Outcome of Subtrochanteric Femur Fractures Treated with Dynamic Condylar Screw (DCS) Fixation

G. Praneeth Kumar Reddy[1], Kasarapu Nagaravi Prasad[2]

[1]Assistant Professor, Department of Orthopaedics, Viswabharathi Medical College and General Hospital, Kurnool, Andhra Pradesh. [2]Assistant Professor, Department of Orthopaedics, Viswabharathi Medical College and General Hospital, Kurnool, Andhra Pradesh.

ABSTRACT

BACKGROUND

Growing population and increase in number of road traffic accidents have resulted in an enormous increase in the number of hip fractures. In younger patients, fractures usually result from high energy trauma like RTA and fall from height and accounts for only ten percent.[1] Older patients suffering from a minor fall can sustain fracture in this area because of weakened bone due to osteoporosis or pathological fracture and this accounts for 90%. The incidence of proximal femoral fractures among females is 2 to 3 times higher than the incidence of such fractures among males.[2] Also, the risk of sustaining a proximal femoral fracture doubles every 10 years after the age of 50 years.[3]

METHODS

The present study was carried out in Viswabharathi Medical College & General Hospital, Kurnool, from January 2018 to December 2019. 50 patients with subtrochanteric fractures who came to casualty and outpatient department were admitted and treated surgically with Dynamic Condylar Screw (DCS) fixation.

RESULTS

In our series maximum age was 65 years and minimum age was 24 years. 28 cases (56%) were in the age group 24 to 40 years and other 18 cases (36%) were above 50 years of age and the mean age was 45 years. AO classification was taken into account for subtrochanteric fractures, in this study. There were 28 cases (56%) of type A fractures, 14 cases (28%) of type B fractures and 8 cases (16%) of type C fractures. 40 patients came to hospital within 24 hours and 10 patients reported within 24-72 hours. Average time interval between injury and surgery was 5 days. Primary bone grafting was done in 8 patients (16%), in whom there was posteromedial comminution. Source of bone grafting was iliac crest. Blood loss was measured by mop count (each fully soaked mop containing 50 ml blood). The average duration of surgery was 90 minutes and average duration of x-ray exposure was 80 seconds. In the immediate post-operative period, we had no complications.

CONCLUSIONS

Operative fixation is treatment of choice for subtrochanteric fractures of femur in adults. Successful surgical outcome is dependent not only on implant selection but also heavily influenced by surgical skill and experience. In the present study, we observed that Dynamic Condylar Screw fixation (DCS) for subtrochanteric fractures is safe, effective and successful procedure, provided the principle of accurate reduction, minimal soft tissue stripping, and stable internal fixation are followed.

KEYWORDS

Sub trochanteric femur fracture, open reduction and internal fixation, dynamic condylar screw lateral approach

Corresponding Author:
Dr. Kasarapu Nagaravi Prasad,
Flat No. 208, S. V. Paradise,
Dharmapet, Kurnool- 518004,
Andhra Pradesh.
E-mail:
master_k@rediffmail.com
praneeth.reddy.mbbs@gmail.com

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BACKGROUND

Growing population and increase in the number of road traffic accidents have resulted in an enormous increase in the number of hip fractures. In younger patients the fractures usually result from high energy trauma like RTA and fall from height and accounts for only ten percent.[1] older patients suffering from a minor fall can sustain fracture in this area because of weakened bone due to osteoporosis or pathological fracture and this account for 90%. The incidence of proximal femoral fractures among females is 2 to 3 times higher than the incidence of such fractures among males.[2] Also, the risk of sustaining a proximal femoral fracture doubles every 10 years after age 50 years.[3]

Since the femur is the principal load bearing bone in the lower extremity, fracture of this bone may result in prolonged morbidity and extensive disability unless the treatment is appropriate. The goal of treatment is to limit pain and to help the patient return to the pre injury status at the earliest[4]. So keeping this in consideration, it has become important to intervene surgically. The obvious advantages of surgical treatment are (a) it avoids complications of prolonged bed rest and hospitalization, (b) accurate reduction or anatomical alignment, and (c) early mobilization and weight-bearing walking exercise is possible with new implants and fixation techniques.

