



Early outcome of femoral supracondylar fracture managed with distal femoral locking plate at National Orthopaedic Hospital Dala Kano

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Abstract

Background: Supracondylar fractures of the femur cause considerable morbidity and mortality especially in the elderly.¹ The incidence was found to be higher among the younger socioeconomically active groups.¹ Surgical treatment of this difficult fracture is a challenge due to the need for anatomic and functional restoration of the fracture fragments.

Improved implant instrumentation and extensive surgical experience have made operative treatment the standard cure for the management of the fractures.²

This study looks at the early outcome of supracondylar fractures in adults treated with the Distal Femoral locking plate at National Orthopedic Hospital Dala, Kano.

Methodology: This study had a prospective descriptive design and was conducted among forty two (42) eligible patients over a 19 months period. Patients were followed up for six (6) months. Functional surgical outcome was assessed using Schatzker and Lambert criteria. Data of 39 patients was analyzed using SPSS version 20.0 with a p - value of 0.05. Three patients were lost to follow up.

Results: The mean age of the study participants was 34.64 ± 9.74 years with a male preponderance of 82.1%. Road traffic accident was the commonest cause of injury. The common fracture patterns were AO muller A1 and A2; 28.2% each. Normal knee extension was recorded in all the patients.

About 53.8% of participants had knee flexion of $120^\circ - 130^\circ$. No varus or valgus deformities were recorded. Persistent pain as post-operative complication was recorded in 15.4%. Satisfactory outcome was recorded in 97.4% and fair in 2.6%

Conclusion: The study revealed that femoral supracondylar fracture is common among young active males. Promising outcome was recorded in patients treated with distal femoral locking plate.

Key words: Early outcome, Femoral supracondylar fracture, Distal femoral locking plate (DFLP)

Introduction

Supracondylar fracture of the femur causes considerable morbidity and mortality especially in the elderly and its incidence was found to be higher among younger socioeconomically active groups.¹ The treatment of supracondylar femoral fractures remains a significant surgical challenge due to the need for anatomical and functional restoration of the fracture fragments.² The goals of treatment are anatomical reconstitution of the articular surface in the intra-articular fractures, reduction of the metaphyseal component of the

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fracture to the diaphysis and restoration of normal axial alignment of length and rotation.^{1,2,3,4} Surgical treatment of these fractures with open reduction and internal fixation has been recommended since 1950 and has shown to be superior to non-operative treatment.^{1,5} There is a higher complication rate with

lower patient satisfaction when treated non operatively.² These complications include angular deformities, knee stiffness and early post-traumatic osteoarthritis.

Various implants have been used for the fixation of these fractures. Distal femoral locking plate (DFLP) remain a popular and effective implant alternative to dynamic compression screws, 95° angle blade plate and intramedullary nail.^{5,6,7,8,9,10}

Previously, at National Orthopaedic Hospital, Dala (NOHD), distal femoral fractures were managed either non operatively with traction and casting or operatively with 95 degrees angle blade plate or dynamic condylar screw

The limitations with using a 95 degree angle blade plate are load shielding and allowing correction of the deformity only in the saggital plane⁵. The distal femoral locking plate is associated with less knee pain and hardware failure, but there is usually asymmetrical callus formation with more callus medially³. It not only maintains the biologic environment of the bone, but also prevent metaphyseal collapse and provides a stable construct for fracture union with good functional outcomes.²⁵

Although DFLP is currently among the standard of care in the treatment of supracondylar fracture of the femur, however there is no documentation /literature in this environment showing its usage or why the move away from other implants.

Therefore, this study is looking at the early outcome of treatment with DFLP using the Schatzker and Lambert scoring system (extension, flexion loss, varus/valgus, pain and joint congruence).

Materials and methods

This is a prospective descriptive study conducted at a government referral Orthopaedic hospital in the north-western part of Nigeria, which was carried out after approval from the hospital research ethics committee. The study commenced in May, 2019 and spanned over a 19 months period.

A proforma was used to collect and store data that include: socio-demographic data, source of referral, date and time of presentation, systemic illness, details of injury, clinical features, radiological examination, treatment, Schatzker and Lambert scoring and complications.

Forty two patients were recruited, however only

data of 39 was analyzed as three were lost to follow up

Inclusion criteria

The study included all consenting adult patients that presented to the accident and emergency unit and Surgical out patients department with closed femoral supracondylar fracture.

