ORIGINAL RESEARCH PAPER

Volume-8 | Issue-3 | March-2019 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

A PROSPECTIVE STUDY ON OUTCOME OF CLOSED SUBTROCHANTERIC FRACTURE MANAGEMENT

Orthopaedics

Dr.R. Karthik Raja MS ORTHO Assistant professor of Orthopediacs , Madurai Medical college , Madurai

Dr.d.pathi Arasa Kumar * MS ORTHO Associate professor of Orthopediacs , Madurai Medical college , Madurai
*Corresponding Author

ABSTRACT

Subtrochanteric femur fractures have demanded special consideration in Orthopaedic Traumatology, given the higher rate of complications associated with their management. The purpose of the study is to evaluate the functional outcome of closed subtrochanteric fractures managed surgically in Government Royapettah Hospital/Kilpauk Medical College, Chennai A total of 20 patients were taken up for the study. 10 patients were treated with reconstruction Nail, 10 patients were treated with Dynamic Condylar Screw fixation. Primary bone grafting was done in 4 patients who were treated by open reduction for Seinsheimer type IV and V On follow up patients were assessed by traumatic hip score by Sander's et al.,. Out of 20 cases there were 3 cases (15%) of malunion. One patient in recon nail group and two in DCS group. Many patients have occasional pain. Most of them walk without support. Mostly do their normal activities. Almost all patients have normal muscle power.Nonunion was noted among 3 patients. One in recon nail group and two among DCS group. One failure case in DCS group was due to implant failure secondary to infection for which Implant removal was done and infection control achieved. This study suggests that reconstruction nail is a reliable implant for subtrochanteric fractures, leading to high rate of bone union and minimal soft tissue damage. Intramedullary fixation has biological and biomechanical advantages. Reconstruction nail being a load sharing device, rehabilitation can be started early, DCS fixation being load bearing device may be unstable in fractures with posteromedial communition, delaying rehabilitation.

KEYWORDS

femur fracture, subtrochantric fracture, screw fixation,complications.

1.INTRODUCTION

Fractures of the femur are commonly encountered in Orthopaedic practice. Of all femur fractures, 7% - 34% occur in the subtrochanteric region[1].Subtrochanteric femur fractures have demanded special consideration in Orthopaedic Traumatology, given the higher rate of complications associated with their management. The intense concentration of deforming forces and decreased vascularity of the region have challenged orthopaedicians with problems of malunion, delayed union, nonunion and implant failure.Recently, better understanding of fracture biology, reduction techniques, image intensification and biomechanically improved implants allow for subtrochanteric fractures to be addressed with consistent success.

2.AIM OF THE STUDY

To compare and evaluate the outcome of traumatic Subtrochanteric fractures managed with Dynamic Condylar Screw and Reconstruction Nail

3.MATERIALS AND METHODS

The purpose of the study is to evaluate the functional outcome of closed subtrochanteric fractures managed surgically in Government Royapettah Hospital/Kilpauk Medical College, Chennai A total of 20 patients were taken up for the study.The pre-requisite for the inclusion in the study was a minimum of 6 months follow-up evaluation period. Reduction was considered acceptable when the anatomic configuration of the hip was restored and continuation of the medial cortex was re-established. If neither of these were achieved, the reduction was deemed unacceptable. Union was defined by radiographic criteria consistent with clinical examination or both. The majority of the patients were operated when their general condition was stable, mostly within a week. Few were postponed for their medical problems or associated injuries. Prophylactic antibiotics were given at the time of skin incision.For both DCS and Reconstruction nail we prefer supine position in fracture table. We prefer lateral approach. We prefer bone grafting for severely comminuted fractures. In case of closed nailing no bone graft is needed.

Post operatively hip is mobilized from 4th Post-op day. If there is stable construct i.e., medial cortex continuation is restored, we advised partial weight bearing usually after 6 weeks. Then after bridging callus formation, full weight bearing is started, usually after 12 weeks. Even partial weight bearing is allowed only after bridging callus formation in unstable injuries.

4. RESULTS

In our study we have taken 20 patients with 20 subtrochanteric fractures. 10 patients were treated with reconstruction Nail, 10 patients were treated with Dynamic Condylar Screw fixation. Primary bone grafting was done in 4 patients who were treated by open reduction for Seinsheimer type IV and V On follow up patients were assessed by traumatic hip score by Sander's et al.,. Out of 10 reconstruction nail patients:

Excellent - 1 (10%)
Good - 8 (30%)
Poor - 1 (10%)

Out of 10 DCS operated patients:

Excellent - 2(40%)
Good - 6 (40%)
Poor - 1 (10%)
Failure - 1(10%)

Out of 20 cases there were 3 cases (15%) of malunion. One patient in recon nail group and two in DCS group. Many patients have occasional pain. Most of them walk without support. Mostly do their normal activities. Almost all patients have normal muscle power.Nonunion was noted among 3 patients. One in recon nail group and two among DCS group. One failure case in DCS group was due to implant failure secondary to infection for which Implant removal was done and infection control achieved.

4.DISCUSSION

Subtrochanteric fractures are one of the challenging fractures to treat because it is subjected to high compressive force medially, high tensile forces laterally and enormous amount of bending forces.