The technique of DCS fixation is not very demanding and the implant cost is reasonable. Because of the above features &great potential for its use and keeping the magnitude of subtrochanteric fractures as well as financial constraints of patients coming to Viswabharathi Medical College & General Hospital in mind, an attempt is made to evaluate the results of D.C.S. in management of subtrochanteric fractures of femur.

METHODS

The present study was carried out in Viswabharathi Medical College & General Hospital, Kurnool from January 2018 to December 2019. 50 patients with subtrochanteric fractures who came to casualty and Outpatient department were admitted and treated surgically with Dynamic Condylar Screw (DCS) fixation.

Patients included in the study were of both sexes with subtrochanteric fractures (simple & comminuted) and subtrochanteric fractures with intertrochanteric extension and were >20 years of age. Patients less than 20 yrs. of age with pathological fractures, compound fractures and polytrauma cases were excluded from the study. After stabilization of vitals, radiographs of affected extremities were taken and the fracture pattern was grouped according to classification & inclusion criteria. A routine preoperative workup was done as per our institutional protocols and all the cases were taken up for surgery. The procedure was done under spinal epidural anaesthesia, on a radiolucent table top to facilitate the use of image intensifier. Lateral approach to the proximal shaft and trochanter region is used to expose the proximal femur. Guide pin is inserted at an angle of 95^0 just above the highest point on the greater trochanter into posteroinferior part of head and neck. The position is confirmed in A.P and lateral views. The appropriate length of the lag screw is inserted and the barrel plate is slipped over the lag screw. The plate is seated gently using the DCS impactor. The DCS compression screw is inserted into the lag screw to prevent disengagement of the lag screw from the barrel. The DCS plate is fixed to the femur using 4.5 mm Cortex Screws & interfragmentary compression screws were used wherever needed. IV antibiotics in the form of third generation cephalosporins were given for 2 days. Drain removed after 48 hrs and static quadriceps exercises begun immediately. Early hip and knee assisted ROM was started from third day and sutures were removed after 15 days. Partial weight bearing was started 2 to 4 weeks post operatively, on a case specific basis. Full weight bearing was allowed after radiological and clinical signs of union. The patients were followed up at 6 weeks, 3 months and then at monthly intervals until fracture union. Clinical and radiological evaluation was done.

RESULTS

In our series maximum age was 65 years and minimum age was 24 years. 28 cases (56%) were in the age group 24 to 40 years age group and other 18 cases (36%) were above 50 years and mean age group was 45 years. AO classification was taken into account for subtrochanteric fractures, in this study. There were 28 cases (56%) type A fractures, 14 cases (28%) type B fractures and 8 cases (16%) type C fractures. 40 patients came to hospital within 24 hours and 10 patients reported within 24-72 hours. Average time interval between injury and surgery was 5 days.Primary bone grafting was done in 8 patients (16%), in whom there was posteromedial comminution. Source of bone grafting was iliac crest. Blood loss was measured by mop count (each fully soaked mop containing 50ml blood).

Variables	No. of Cases	%
Males	36	72%
Females	14	28%
Mode of Injury		
RTA	30	60%
FALL	20	40%
Right side	36	72%
Left side	14	28%
Type A fractures	28	56%
Type B fractures	14	28%
Type C fractures	8	16%
Intact medial buttress	30	60%
No medial buttress	20	40%
Union Time		
10-14 weeks	8	16%
14-18 weeks	32	64%
18-22 weeks	10	20%
Full Weight Bearing		
13-16 weeks	8	16%
17-20 weeks	40	80%
>20 weeks	2	4%

Table 1. Comprehensive Data of Our Study

The average duration of surgery was 90 minutes and average duration of x-ray exposure was 80 Seconds. In the immediate post-operative period, we had no complications.

