

Evaluation of Results of Operative Treatment of Types A Supracondylar Femoral Fractures by Dynamic Condylar Screw (DCS)

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Abstract: *Supracondylar fractures of the femur although uncommon, are very challenging injuries to treat. Supracondylar femur fractures are complex injuries, difficult to manage and associated with potential complications⁽¹⁾. Treatment of these fractures have been a controversial subject over the past two decades. There has been a changing philosophy towards surgical treatment of supracondylar fractures of femur^{2, 3,4,5,6}* **Material and methods:** *This was a hospital based prospective study conducted on 60 patients of fresh supracondylar femoral fractures admitted in Bone and joint Hospital Barzulla from January 2012 to January 2015. These patients were followed up for 1 year and parameters like union, range of motion and time for healing were recorded Schatzker⁵ and Lambert criteria were used to grade the results. **Results:** The age of the patients ranged from 18-72 years. There were 36 males and 24 females. Road traffic accident was the most common mode of trauma, followed by fall from height. All fractures were of AO type A. Results were excellent to good in 80% patients, fair in 17% and poor in 3% patients.*

Keywords: Dynamic condylar screw, supracondylar femur, fracture, osteosynthesis.

1. Introduction

Supracondylar fractures of the femur although uncommon, are very challenging injuries to treat. Supracondylar femur fractures are complex injuries, difficult to manage and associated with potential complications⁽¹⁾. These fractures occur in two different age groups - due to different types of injuries. In young patients these fractures occur due to high velocity injury e.g. Road traffic accidents, fire arm injuries and sport's injuries. While in elderly patients usually low velocity injury like fall during walking, results in supracondylar fractures of the femur. Treatment of these fractures has been a controversial subject over the past two decades. There has been a changing philosophy towards surgical treatment of supracondylar fractures of femur^{2, 3,4,5,6}

Distal femoral fractures are more likely in patients who have osteoporosis and in patients who have had prior artificial knee replacement surgery⁽⁷⁾. Successful treatment of intraarticular fractures especially in weight bearing joint requires restoration and maintenance of the congruity of the two articular surfaces⁽⁸⁾. Involvement of the articular surface demands a congruent anatomic reduction to prevent or minimize posttraumatic arthritis and provide bone stock for later knee replacement or fusion^{9,10}.

Although managed conservatively in the initial era but with improvement in the available implants and surgical techniques, operative treatment is now¹¹ considered as a standard treatment option. Internal fixation allows early ambulation and range¹² of motion which avoids knee stiffness. There are number of options available for fixation of these¹³ fractures, including distal femur locking plate, dynamic condylar screw (DCS) and retrograde¹⁴ intramedullary supracondylar nail.

2. Material and Methods

This was a hospital based prospective study conducted on 60 patients of fresh supracondylar femoral fractures admitted in Bone and joint Hospital Barzulla from January 2012 to January 2015. Patients were initially resuscitated in emergency ward following ATLS protocol. Primary treatment was given in the form of splintage, antiseptic dressing, antibiotics, analgesics, anti-inflammatory drugs and intravenous fluids. Routine investigations were done and initial radiographs taken in antero-posterior and lateral views. Fractures were classified according to AO classification. Of 30 patients 30 were A1; 24 were A2 and 6 were A3 type.

Inclusion Criteria

- 1) AO type "A" supracondylar fracture.
- 2) Both sexes
- 3) Age 18 years and above.

Exclusion Criteria:

- 1) Lower diaphyseal fractures of femur.
- 2) Pathological fractures.
- 3) AO type "B" and "C" fractures
- 4) Active infections any where in the body.
- 5) Medically unfit patients.

After taking a proper history and meticulous physical examination the patients were prepared for the surgery. Templating on the antero-posterior and lateral views were done before the operation as pre-op preparations. The patients were operated under spinal anesthesia. Under all aseptic precautions, under tourniquet control in spine position with a pillow under knee via standard lateral approach skin incision was made and vastus lateralis was elevated from lateral inter-muscular septum. As per standard method Dynamic condylar screw plate system was fixed.

