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COMPARATIVE ANALYSIS OF OPERATIVE TREATMENT OF SUBTROCHANTERIC FEMUR FRACTURES TREATED WITH LONG PFN, ANGLE BLADE PLATE AND DHS

Orthopedics

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ABSTRACT

INTRODUCTION: This study was conducted to evaluate the outcome of operative treatment of subtrochanteric femur fracture and comparative analysis of clinical outcome of fixation with three different implants.

METHOD: This study was conducted at tertiary care hospital from August 2015 to June 2017. Patients with subtrochanteric femur feacture were treated with three implants ABP, DHS, Long PFN, 25 patients were selected randomly for each of these implants. Fracture was classified according to Seinsheimer's classification, there were 12 type1, 23 type2, 19 type4 and 21 type5 fractures. For operative procedure fracture table was used , in case of ABP/DHS- 1st fracture was converted into two piece if comminution was present and guide wire was inserted opposite to level of Lesser trochanter, screw was kept within 2cm of subchondral bone. For Long PFN 1st reduction was done and then entry was made through modified medial portal and reduction was maintained till proximal and distal locking. Minimum follow up was 12 months.

RESULTS: Average surgery time was 60 minutes for PFN and 90 Minutes for ABP/DHS. Average healing time was 16 weeks. Results based on Harris hip score: 92% were excellent and good for ABP and 96% for DHS and PFN. One case of screw cut out was there with DHS and one case of breakage of implant with ABP.

CONCLUSION: Operative treatment should be done in fracture of subtrochanteric femur fracture though we did not found any difference in clinical outcome and fracture union among ABP, DHS and Long PFN but more quantitative and long follow up studies are needed.

KEYWORDS

ABP, DHS, Long PFN, Subtrochanteric fracture, Harris hip score.

INTRODUCTION

Subtrochanteric fractures deserve special consideration because of the difficulties in their management and reported significant rates of complications with their surgical treatment.

The difficulties encountered in the treatment of subtrochanteric fractures are related to the anatomic and biomechanical features unique to this area. Anatomically the subtrochanteric area consists of mostly cortical bone[1], which often is comminuted and tends to heal more slowly than metaphyseal bone associated with delayed union non-union and implant failure[2-5]. Just proximal, the canal widens in the intertrochanteric area, which leads to less optimal fixation with intramedullary devices because of the wide canal and short segment proximally. Biomechanically the subtrochanteric area is an area of high stress concentration, and the muscle attachments lead to strong deforming forces that can make fractures reduction difficult[6,7]. Conservative management almost always needs prolonged bed rest associated with recumbency[8,9] related complications and also fracture reduction cannot be maintained,so surgical management is preferred[10]. In this retrospective study weanalysed 75 cases of subtrochanteric femur fractures treated by long PFN, DHS and Angle blade plateto compare multiple available options for treatment of these fractures &To draw any therapeutic or prognostic significance

MATERIAL AND METHODS

The study was conducted at tertiary care centre from August 2015 to June 2017. Seventy five of subtrochanteric femur fractures were separated & classified by Seinsheimer's classification. Clinical records of these patients were reviewed retrospectively by obtaining their bed tickets from the record room and by contacting the patients personally.

Patients excluded from this study were with:Unsuitable skin conditions- wound infection, bed sores, Poor anaesthetic risk, Fracture was thought to be too comminuted for a stable fixation & and patients with associated lower limb injuries, severe chest and head injuries.

All patients in study were studied with detailed history, Name, Age, Sex, Mode of injury, associated injuries, X-rays taken were AP view of pelvis with both hips in 15º internal rotation, AP and Lateral views of affected hip along with upper 2/3rd of thigh.These were studied to evaluate the type of fracture (its classification by Seinsheimer's type) and to determine the degree of comminution and the involvement of piriformis fossa. There were 61 males and 14 female patients. There was 12 cases type II, 23 Type III, 19 type IV and 21 type V. Three types of implants were used 1)Long PFN 2)DHS 3)Angled blade plate and 25 pt's were randomly selected for each implant.

SURGICAL TECHNIQUE

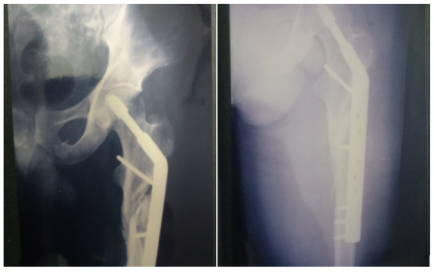
After spinal anaesthesia: patients were taken on fracture table in supine position for every patient with opposite leg in slide hyperextension and same side leg in 15 to degree flexion. Closed reduction was done and checked under C-arm fluoroscopy. For long PFN if fracture was not reduced fracture site was opened and reduction was done using bone holding before making entry. For entry we used modified medial trochanteric portal[11]. After making entry insertion guide wire inserted sequential reaming done, proper size long PFN inserted and proximal locking done, while still maintaining the reduction with holdings static distal locking was done. We did not used cerclage wire around the fracture. FOR DHS/ANGLE BLADE PLATE: Insertion of Guide Wire, was done from a point around 2 cm distal to bony ridge of greater trochanter from which vastus lateralis arises. This point of entry was opposite the level of lesser trochanter.The length was chosen so as to keep the tip of plate/screw to a point within 2 cm of subchondral bone of head. The length of plate was selected so that at least 4 holes extended below the distal most point of the fracture.

In post-operative period prophylactic antibiotics were given for 5 days. Non wt. bearing physiotherapy was started from 2nd post-operative day. Stich removal was done at end of 2 weeks.Patients were then regularly followed up clinically as well as radiographically at six weeks, three months, four months and six months and 12months. Full weight bearing was permitted depending upon radiological and clinical

progress. In all cases, x-rays of the affected hip were taken at regular intervals to note the progress of union. Union was considered when there was bridging callus or obliteration of fracture line in at least 3 of the 4 cortices.