In our study, average union time was 17 weeks. The average time to full weight bearing was 17 weeks. 4 patients had (8%) had superficial wound infection, which healed with local wound care and appropriate antibiotics. In our series 4 patients each of varus and valgus deformities (<10 degrees) were seen. 4 patients (8%) had limb shortening of 1.5 cm who were managed with a shoe raise. The results were evaluated on the basis of criteria laid down by Schatzker and Lambert,[5] which was modified by Radford P.J. and Howell C.J, in 1992.[6]

DISCUSSION

In general, 7% to 20% of the proximal femur fracture occurred over the subtrochanteric region.[7,8] The aims and objectives of this study is to study subtrochanteric fractures of femur in adults and its biomechanics, to study the outcome of surgical management of these fractures with the use of a commonly available extramedullary device D.C.S for comminuted and extensive subtrochanteric fractures, combined with the bridge or so- called biological plating technique, to re-establish the anatomy of these fractures perfectly by operative treatment using D.C.S, to assess the union of these fractures after surgical treatment using D.C.S, to assess the stable fixation and early mobilization of the patients and to assess the post-operative restoration of the walking ability of these patients. We chose the dynamic condylar screw for subtrochanteric fracture fixation, because this is used commonly in our setup. In the present study, the maximum age was 65 years and minimum age was 24 years and 56% of the patients were in the age group 24 to 40 years age group and other 36% were above 50 years and mean age group was 45.4 years. The maximum no. of cases (16 cases – 32%) were found in the age group between 31 to 40 years and minimum no. of cases were found in the age group of >61 years (4 cases – 8%).

In the study by Manzoor Ahmed et al[9] the age range of the patients was 22–68 years with a mean age of 52.7 years. 60% were in the age group of 41–60 years. In the present study, there were 72% males and 28% females showing males are commonly affected than females. In the study by Manzoor Ahmed et al[9] the males comprised 77% and females 23%. In the present study, thirty (60%) of patients met road traffic accident and twenty (40%) patients had injury due to fall. In the study by Manzoor Ahmed et al eighteen (60%) patients were injured in a road traffic accident and 12 patients in a fall from height. In the present study right-sided trauma was more than left sided trauma, thirty six patients were injured on right side and fourteen on left side. Similar scenario observed in the study by Manzoor Ahmed et al where the right limb was involved in 19(64%) patients and the left limb in 11(36%).

In the present study of 50 adult patients with subtrochanteric fractures of femur, open/ biological reduction and internal fixation was done by using 95^0 fixed angled dynamic condylar screws. In this study most of the fractures were of type-A (28) and relatively younger age (average 45.4 years) and 30 patients had intact medical buttress. In 32 patients reduction was done by open method and in rest 18 biological reductions was done. Primary bone grafting was done in 8 patients all of them were having posteromedial comminution. Thus, in patients with posteromedial comminution either biological reduction or primary bone grafting was done. Thus, lack of so-called medial support is compatible with safe healing under conditions adequately maintained or restored by using biological reduction technique. As compared to our study Manzoor Ahmed et al Primary bone grafting was done in 3 patients. These cases were elderly patients with significant posteromedial comminution (more than 1/3 diameter), which even though reduced was not held with screws.

It appears that better results are achieved by preservation of medial soft tissue, and that a bone graft is unnecessary in comminuted fractures treated with the bridge-plating technique.[10] The essence of the concept of bridge plating introduced by Perren is an indirect reduction technique, and the philosophy emphasizes maximal exploitation of implants and reduction tools to avoid unnecessary intraoperative soft-tissue stripping and to achieve stable and satisfactory (although not necessarily anatomic reduction[10]. This is in some contrast to the previous concept of rigid internal fixation of metaphyseal and diaphyseal fractures. Average duration of surgery was 92.2 min little higher than 80 min as noted in study of Manzoor Ahmed et al. Average union time was 17.56 weeks in the present study. In the study conducted by Manzoor Ahmed et al average union time was 19.7 weeks.

