

A Comparative Study of End Results of Various Methods of Treatment of Fractures of Distal Femur

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ABSTRACT

Background: Fractures of distal femur are difficult complex injuries. Deformity and loss of knee motion, following conservative treatment have led to widespread attempts at internal fixation. The aim of this study to compare the end results of various methods of treatment in supracondylar fractures of femur.

Material & Methods: The present study was conducted on 40 patients of supracondylar fractures of femur treated in the dept. of Orthopedics, R.N.T. Medical College, Udaipur, Rajasthan. Thorough general physical assessment and other systemic examination were done. Various treatment modalities such as screws & implants were compared in our study.

Results: Our study showed that the maximum incidence was in 3rd & 4th decade with the mean age of 32.3 years, it shows that male predominantly affected. Condylar buttress less hospital stay as compared to other treatment modalities and having maximum excellent results (50%) & supracondylar nail proves to be second best option.

Conclusion: We concluded that various methods of internal & external fixation devices used depending on situation and availability of the implants, biological condylar buttress plate fixation & supracondylar nail proves to be better in term of reduced hospital stay, early mobilization, range of movements, function, work & full weight bearing as well as least chances of complications.

KEYWORDS: Supracondylar Fractures, Condylar Buttress, Dynamic Compression Plate, End Results.

INTRODUCTION

Fractures of femur are one of the common type of fractures encountered by orthopedic surgeon. Being the prime weight bearing bone, it gets priority over other bony injuries. Fractures of distal femur are difficult complex injuries. They can produce significant long term disability. Distal femoral fractures are much less common than hip fractures and account for 7% of all femoral fractures. If fractures of the hip are excluded, 31% of femoral fractures involve distal portion.¹

Due to stiff knee patient has difficulty in entering public transport, driving car is not easy, taking part in any competitive sports activity becomes impossible, tripping over the outstretched leg in buses, trains and theatres and stairs can be cleared only one at a time, there have been continuous efforts in the past to treat these fractures by various methods but the disappointing point is that if a method gives better knee movements, it comprises a deformity and vice versa.¹

Conservative treatment leads to prolonged immobilization thereby to socio-economic burden to the patients and demand for more beds in hospitals. Even a simple fracture after receiving adequate treatment and in which healing occurs without complications, has an average period of morbidity of about 5-6 months and when complications are present, eventual outcome may be accompanied with even more serious aspects than economic loss.²

Problems encountered during conservative treatment of supracondylar femur are angulatory deformity, either posterior angulation at fracture site compromising knee motion or a valgus deformity disrupting overall leg alignment, knee joint incongruity and degenerative changes after intercondylar fractures, restricted active and passive knee motion due to quadriceps expansion injury and delayed unions and non-unions.³ Deformity and loss of knee motion, following conservative

treatment have led to widespread attempts at internal fixation. The technique of open reduction and internal fixation of fractures fell into disrepute during the post war years because of high incidence of complications reported.⁴ However, modern technology has eliminated many of the difficulties and dangers. The recent trends have been towards open reduction and internal fixation to achieve better alignment and early mobilization of knee joint.

Now-a-day conservative methods are used in patients who are medically unfit for anaesthesia and surgery, patients not willing for surgery and those having severely comminuted fractures where surgery is not possible.

Various kinds of implants devices have been used such as intramedullary nails, dynamic condylar screw, condylar buttress plate, nickel nail, LISS plate etc. In view of the above, the aim of this study to compare the end results of various methods of treatment in supracondylar fractures of femur.

MATERIALS & METHODS

The present study was conducted on 40 patients of supracondylar fractures of femur treated in the dept. of

Orthopedics, R.N.T. Medical College, Udaipur, Rajasthan.

Inclusion Criteria

- Patients of all ages from 7 years onwards (both fresh & old fractures)
- Supracondylar as well as intercondylar fractures of all types.

Exclusion Criteria

- Pathological fractures
- Fractures associated with traumatic paraplegia/quadriplegia

Just after admission of the patients, vital signs were assessed and maintained and first aid treatment was started. Detailed history of injury was taken. Thorough general physical assessment and other systemic examination were done. After full clinic-radiological evaluation, the patients were given primary wound dressings, below knee traction fixed to Thomus splint., antibiotics, analgesics, tetanus prophylaxis, management of hypovolemic shock by i.v. fluids, plasma expanders, blood transfusion before taking patient to operation theatre for surgery. Choice of treatment was decided type and grading of the fracture. Various treatment modalities were compared in our study.

Table 1: Age Incidence

Age (in years)	Number of patients	Percentage
6-14 yrs	01	2.5%
15-24 yrs	06	15%
25-34 yrs	12	30%
35-44 yrs	10	25%
45-54 yrs	07	17.5%
55-64 yrs	03	7.5%
More than 64	01	2.5%
Total	40	100%

Table 2: Profile of Patients

PROFILE	Number of patients	Percentage
SEX		
Male	32	80%
Female	08	20%
SIDE OF INVOLVEMENT		
Right	29	72.5%
Left	09	22.5%
Bilateral	02	5%
MODE OF INJURY		
Automobile accidents	26	65%
Falls	11	27.5%
Fall of stone/ marble slab	02	5%
Assaulted by lathi	01	2.5%

Table 3: Methods of treatments

Method/procedure	Number of patients	Percentage
Dynamic condylar screw (DCS)	16	40%
Condylar buttress plate (LISS)	04	10%
Supracondylar nail	07	17.5%
Trans-articular external fixator	08	20%
Cancellous screws	04	10%
K-wires	01	2.5%