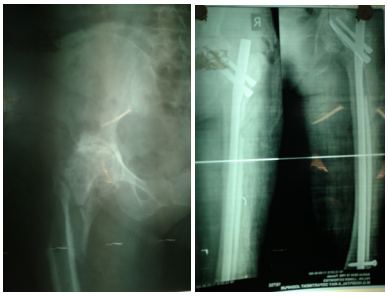
RESULTS

Average age of the patients were 43 year, with most of the patients belonged to 3rd and 4th decades of life. Most common mode of injury was RTA(48%) followed by fall from height. All these cases were followed up atleast for 12 months. Mean duration of hospitalization was 5 days for long PFN, 8 days for DHS and ABP. The average operating time 60 min. for long PFN and 90 min. for DHS/ABP. Type of reduction was anatomical in 30% patients and optimum alignment was achieved in remaining 70% patients.Average time of fracture healing was 16 weeks for long PFN as well as for DHS and ABP.Full weight bearing was started in 16 to 18 weeks and no significant difference was seen among different implants. Blood loss was more in cases treated by DHS/ABP and it was about 300 ml average and one unit blood transfusion was done in all these patients in post-operative period, as compared to average 100ml in long PFN.There was superficial infection in two cases one treated with ABP and other with DHS which cleared subsequently. One case treated with long PFN had malalignment, with abduction and flexion about 10 degrees of proximal part and 1.5cm shortening, healing occured uneventually at fracture site with fair outcome.There was one case of cut out of screw in DHS and There was one case of breakage of ABP. There was shortening of 1.5 cm in two patients treated with DHS and one pt. treated with ABP. In rest of the patients shortening was nil or minimal.



Patient operated with DHS showing immediate post-op x-rays and x-ray at 4 months.

A Case of implant faipure with ABP



Results based on Harris hip score clinical results were excellent in 80% ABP, 76% DHS and 84% PFN. Good in 12% ABP, 20%% DHS and 12% long PFN. Fair in 4% ABP,4% DHS and 4% long PFN and poor in 4%(1case)of ABP.

RESULTS	ABP	DHS	LONG PFN	TOTAL
Excellent	20	19	21	60
Good	3	5	3	11
Fair	1	1	1	3
poor	1	0	0	1

DICUSSION:

Difficulty encountered in treatment of subtrochanteric fractures are related to anatomic and biomechanical features unique to this area. Anatomically it is cortical bone with comminution that tends to heal slowly,and mechanically area of high stress concentration,and muscle attachments lead to strong deforming forces that make fracture reduction difficult. More proximal the fracture more deforming forces acting on it.also in our study this fracture occurred mostly in middle age to old patients, so conservative management is not ideal for these fracturesas it is associated with recumbency related problems like deep vein thrombosis,hypostatic pneumonia,bed sores. Also there is risk of malunion, shortening and rotational deformities[12].

Numerous extramedullary and intramedullary devices are available for treatment of these fractures.If the posterior and medial cortex is intact or reduced anatomically with bone to bone contract, internal fixation devices act as a tension band on the lateral femoral cortex. If this medial buttress is not intact or cannot be reestablished, the internal fixation devices are subjected mainly to bending stresses, and the loads are concentrated in high stress area. This concentration may result in implant failure or loss of fixation[13].

Extramedullary devices are thought to be more associated with implant failure[14] due to more lever arm,more stress on medial cortex also there is associated disadvantage of large incision,more blood loss,Intramedullary devices are now preferred due to short lever arm,less incision,less stress[15] on medial cortex so less risk of varus collapse,intramedullary devices also acts as buttress and prevent medial displacement of distal fragment. Although biomechanically intramedullary devices may be superior there are not enough studies to prove it.

Cooketal[15] in his study had no significant difference in clinical outcomes between extramedullary and intramedullary fixation.The cause of this might be due to that outcome depends on multiple factors and not just the choice of implants,these factors include bone age,communition at fracture site especially postero-medial cortex,type of reduction whether anatomical or optimum,retention of reduction by internal fixation and physiotherapy.

In our study we did not find significant difference in fracture healing and clinical outcome among long PFN, DHS and ABP. For long PFN we opened the fracture site[17] if good reduction is not achievedand maintained the reduction until the insertion of distal screws of PFN.Beingessner[18] in his study treated these fracture with open reduction and intramedullary fixation and acheived good reductionu in 98%patients. Use of encerclage wire is still controversial with some studies supporting cerclage[19,20] for maintainance of reduction while others refuting[17,21]. we did not used encerclage wire around the fracture in our study,though we were able to get good reduction by close reduction or by open reduction before inserting the guide wire.

For DHS/ABP the length of plate was selected so that at least 4 holes extended below distal most point of fracture. First Communated parts were converted to single part by interfragmentry screws, wherever feasible than plate was applied. Though there was shortening of 1-2 cm in three cases treated by DHS and one case of ABP ,this was not associated with poor prognosis. There was no case of implant failure.Wile et al[22] in his study found no implant failures in 25 cases of subtrochanteric fractures. While Parker et al[23] in his study 6 failures out of 74 cases treated with DHS. Mean time of healing in our study was 16weeks while it was 3 months in study by Haberneck et al[24]and was 4.5 months in study by Zu-binZhou et al[25] in 76 cases treated by pfn.

Conclusion& limitations

In our study for subtrochanteric femoral fracrures we found out that operative procedure is good for these fractures and there is no difference in clinical outcome and fracture union among ABP,DHS and long PFN. The limitations of this study are small sample size, relatively short follow up time. A longer follow up and large sample size is needed.

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