes to minimize contamination from surrounding skin. Approach: Postero-lateral for hemiarthroplasty and lateral for dynamic hip screw closure in layers over negative suction drains.

Postoperative protocol: In well equipped intensive care room pre-fumigated with attendant inside for partial hip replacement or medically unstable patient and foot end elevation for one day. DVT prophylaxis given only if patient is high risk. High Risk for DVT:divided into procedure specific and patient specific

Procedure > 1hour,Prolonged Immobility, Major Surgery (abdomen, pelvis procedures). Increasing age ,stroke,paralysis,

previous VTE, cancer, obesity, varicose veins, cardiac dysfunction. Indwelling central venous catheters, inflammatory bowel disease, nephrotic syndrome, estrogen use. For surgical patients, the incidence of DVT is affected by the preexisting factors listed above and by factors relating to the procedure itself, including the site, technique, and duration of the procedure, the type of anesthetic, the presence of infection, and the degree of postoperative immobilization (Geerts, Heit, Clagett, Pineo, Colwell, Anderson, & Wheeler, 2001). Post-operative antero-posterior x-ray of operated hemiarthroplasty and antero posterior and lateral for DHS. Post-operative hemogram and Serum Electrolytes done immediate postoperative and 24 hrs post operative static exercises in bed for glutei, hamstrings and quadriceps with regular ankle pump exercises started if pain permits. Drain removal after 48 hrs. Sitting started on 2nd day with quadriceps exercises in bed. Non weight bearing walking on operated side after 2 days. ROM exercises actively after 5 days. Partial weight bearing started in hemiarthroplasty when pain permits. In internal fixation group, partial weight bearing started depending on stability of fixation. Postoperative dressings done on 2"", 5"" and 8"" day. Suture removal done on or after 14 days. Patient discharged after rehabilitation. Prior to discharge check done for late clinical sepsis and Deep Venous Thrombosis.

Follow up: 6 wks, 3 months, 6 months, 1 year, 1 '/2 years.
Systemic grading of patients: Harris Hip Scoring System: formulated by W.H.Harris .It incorporates all important variables into single reliable figure, which is both reproducible and reasonably objective.
Statistical analysis: Data were reported as mean, standard deviation (SD), median (range) or number (percentage). T-test was used to assess significant difference among all numerical parameters of the study within the two surgical groups. Whereas, Chi square test was used for statistical analysis among all studied categorical variables such as gender, pre-morbid conditions and postoperative complications. P–values < 0.05 were considered statistically significant.

Observation and Results

There were no significant differences between the 2 groups in terms of demographic data (age, sex), fracture type, hospital stay, operating time, metabolic diseases and associated diseases. Full weight bearing started significantly earlier in patient who fixation had more early complication than those with hemiarthroplasty mean follow up period for internal fixation is 1.2 years. Patient who underwent internal fixation had more early complication than those with hemiarthroplasty.
osteoporosis evaluation was not done by tests like dexa scan et. only x rays were done and as patients where selected randomly no uniformity of osteoporosis was noted in select group
Hemiarthroplasty (BIPOLAR group): Total numbers of patient in this group are 16 of mean age of 80.2 yrs and female to male ratio is 9:7. Mean follow up period of 1.1 yrs. Of total 16 patients, 7 are type 3 fractures, 7 are type 4 fractures, 1 Of type 5 and l of type reverse oblique. Mechanism of injury in this group was mainly trivial trauma in the form of slip and fall, only one patient had road traffic accident. All were ambulatory pre-fall either community or household. Average trauma admission time was 2.2 days with average stay of 15.53 days in hospital. All were operated with cemented prosthesis bipolar prosthesis. Complete wt bearing was started after average period of 7.46 days. 1 patient had superficial wound infection which was treated with meticulous wound care and antibiotics no patient had deep infection or pulmonary infection.1 had bed sore which was treated with air bad and wound dressing. 1 patient had post-operative constipation and abdominal distention (known operated case of carcinoma stomach) GI scopy was done and treated accordingly, this increased stay in hospital. After 6 months of follow up fair result in 2 patients, good result in 4 patients and excellent result in 10 patients. Eventually all had good to excellent result after 1 yr. There was no dislocation, acetabular protrusion or aseptic loosening of the stem.
Internal fixation(DHS GROUP) : Total numbers of patients in the group are 21 of mean age of 70.1 yrs and female to male ratio of 6:15.mean follow up period of 1.2 yrs of total 21 pts,10 are of type 3,8 are of type 4 and 3 are of type 5.mechanism of injury in this group was also trivial trauma in the form of slip and fall,3 had road traffic accident and had fall from height all patients were ambulatory pre fall except 1 who had hemiplegia on same side. average trauma admission time was 3.57 days and inpatient duration was 14.95 days all fractures were fixed using DHS in this group bone wires, k wires and screws were used to provide additional stability in some fractures.complete weight bearing was started after average period of 10.3 wks.3 patients had bed sore,treated with air bed and wound dressing.1 had lacunar infract in lentiform nucleus and rt frontal area postoperatively, and was treated accordingly.1 patient was admitted for physiotherapy at 6th month for gait training and muscle strengthening.1 had palpable implant and pain in hip, implant removal was done after 1 yr, fracture was united after collapse, no patient had deep infection. After 6 months of follow up,2 had poor results, 2 had fair results,13 had good results and 2 had excellent result at the end of 1 yr patient who follow up all had good to excellent results no implant cut out was seen, and no revision surgery was required.