In the present study the number of complications was more in high velocity trauma (64%) and less in low velocity (36%) trauma. This is explained by fact that, in our series the patients with high energy trauma had sustained type B & C fractures. In study by Manzoor Ahmed et al out of 30 patients, excellent outcome was seen in 17 patients (56.6%) good in 5 patients(16.6%) fair in 5 patients (16.6%), poor in 3 patients (10%). In the study conducted by Manzoor Ahmed et al one implant failure was noticed of 30 cases (3.33%). After comparing various studies, our series is comparable with most of the previous published studies. In our set up we have achieved good results by the use of dynamic condylar screw system.

Study	Excellent/Good	Fair	Failure
Manzoor Ahmed et al	73.3%	16.7%	10%
Present study	92%	8%	------

Table 2. Comparison of Present Study with Other Studies

CONCLUSIONS

Operative fixation is the treatment of choice for subtrochanteric fractures of femur in adults. Successful surgical outcome is dependent not only on implant selection but also heavily influenced by surgical skill and experience. In the present study, we observed that Dynamic Condylar Screw fixation (DCS) for subtrochanteric fractures is a safe, effective and successful procedure, provided the principle of

accurate reduction, minimal soft tissue stripping, and stable internal fixation are followed. This procedure offers significant advantages such as being less technically demanding, and cost effective (cheaper than the modern intramedullary fixation devices and the best implant in a financially constrained setting). Most surgeons are well trained with the technique of using this implant. The absence of non-unions and implant fatigue failure in our study portrays the judicious handling of soft tissues and gentle manipulation of fracture fragments, which yielded a satisfactory and favourable outcome. We therefore suggest DCS as a viable & cost effective implant which works as an alternative to intramedullary implants to treat subtrochanteric fractures.

REFERENCES

[1] LaVelle DG, Canale ST, Beaty JH. Campbell's operative orthopaedics. Vol. 3. 11th edn. Philadelphia: Mosby 2008:3237-3238.

[2] Hinton RY, Smith GS. The association of age, race, and sex with the location of proximal femoral fractures in the elderly. J Bone Joint Surg Am 1993; 75(5):752-759.

[3] Melton JL, Ilstrup DM, Riggs BL, et al. Fifty year trend in hip fracture incidence. Clin Orthop Relat Res 1982; 162:144-149.

[4] Chapman MW. Chapman's orthopaedic surgery. Vol. 1. 3rd edn. Philadelphia: Lippincott Williams and Wilkins 2001: p. 653.

[5] Schatzker J, Mahomed N, Schiffman K, et al. Dynamic condylar screw: a new device. A preliminary report. J Orthop Trauma 1989; 3(2):124-132.

[6] Radford PJ, Howell CJ. The AO dynamic condylar screw for fractures of femur. Injury 1992; 23(2):89-93.

[7] Kinast C, Bolhofner BR, Mast JW, et al. Subtrochanteric fractures of the femur. Results of treatment with the 95 degrees condylar blade-plate. Clin Orthop Relat Res 1989; 238:122-130.

[8] Johnson LL, Lottes JO, Arnot JP. The utilization of the Holt nail for proximal femoral fractures. A study of 146 patients. J Bone Joint Surg Am 1968; 50(1):67-78.

[9] Halwai MA, Dhar SA, Wani MI, et al. The dynamic condylar screw in the management of subtrochanteric fractures: does judicious use of biological fixation enhance overall results? Strategies Trauma Limb Reconstr 2007; 2(2):77-81.

[10] Perren SM. The concept of biological plating using the limited contact-dynamic compression plate (LC-DCP)-scientific background, design and application. Injury 1991; 22 Suppl 1:1-41.