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The fractures of distal femur i.e. supracondylar and inter-condylar fractures have posed a great challenge to the orthopaedic surgeon since time immemorial. The results of conservative treatment have been disappointing and time consuming and have led to development of concept of open reduction and internal fixation to achieve anatomical and stable reduction with rigid internal fixation.

This study was conducted in the Department of Orthopaedics, M.L.B. Medical College, Jhansi on 8 cases of distal femoral fractures, which were randomly selected and treated by open reduction and internal fixation by Dynamic condylar Screw. Patients were studied from the day of admission through the pre, intra and post-operative period, to the complete follow-up till the patient achieved maximum possible functions of the injured limb. The data collected in this manner was evaluated, analysed and compared with previously done studies reported by various authors at different centres of the world.

In our study out of 8 cases 7 were male and 1 female. Our observations are comparable to report made by James et al (1982) who reported male female ratio to be 18:8, Lavella (1993) reported 13:2, Dhar & Sahu (1994) reported 12:1. The male predominance in our study and majority of studies in understood to be due to more exposure of males to high velocity trauma than females.
Majority of the patients in our study were young adults. The youngest patient was a 20 year male and the oldest one was 60 years elderly male patient. But most of the patients were between 30 years to 45 years. Mean age was 37.75 years. The fixation with this implant was avoided below 18 years of age because of risk of growth disturbance at distal end of femur. In similar study conducted by Hadlow & Brown (1992) the average age was 55 years and by S. Olerud (1972) the average age was 46.6 years (range 16 – 75 years), whereas in Lavella and Hanseder (1993) study average age was 62 years (range 17 – 82 years). This diserpancy probably occurred due to the fact that the average life expectancy in our country is quite less than that of western world. Dhar and Sahu (1994) reported age range 17 – 42 years in their study.

Considering the mode of injury in our series of cases, out of 8 cases, road traffic accidents alone accounted for 5 cases, 2 cases due to fall from height and 1 case due to fall of heavy object on thigh. This distribution was somewhat similar to the series of cases reported by Lavella and Hanseder (1993) in which road traffic accidents accounted for 53% cases, industrial injuries 14.7%, domestic injuries 16% and other causes 13.9%, which included fall from height etc. James et al (1982) reported similar observation in their study of 26 cases – 16 were caused by road traffic accidents. S. Olerud (1972) also reported 12 cases of road traffic accident out of 16 cases in his study.

In our study of 8 cases, 4 cases had fractures of left side, 3 cases were right sided and 1 case had bilateral involvement. There is left sided
dominance in our study as either colliding with some obstruction or falling to that side in his last minute to avoid accident.

While evaluating the nature of injury in our series of cases it was found that there were 5 (62.5%) cases with simple and 3 (37.5%) cases with compound injuries. The predominance of closed fractures was probably a selection bias as compound fracture were firstly managed by debridement requiring long period for soft tissue healing and they were mostly treated by conservative means. Yang et al (1972) had 21.4% and Giles et al (1972) had 19.2% case of compound fractures in their study.

Regarding the type of distal femoral fracture in our study of 8 cases according to classification by Muller et al, 1 case was of type A-1, 1 case of type A-3, 1 case of type C-1, 2 cases of type C-2 and 4 cases of type C-3. In our study, mostly those cases were taken in whom other procedures were contraindicated i.e. type-C fracture. Dhar and Sahu reported DCS fixation in 12 inter-condylar fractures.

The time interval between injury and surgery was 2 days (minimum) and 6 weeks (maximum). In fact most cases were operated as possible, as soon as patients was stabilized. The compound fractures were treated by debridement and internal fixation was done as early as wound healed. Only one patient was operated after 8 months as he had severe compounding and was treated conservatively initially landing up into nonunion.

The prolonged interval between injury and surgery is attributed to following reasons :-
Late reporting to hospital for treatment due to illiteracy, poverty and ignorance

Failed cases treated by other modalities of treatment presenting as malunion and nonunion

Compound fractures requiring a long time for control of infection and healing

In our study, the average duration of hospital stay was 23 days with minimum of 16 days and maximum of 28 days S. Olerud (1972) in his series of cases reported average hospital stay as 53.3 days, Neer (1972) 21 days, Giles et al (1982) at 17 days with range being 7 – 37 days, Muller (1967) 20 days, Shewring (1992) 28.7 days and Lavella and Brown (1993) 27 days with range from 9 – 49 days. In our study long hospital stay is because of the fact that most of the patients had residence in remote areas where the facilities of transport are not good. Some patients took more stay to attend the physiotherapy.