The problems in subtrochanteric fractures are:

a) Anatomically the area consists of hard cortical bone with different healing characteristics than metaphyseal bone.
b) Due to high velocity injury, this bone is frequently comminuted.
c) Biomechanically proximal part of the femoral shaft is an area of high stress concentration.
d) The deforming forces about the hip, makes closed reduction difficult.

Now most authors advocate internal fixation of these fractures due to improvement in implants.Due to better understanding and improvement in reduction techniques and advancement in image intensification techniques subtrochanteric fractures have now become simple with the aid of fracture table.Reconstruction of medial cortex is the most important step in treating subtrochanteric fractures. But in many of these fractures, reconstruction of solid medial wall is not possible, due to comminution or bone loss. In these cases we must fill that medial gap with autogenous bone graft. When there is medial comminution, there will be higher bending force on the laterally applied implant than centromedullary devices because centromedullary devices are closer to the line of joint reaction force than laterally placed implants (DCS, DHS, 95° ABP).

In our study, 10 patients were treated with centromedullary devices (Recon Nail), out of which 9 patients(90%) had good to excellent results. Of 10 patients who were treated with laterally placed implants (DCS) out of which 8 patients (80%) had good to excellent results. EL Santo et al[2]. compared the results of unstable subtrochanteric fractures treated with Gamma Nail and DCS, concluded that there were no significant differences in pain, range of movement or walking ability, but recovery was significantly earlier in the Gamma Nail group. In our study DCS and recon nail showed equally good results. Mean age in their study is 70 years compared to 44.5 years in our study. In our study, we encountered one failure (5%) is due to infection and implant failure in DCS fixation. We had 3 cases of non union one in recon nail group and two in DCS group. Of these two were revised with DCS fixation and bone grafting. We had 3 cases of malunion (30%). Vaidya et al[3]. evaluated the use of DCS and biological reduction techniques for subtrochanteric fractures and concluded the use of indirect reduction techniques instead of anatomic open reduction has proven to be successful, especially in comminuted fractures. The mean age in our series is 44.8 year compared to 32 years in their series. In all the patients mode of injury was due to fall or RTA compared to 87% in their study. Union was achieved in all case in our study except one case of DCS compared to union in all cases in their study. Roberts et al[4]. evaluated the biomechanical study of fracture site motion in second generation Intramedullary nailing of subtrochanteric fracture. He concluded that when subtrochanteric fractures are unstable and early weight bearing is desirable, the choice of implant is critical and should be restricted to long intramedullary implants that allow minimal fracture site motion.Pelet et al. evaluated the results of osteosynthesis of subtrochanteric fractures by blade plate verses gamma nail. He concluded, gamma nail is preferred for subtrochanteric fracture management as it allows early weight bearing. Twenty six patients were treated with Gamma nail and blade plate. In our study, 10 patients were treated with long recon nail and early weight bearing was advised in all, average being of 4-6 weeks. In DCS / blade plate fixation, weight bearing is delayed till bridging callus formation usually after 8 weeks. Fracture healing was acquired at 4 months compared to 4. 2 months in their series. A study by Neher et al.[5], in treatment of subtrochanteric fracture using submuscular fixed low angle plate, concluded that submuscular application of fixed low-angle plate devices resulted in anatomic alignment of femoral neck shaft angle while maintaining low rates of implant failure and high rates of union. In their study, time for radiological union was averaged 91 days compared to 102 days in our study, time taken for clinical union was 107 days compared to 120 days in our study.In a study by Krettek et al. minimally invasive percutaneous plate osteosynthesis (MIPPO) using the DCS in proximal and distal femoral fractures, concluded that the results of MIPPO technique are equal to that of subtrochanteric fractures treated by anatomical reduction and autogenous bone grafting. In their study 12 out of 13 cases healed without a second procedure. There was one implant failure (plate screw breakage) which required repeat fixation in their series similar to one implant failure in DCS group in our study. At follow-up, there were 2 varus deformities more than 5°, compared to 2 varus deformity in our study. There were 2 shortening over 20mm compared to 1 patient with 15mm shortening in our study.

In the management of subtrochanteric fracture for achieving successful outcome, good pre operative planning and execution is necessary. Recent results indicate short centromedullary devices like PFN, reconstruction nail yield results comparable to DCS. This is essentially a closed procedure. Nowadays with experience, surgeons can use reconstruction nail in severely comminuted cases and obtain good results with little more technical precision.

6.CONCLUSION

For the successful management of the subtrochanteric fractures reestablishment of medial cortex with maintenance of length and rotation are the most important factors.

Centromedullary devices yield comparable results with DCS and being closed procedure this is a very good option nowadays.

When anatomic reduction is attempted in comminuted fractures where open reduction is done bone grafting is used.

In grossly comminuted fractures, closed ILIM nails such as reconstruction nail gives equally good results without bone grafting.

Despite anatomic reduction the mode of failure in the DCS treated patient was due to lag screw cut out, plate or screw breakage. They are disturb the fracture biology and are prone for delated healing and nonunion.

This study suggests that reconstruction nail is a reliable implant for subtrochanteric fractures, leading to high rate of bone union and minimal soft tissue damage. Intramedullary fixation has biological and biomechanical advantages.

But the operation is technically demanding. Gradual learning and great patience is needed in order to make this method truly minimally invasive.

Reconstruction nail being a load sharing device, rehabilitation can be started early, DCS fixation being load bearing device may be unstable in fractures with posteromedial communition, delaying rehabilitation.

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