All patients within 18-64 years of age presenting within three weeks of injury with clinical or radiological diagnosis of supracondylar fracture were considered

Exclusion criteria

- Hoffa intra articular fracture,
- Pathological fracture,
- Metabolic bone diseases,
- Symptomatic knee osteoarthritis,
- Floating knee,
- Nonunion
- Immunocompromised patients.

Patients were followed up for six months.

Management protocol

The patients were optimized for surgery; prophylactic antibiotic (Ceftriaxone 1g) was given at the time of induction of anaesthesia and repeated daily for 48 hours post operatively.

Patients were usually put in a supine position. with a towel under the fracture site so as to relax the deformity. The limb was cleaned with cetrimide three times then with 70% alcohol and povidone iodine was used to paint the limb. Surgical drapes were used to cover the limb; only exposing the operation site.

The fractures were exposed usually via a lateral approach to the distal femur. Reduction of the fracture was done with the use of traction and reduction clamp. It was fixed with a DFLP after achieving satisfactory alignment. The post op wound was irrigated with normal saline and closed in layers while leaving a suction drain in situ.

Post operatively, they were given a second dose of antibiotic at 4 hours while continuing with analgesics and range of motion exercise as tolerated. Stitches were removed at two weeks and patients usually discharged home on non weight bearing ambulation .

Follow up started at 4 weeks from discharge, then at

8, 12, 16 and 24 weeks. There after, follow up is based on assessment during a visit, till full weight bearing and satisfactory rehabilitation is achieved. During each visit, relevant clinical and radiological evaluation were taken including: post operative persistent pain using the visual analogue score (VAS), knee range of motion measured with a goniometre while valgus and varus were assessed from the radiographs, Patients with superficial surgical site infection were treated with oral antibiotics based on a sensitivity test and 10% povidone iodine dressing.

Data collection and Analysis

Data obtained from the proforma were entered into Microsoft excel spread sheet. The statistical package for social sciences (SPSS) version 20.0 was used for data analysis. Qualitative variables were summarized and presented as frequencies and percentages while quantitative variable were summarized as means and standard deviation. Data summaries were presented using frequency table, pie and bar charts. Statistical significance was set at P value < 0.5.

Results

The age distribution of the study participants was 21 to 58 years with a mean age of 34.64±9.74 years. Individuals between the ages of 26 – 35 years were commonly affected. There were 82.1% males and 17.9% females.

Table 1: Age distribution

Age groups	Frequency	Percentage (%)
18-25	5	12.8
26-35	20	51.3
36-45	8	20.5
46-55	5	12.8
56-65	1	2.6
Total	30	100

Road traffic injury was the commonest aetiology (76.9%) and the left femur was affected in 53.8% of cases. The common fracture pattern was AO Muller A1 and A2, with a proportion of 28.2% each. Persistent post-operative pain was recorded in 15.4% and surgical site infection in 5.1%. Using Schatzker and Lambert criteria 97.4% of patients had satisfactory outcome had fair outcome.

Table 2: Causes of Injury

Type of injury	Frequency	Percentage (%)
Road Traffic	5	12.8
Accident (RTA)		
Fall from height	20	51.3
Sport injury	8	20.5
Total	5	12.8

Most patients (71.8%) showed radiological evidence of bridging callus, reduced pain and increased mobility within 12-16 weeks and the remaining 28.2% within 20-24 weeks

Table 3: Distribution of fracture pattern

Type of fracture	frequency	Percentage (%)
A1	11	28.2
A2	11	28.2
A3	8	20.5
B1	4	10.3
B2	-	-
B3	-	-
C1	3	7.7
C2	2	5.1
C3	-	-
Total	39	100