Regarding the occupation of cases in our study, most of them were daily wage labourers or poor farmers and businessmen. 1 case each was a policeman, a student and a housewife.

Continuous passive motion exercises were started the very next day of surgery. Non weight bearing exercises of knee and ankle such as knee bending and straight leg raising exercises were started after 1 week. However, the non weight bearing walking with crutches or walker started after 2 weeks and partial weight bearing at 6 – 8 weeks, while full weight
bearing was not allowed till fracture consolidated clinically and radiologically. In a similar study Yang et al (1990) recommended immediate post-operative non-weight bearing exercise and guarded partial weight-bearing as soon as pain threshold permitted and continued them 2 – 3 months after surgery and full weight bearing permitted after radiological consolidation of distal femoral fractures. Giles et al (1982) reported average time for full weight bearing to be 3.7 months when supracondylar fractures of femur treated by plate and lag screw.

In our study the average time taken for union was about 12.5 week ranging from 10 – 18 weeks. Radiological and clinical union occurred more or less at same time. The exact period of union cannot be determined because of irregular reporting of patients during follow-up. Our results are comparable to results reported by Shewring (1992), who reported average time of union to be 11.3 weeks. Giles et al (1982) similarly reported that the duration of union was 4.3 months for closed fractures and 4.6 months for compound fractures treated with plate and lag screw. It shows that compound fractures took long time to consolidate which is in accordance to our study.

The results were evaluated by using criteria devised by Neer depending upon pain, walking capacity, working capacity, restoration of anatomy, joint movement and roentgenographic appearance.

In our series of study 6 cases out of 8 patients had no residual pain and hence were given 20 points. 1 patient (12.5%) had occasional pain associated with change of weather or in early morning which may be due to
post traumatic arthritis or pre-existing osteo-arthritis of the knee. One patient (12.5%) had pain after a moderate range of movement at knee joint and hence given 14 points. The average score for pain was 18.75. In study of S. Olerud (1972) 50% patients had no pain, rest had intermittent pain with change of weather. Dhar and Sahu (1994) reported all the 12 cases with pain free movement.

Regarding the range of movement at knee joint 5 patients out of 8 regarded full range of movements and were given 20 points. 2 patients (25%) had restriction of terminal 10 – 20\(^0\) of movement and hence were given 16 points each. One patient had got less than 90\(^0\) range of knee movement and hence was given 8 points. The average score for range of knee movement in our study was 17.5. In a similar study by S. Olerud (1972) the average score for joint movement was 15.25 points. The range of knee movement in our study averaged 119.6\(^0\). In his study Giles (1982) reported 120\(^0\), Seinsheimer (1980) 91\(^0\), Shewring (1992) 112\(^0\), Lavella (1993) 80\(^0\) and Dhar et al (1994) 120\(^0\) as average range of knee movement.

Two (25%) out of 8 patients had same working capacity as prior to trauma, 5 patients had some difficulty in work, thus 7 out of 8 patients were back on their work as before injury without any limitation or minimal compromise however 1 patient could not return to his pre-injury status and had to take on some light work and hence given 6 points. The average score given was 8.25. S. Olerud (1972) in his study stated that 7 out of 9 patients could perform same work as they did before.
Anatomical reduction was achieved in majority of cases despite intra-articular involvement in most cases. The average score was 11.8 points.

The results were taken as excellent, score more than 85 points; satisfactory score between 55 – 85 and poor score less than 55.

Four (50%) of our patients had score more than 85 points and hence had excellent results, 3 (37.5%) cases scored between 55 – 85 points had satisfactory results and one patient scored 54 points was graded as a poor result. Yang et al (1990) evaluated results on the basis of modification of criteria of Shelbourne and Bruckman (1982) as excellent results of 57 patients (61.3%), good 22 (23.7%), fair 9 (9.7%) and 5 (5.5%) failure in the 93 cases of supracondylar fractures treated by 95° angled blade plate.

**Complications of distal femoral fractures**

Overall results in our study were excellent but few complications were faced, which are as follows :-

- Superficial infection in 1 case
- Knee stiffness in 1 case
- Malunion in 1 case
- Limb shortening in 1 case

In our study only 1 (12.5%) case had suffered superficial infection as he had some compounding of distal femoral fracture.

Restriction of knee movement was noticed in 1 case (12.5%). This patient was same who had suffered fracture 10 months ago and was treated conservatively then. Dhar and Sahu (1994) reported stiffness of knee in 8.3% cases.

So, in our study with comparison to various studies reported by various authors at different centres of world showed very much similar results to them. By fixing the distal femoral fractures with Dynamic condylar screw, Muller’s principle "Life is movement, Movement is life" can be followed.