Minimum four 4.5 mm cortical screws engaging 8 cortices were put in proximal fragment while two 6.5 mm cancellous screws were put in distal fragment in addition to condylar screw. In comminuted fractures the , area of comminution was exposed with care without much soft tissue dissection so that the fragments will maintain soft tissue attachment and biology will be maintained without going for anatomical reduction of fragments. Intravenous antibiotics were given for 5 days followed by oral antibiotics and analgesia. Patients were allowed only toe touch weight bearing for first six weeks. Partial weight bearing was started after reviewing x-ray at six weeks. Full weight bearing was allowed at three months.

Roentgenographic union was considered satisfactory when plain x rays showed bone trabeculae or cortical bone crossing the fracture site. Patients were reviewed at 2 weekly intervals for first 6 weeks and thereafter every six weeks up to six months and then every three months interval up to one year. Final assessment of all the patients was done at one year. ⁵**Schatzker and Lambert Criteria** were used to grade the results.

3. Results

There were 36 males (60%) and 24 females (40%) with a male to female ratio of 3:2. The age range was from 18 years to 72 years with mean age of 42 years. 42 patients (70%) were aged 25-50 years, 20% were below 25 years and 10% above 50 years. 38 (63.33%) patients had fractures on right side and 22(36.66%) patients on left side. Average stay in hospital was 18.8 days , most patients quickly regained mobility after surgery. All patients achieved full extension.

Table 1: Range of Movements

S.NO	Flexion	No of patients	Percentage
1	More Than 1200	30	50%
2	Between 90 - 1200	20	33.5%
3	Less than 900	10	16.5%

Table 2: Time for Radiological Union.

Time of union	No of patients	Percentage
0-8 weeks	16	26.5%
8-16 weeks	42	70%
More than 16 weeks	2	3.5%

Table 3: Grading of the results using ⁵Schatzker and Lambert Criteria

Result at 1 year	No of patients	Percentage
Excellent	36	60%
Good	12	20%
Fair	10	17%
Poor	2	3%

Complications

2 case had superficial infection which was treated with dressings and antibiotics No case had deep infection. 6

patients (10%) had knee pain of moderate nature which responded well to oral analgesics. The cause of pain was degenerative osteoarthritis, due to old age. Ten patients (16%) were using walking stick as per instructions for osteoarthritis.

4. Discussion

Supracondylar fractures of the femur are often difficult to treat and these remain difficult surgical challenge even for the experienced surgeons because these require careful management to obtain good cosmetic and functional results. The DCS is an effective method of treating supra condylar fracture of the femur with a wide range of advantages. However, extensive soft tissue dissection can lead to infection and frequent need for bone grafting. Indirect reduction and bridge plating with DCS can produce favorable results in ¹⁵complex distal femur fracture.

In our study males dominated and were mostly in the age group (30-50 years) which is the productive and involved in outdoor activities and hence resulting in trauma. In Muslim countries the male to female ration is high as compared to western studies because of less active participation of females in outdoor activities in those societies ^{16,17}.

In our study Road traffic accident was the most common mode of trauma accounting for 66% of cases which is comparable to KM Marya ¹⁸ and Australian study ¹⁹ reporting RTA as the most common mode of trauma in 92% and 82% respectively.

In our study 80% of the patients had excellent to good results which are comparable to Christodoulou et al ¹⁷ reporting excellent results in 51%, good in 30%, fair in 4%, poor in 8% in total of 37 patients.

Average time for union in present study was 15 weeks. Christodoulou et al ¹⁷ reported time for union to be 20 weeks while a study at Addenbrook's ²⁰ hospital, Cambridge reported it to be 11.3 weeks. This vast difference in time taken for union in difference studies was due to differences in postoperative mobilizations protocols and criteria for union so cannot be compared to present series. Range of motion of knee achieved at final follow-up was comparable to international studies ^{2,3}. 3.5 % had superficial infection. The reported rate is zero to eight percent in other studies which is comparable ^{17,20}.

5. Conclusion

From our study it is concluded that DCS is an acceptable and effective means of treating distal femoral fractures. However care is to be taken to preserve soft tissue envelop in order to achieve acceptable outcome . Younger age group (age <50yrs) had better functional outcome.



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