Discussion

Surgical outcome in elderly patient is unsatisfactory with associated co morbid conditions like medical illness, osteoporosis and fracture instability. Elderly patients, even if they are in good general health cannot be mobilized without some weight being borne on the involved limb. Early mobilization may decrease the risk of mortality and morbidity. In patients with osteoporotic fractures, and major comminution, maintenance of reduction can be a major problem, so many surgeons recommend hip to be protected throughout the healing period5 '9 2° 2'. To reduce the healing time, dynamic devices are replaced with the static ones. Dynamic implants have more weight bearing capacity than static implants. Partial weight bearing creates a micro movement in dynamic system which increases union rate. The weak and porotic bone tolerates screws poorly so cut out is the major problem in internal fixation. Central position of the screw in the femoral neck is the recommendable position". Use of intemal fixation has decreased the mortality rate but rate of complications are high

bearing, many surgeons prefer arthroplasty for the treatment of unstable intertrochanteric fractures. The patient's rapid return to the prefacture level of activity has essentially prevented post-operative complications such as bed sores, pulmonary infections and atelectasis.

Stern and Angerman" reported 94% good and excellent results afier mean follow up period of 8 months with 1% cases of pneumonia and 3 % cases of deep infection. Haentj ens et al 28 compared results of bipolar arthroplasty and intemal fixation and reported 75% satisfactory results with less post operative complications in arthroplasty group.

Rosenfeld et al 29 reported 86% of satisfactory results in early period using arthroplasty.

failure rates of as high as 56% have been noted in association with unstable fractures, comminution, suboptimal fracture fixation, or poor bone quality treated by DHS in elderly patients.

No differences in postoperative mortality in two groups.

The Cochrane database analysis of relevant studies concluded that there is insufficient evidence to prove that primary arthroplasty has any advantage over internal fixation.However, they also mentioned that there were only two randomized trials studied and both had methodological limitations, including an inadequate assessment of the longer term outcome.

Harwin et al. reported on fifty-eight elderly patients with osteoporosis in whom a comminuted intertrochanteric femoral fracture had been treated with a bipolar Bateman-Leinbach prosthesis and who were followed for an average of twenty-eight months. The average patient age was seventy-eight years, and 91% walked prior to discharge. Two patients had a nonunion of the greater trochanter. There were no deep infections, dislocations, acetabular erosions, or cases of stem loosening.

Broos et al. reported on ninety-four elderly patients treated with a bipolar Vandeputte prosthesis. They found that the average operating time was shorter, the mortality rate was lower, and the functional results were better in the group treated with the bipolar hemiarthroplasty than in groups treated with Ender nailing, an angled blade-plate, or a dynamic hip screw.

Recently, Rodop et al. reported on fifty-four elderly patients who had been treated with a bipolar Leinbach hemiprosthesis (Protek; Sulzer Orthopedics, Baar, Switzerland). A good to excellent result, as assessed with the Harris hip-scoring system, was reported in 80% of the patients. There were no dislocations or cases of stem loosening.

In the current study, 86.6% patient had excellent to good results after follow up period of 1 yrs.

In patients with intemal fixation, advised to put minimal weight on the affected limb.

Despite the advice patient bear more weight. It is difficult to teach them to bear weight only on normal limb.

The most serious complication in arthroplasty is deep infection, rate reported to range from 0 to 3% 27 3° 3 ' . In the current study rate of deep infection is 0% in arthroplasty.

It should be remembered that even in the conventional total hip replacement, the rate of deep infection is higher in patients who have a previous operation on the hip".

In the current study, rate of postoperative complications are higher in internal fixation as compared to arthroplasty, full weight bearing was delayed in internal fixation. No dislocation was seen in this study. 0 to 7 % dislocations were seen in other studies 27 3°. The rate of dislocation is aggravated by improper prosthesis length, larger the femoral component greater the tendency to dislocate.

Conclusion

1.Patients treated with internal fixation started full weight bearing (avg.10.3 wks) late as compared to hemiarthroplasty (avg. 7.46 days), hence the functional recovery was delayed with internal fixation group.

2.Early post operative harris hip score were good in patients treated with hemiarthroplasty as compared to internal fixation group but at the end of 1 year score was comparable.

3.Post operative complications were more internal fixation group than hemiarthroplasty group and were comparable with other studies.

4.Most of the fractures occure above 50 years were due to trivial trauma. As age advances there is weakning of bones due to osteoporosis and decreased mineralization and deterioration of general condition due to which cancellous bones are prone to fracture with trivial trauma.

5.It is a always advisable since elderly patients with multiple medical problems are prone for hazards of immobilization.

6.Small sample size is one of the limitations of our study. Further, inhomogeneous population in terms of existing co-morbidity is the other limitations.

7.Thus in conclusion, primary hemiarthroplasty does provide a stable, pain-free, and mobile joint with acceptable complication rate as seen in our study; however a larger prospective randomised study comparing the use of dynamic hip screw devices against primary hemiarthroplasty for unstable intertrochantric fractures will be needed.

Clinical Message

Although the clinical outcomes were comparable at the end of one year in both groups,arthroplasty patient had lower post-operative complications like bed sores,,pulmonary infection and atelectasis..Major difference was in the duration after which full weight bearing was started,which was significantly early in arthroplasty group.in the end we conclude that hemiarthroplasty is a better option in patients with unstable intertrochanteric fractures.

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