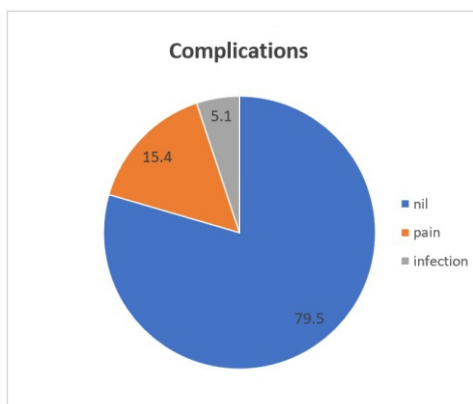


Figure 1: Distribution of complications

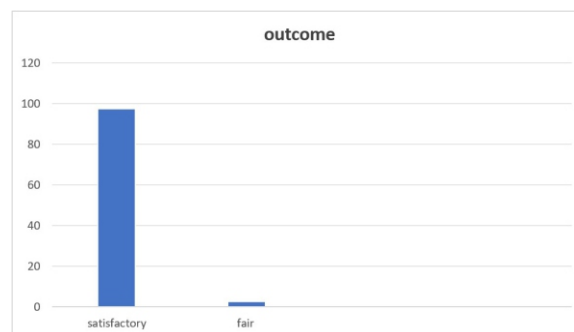


Figure 2: Distribution of outcome

Discussion

The purpose of this case series was to note common causes and the pattern of femoral supracondylar fractures in our setting. In addition, to document the early functional outcome of fractures treated with the DFLP. We found a mean of 34.64 ± 9.74 with 26-36 as the modal class. This is similar to the age range of 25 – 45 years noted by Agunda et al. Ifesanya et al found 47.3 ± 21.5 years as a mean which is slightly above our finding. This may be attributed to the larger age range of 22-96 years used by their study thereby capturing older patients. The mean age noted by Saw et al and Ayman et al is coherent with that in our study - 32.6 and 22.5 years respectively. This may be related to individuals at active age being more adventurous and getting involved in trauma more commonly.

The gender distribution we found (M:F ratio of 4.5:1) is common in the literature.¹⁴ and may be explained by the culture of females taking care of the home while males are out searching for a source of livelihood for the family.

The pattern of fractures in this study showed AO Muller type A1 and A2 as the commonest type, which is also reported by Kanda et al.³ However Rajanish et al¹⁷ and Venkatesh et al¹⁸ reported C2 fracture as the commonest. Our finding may be related to an inclusion criteria of only closed fractures, which are more likely in the less severe A1 and A2 pattern.

At 6 months follow up, all the patients had a normal range of extension, while the flexion range was 120° – 130° . There was normal varus and valgus in all the participants. This may be related to less complexity of the cases and without intra articular extension. This is similar to findings by other studies as reported by Philip et al¹⁹, and Syed et al.²¹ Patients presenting relatively early, with direct reduction at surgery under fluoroscopic guidance are likely to have better fracture reduction, thereby avoiding valgus/varus deformities.

Rajanish et al¹⁷ reported a varus angulation of $> 10^{\circ}$ attributed to premature full weight bearing ambulation that lead to the implant bending.

However, Sameh et al²² reported both varus and valgus deformities in their study which was attributed to osteoporosis with a wide medullary canal and consequent inadequate fixation.

Limb length discrepancy (LLD) of ≤ 1.2 cm was

seen in 25% which was insignificant and, LLD of 1.2cm to 2cm was recorded in 1%. Saw et al¹¹ and Rajanish et al¹⁷ reported LLD of > 2 cm in 7.7% and, 6.9% respectively, which was attributed to intra articular comminution in AO Muller C2 and C3 fractures.

Superficial surgical site infection of 5% was noted in this series. This is congruent with findings in the literature (Dar et al⁴ and Mohammed et al²³). However, a higher infection rate was reported in 13.3% by Pradip et al²⁰ attributed to impaired immunity and comorbidities in elderly patients. This study excluded the immuno-compromised, elderly patients and those with open fractures. This could explain why the infection rate was low.

Early outcome of use of DFLP in closed supracondylar fracture showed a promising outcome as up to 97.4% showed at least a satisfactory outcome. This is in keeping with findings by Kiran¹³ et al and George et al²⁴. Fair outcome was seen in 2.6% among participants, similar result was recorded by George et al²⁴. Promising outcome may not be unrelated to proper patient selection, early intervention and good rehabilitation services at the study centre.

Conclusion

Femoral Supracondylar fractures commonly affect active male individuals. Road Traffic Accidents and fall from height were the commonest causes of high energy injuries in this study. Fracture pattern was commonly muller A1 & A2.

It was noted that Distal Femoral Locking Plate has promising early functional outcome following surgical fixation of Femoral Supracondylar Fractures.

Recommendation

- Health education to public through various media outlet on the consequences of road traffic accident in which Femoral Supracondylar Fracture is one of them. This will go along with government enforcing existing laws aimed at reducing road traffic accidents on our roads.

- More studies should be conducted on the use of Distal Femoral Locking Plate in Femoral Supracondylar Fractures that satisfy the requirement of Plate Fixation because of the promising outcome noted in his study.

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Conflict of interest
Nil.

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