Table 4: Complications

Complications	DCS	Supracondylar nail	LISS	Ext. fixator	Cancellous screws	K-wires
Infection	None	None	1/4	3/8	None	None
Delayed union	3/16	1/7	None	4/8	1/4	None
Non-union	2/16	None	None	3/8	None	None
Mal-union	1/16	None	1/4	1/8	1/4	1/1
Knee stiffness	5/16	None	1/4	6/8	1/4	1.1
Shortening	None	None	None	1/8	None	None
Deformity	None	1/7	None	1/8	1/4	None

Table 5: Average duration of hospital stay and full weight bearing

Surgical procedure	Number of patients	Hospital stay (days)	Full weight bearing
Dynamic condylar screw (DCS)	16	10	16
Condylar buttress plate (LISS)	04	07	12
Supracondylar nail	07	08	12
Trans-articular external fixator	08	14	20
Cancellous screws	04	12	18
K-wires	01	08	14

Table 6: End results

Surgical procedure	Number of patients	Excellent	Satisfactory	Poor
Dynamic condylar screw (DCS)	16	05 (31.25%)	09 (56.25%)	02 (12.5%)
Condylar buttress plate (LISS)	04	02 (50%)	02 (50%)	-
Supracondylar nail	07	03 (42.8%)	04 (57.2%)	-
Trans-articular external fixator	08	-	05 (62.5%)	03 (38.5%)
Cancellous screws	04	01 (25%)	02 (50%)	01 (25%)
K-wires	01	-	01 (100%)	-

RESULTS

Maximum incidence was in 3rd & 4th decade with the mean age of 32.3 years (table 1). It shows that male predominantly affected (table 2). It shows that right sided injuries were more common (72.5%) & automobile accidents (65%) were the commonest cause of this injury (table 2).

Our study showed that maximum numbers of patients were treated by open reduction internal fixation with DCS (40%) (table 3). Condylar buttress less hospital stay as compared to other treatment modalities (table 4 & 5) and having maximum excellent results (50%) & supracondylar nail proves to be second best option (table 6).

DISCUSSION

In this series the youngest patient was of 6 years while the oldest was 60 years of age. The highest incidence was found in 3rd decade (30%) with an average age of 32.32 years which is similar to that reported by Olerud (1972)⁵, Schatzker (1979)⁶, Mize & Benzal (1982)⁷. On the contrary Schatzker (1989)⁸, Silisky (1989)⁹ and Shelbourne (1982)¹⁰ reported higher incidences in 6th decade and also higher average age (above 50 years). Males were predominantly affected in the present series (80%) which is similar to Olerud (1972)⁵, Zickel (1977)¹¹, Shelbourne (1982)¹⁰, Neer (1967)¹². This male preponderance in this series may be due to outdoor life led by men in this country (India). On the conflict our results with Schatzker (1979)⁶ & Mize (1982)⁷ reported

higher incidences in females (60% & 61% respectively) in comparison to 20% in the present series.

Right side was more commonly involved (72.5%) compared to left. Majority of patients in this series sustained their injuries in automobile accidents (57.5%) and falls from height (37.5%) which is consisted with Schatzker (1966-72)¹³, Mize (1982)⁷. This may be due to rapid industrializations and high velocity automobiles.

In this series no patients was treated conservatively. The average period of hospitalization is 10.3 days is quite less than that of Giles (1982)¹⁴ who reported 17.1 days. On the other hand Healy (1974)¹⁵, Neer (1967)¹², steward (1966)¹⁶, Olerud (1972)⁵, Chiron (1974)¹⁷ and shelbourne¹⁰ reported 23, 21, 33.29 & 24 days respectively. The full weight bearing was started in an average of 110.6 days which is similar to Giles (1977-80)¹⁴ and Mize (1982)⁷ who reported 110 and 120 days respectively. The earliest weight bearing was started in 77 days and lastest in 168 days.

The methods of treatment in the present series were dyanamic condylar screw (DCS) in 40% cases, supracondylar nail in 17.5% cases, condylar buttress plate in 10% cases, transarticular external fixation in 20% cases, cancellous screw in 10% and k-wire in one case. The cases treated surgically with either internal or external fixation, showed 85% (27.5%+57.5%) excellent to good results while unsatisfactory to poor in 15% patients. This is similar to Chiron (1974)¹⁷ and Zickle (1977)¹¹ who reported 82.5% and 82.3% excellent to

good results, 17.5% & 17.7% unsatisfactory to poor results respectively.

Assessment of end results were done according to Neer's numerical system. The study shows that knee stiffness was found to be the commonest complication (35%) followed by malunion or valgus deformity (22.5%), non-union (7.5%) which required bone grafting, infection (5%) and delayed union in one patient (2.5%).

Knee stiffness, malunion, shortening, infection were reported as major complication by Neer (1967)¹², Giles (1982)¹⁴, Zickle (1977)¹¹ & Shelbourne (1982).¹⁰ By the large, most of the complications occurred in transarticular external fixation group. This may be due to that they were all compound and badly contaminated fractures.

CONCLUSION

We concluded that various methods of internal & external fixation devices used depending on situation and availability of the implants, biological condylar buttress plate fixation & supracondylar nail proves to be better in term of reduced hospital stay, early mobilization, range of movements, function, work & full weight bearing as well as least chances of complications.

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