



Ipsilateral Fracture of Femur and Tibia, Treatment and Functional Outcome

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Abstract

We reviewed forty patients with forty-two extremities having ipsilateral fracture of femur and tibia at Christian Medical College Ludhiana. Patients were grouped according to type of injury and the method of treatment. Three percent femoral and ten percent tibial fractures developed delayed union out of which bone grafting was done in two femoral and seven tibial fractures. Three (7.2%) tibial fractures developed infected gap non union which were subsequently managed by distraction osteoneogenesis. Eight (29.1%) patients had stiffness of knee with range of movement less than 90 degree. Bad results were found in patients having compound injuries and in juxta articular involvement of both fractures. In our study external fixator was the mainstay of treatment in operative group comprising of ten (23%) femoral and twenty-three (55%) tibial fractures because of compound nature of injury and many limbs were salvaged which otherwise could have amputated. Patients in whom rigid internal fixation was used to treat both fractures produced excellent results.

Key Words

Ipsilateral, Fracture, Femur, Tibia

Introduction

Ipsilateral fracture of the femur and tibia have been called 'floating knee' injuries and may include combination of diaphyseal, metaphyseal & intra-articular fractures (1,2). There is little recorded in the English literature on the subject of ipsilateral fracture of femur and tibia, a severe injury which appears to be increasing in frequency. Earlier papers have pointed out the high risk of complications and permanent disabilities (3-4). Bansal *et al* (5) and Chinna A (6) in their respective studies have concluded that rigid fixation of both fractures results in excellent or good results. Most of earlier papers have given attention to shaft fractures only not giving much weightage to knee. Early mobilization of knee joint is the key to successful treatment. The fact that incidence of ipsilateral fracture of femur and tibia are increasing day by day, has prompted us to take this study.

Material and Methods

The hospital record of 40 patients with 42 extremities with ipsilateral fracture of femur and tibia, were reviewed at CMC & Hospital Ludhiana for last 10 years for profile treatment and functional outcome.

Results

Males were involved to the ratio of 9:1 and majority of the patients were of age group of 11 to 30 (62.5%). In 29 (72.5%)

cases two wheels was involved. Thirty nine patients had associated severe injuries to visra seeking specialist attention including head injury (6); chest trauma (4); fracture neck of femur (4); vascular injury (1) etc.

Classification

An easy and working classification on the patron of Bansal *et al* (5), was adopted. Group I, shaft fractures of both femur and tibia only, 30 cases (71.4%), Group IIa, femoral fracture was juxta articular, 6 cases (14.2%), Group IIb, tibial fracture was juxta articular, 4 cases (9.6%) and Group IIc, both fractures were juxta articular, 2 cases (4.8%).

Other Features

Majority 28 (66.7%) of femoral fractures were closed and middle third of femoral shaft was involved in 17 (40%) patients. Were as 27 (64.3%) tibial fractures were compound and all were involving middle third of shaft. Six patients (15.4%) had head injuries, 4 (10.3%) abdominal trauma, 4 (10.3%) chest trauma, 5 (12.9%) upper limb fractures, (17.9%) contra lateral limb fractures, 4 (10.3%) ipsilateral femoral neck fracture, 3 (7.6%) bilateral floating knees, 3 (7.6%) fracture pelvis, 1 (2.5%) each, nerve and vascular injury. One patient of fat embolism was treated successfully. Massive crushing and vascular injuries resulted in

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amputation of 13 limbs although excluded from study. Frequency of surgeries varied between one (3) cases to nine (2) cases, however average surgeries excluding conservative group were 3.4.

Treatment

Patients were managed by conservative (9 cases), combined (11 cases) and operative approach (22cases) respectively. Twelve (31%) femoral and 16 (38.2%) tibial fractures were managed conservatively. External fixator was used in 10 (23.8%) femoral and 23 (55%) tibial fractures, which were compound injuries. In our study we removed external fixator only after fracture united clinically however minor adjustment, dynamisation and changing of pin were carried out from time to time. Three (7.1%) tibial fractures developed infected gap non union and were managed by bone clearance, flap coverage and bone transportation following corticotomy using Ilizarov's fixator. Osteomyelitis was seen in three tibias, which were managed successfully by clearing infected bone, soft tissue coverage(flap) and distraction osteoneogenesis using Ilisrov's ring fixator . These three limbs were thus salvaged which could have amputated in absence of modern techniques. Average time for femur to unite was 20.8 weeks (range 11-35 weeks) and 25.1weeks (range 11-40 weeks) respectively.

Treatment Options

Treatment option	Femur No. of cases	Tibia No. of cases
Initial traction & hip spica	2	2
Initial cast bracing	10	10
Transfixation cast	-	3
K-Nailing	6	-
K-Naling with derotation plate	1	-
Rush nailing	2	-
Interlock nailing	6	2
Supracondylar nailing	1	-
Platting	4	-
Screw fixation	-	1
External fixator	10	23

Local Complications

Complication	Femur	Tibia
Osteomyelitis	9	3
Delayed union	3	10
Non union	-	3
Mal union	3	10
Implant failure	1	1
Compartment syndrome	-	3
Pin tract infections	4	8
Deformity>10 degrees	2	7

Full range of movement was observed in 24(57.1%)_cases where as 8(19.1%)cases had poor range less than 90 degree. Less than 5 degrees movement was noticed in patients with

soft tissue and muscle loss (4cases), and 3 cases had infected non union in whom stiff ness occurred due to multiple procedures and prolonged immobilization.

Treatment Option and Union Problem

Treatment option	Delayed union		Non union	
	Femur	Tibia	Femur	Tibia
Conservative	-	1	-	-
Combined approach	1	2	-	-
Operative approach	2	7	-	3

Range of Movement of Knee

Range in degrees	GroupI	GroupIIa	GroupIIb	GroupIIc	No. of Cases
0 -130	20	2	2	-	24
111 -130	6	-	2	-	8
90 -110	1	-	-	1	2
< 90	3	4	1	-	8

Range of Movement of Ankle

Range in degrees	GroupI	GroupIIa	GroupIIb	GroupIIc	No. of Cases
Full range	24	3	2	1	30 Restricted
PF&DF5-30	2	3	-	-	5
<5 degree movement	5	-	2	-	7

Final Functional Outcome and Mode of Treatment

Treatment	Excellent	Good	Acceptable	Poor	Total
Conservative Treatment					
Traction followed by cast bracing	1	2	2	1	6
Traction followed by QTBT	-	-	1	-	1
Traction followed by hip spica	-	1	1	-	2
Combined Approach					
Internal fixation of femur & cast Immobilization of tibia	3	4	-	-	7
Internal fixation of tibia & non Operative femur	-	-	-	1	1
External fixation of femur & cast Immobilization of tibia	-	-	1	-	1
External fixation of tibia & non Operative management of femur	-	-	-	2	2
Operative Approach					
Internal fixation of both fractures	-	1	1	-	2
External fixation of both fractures	-	-	7	3	10
Internal fixation of femoral fracture and external fixation of tibia	3	6	1	-	10



Final Result in Nutshell

Treatment	Excellent	Good	Acceptable	Poor	Total
Operative	3	7	9	3	22
Combined	3	4	1	3	11
Conservative	1	3	4	1	9

Discussion

Ipsilateral fracture of femur and tibia is a serious injury which is often associated with major injuries to head, chest, viscera and musculoskeletal system. Hojer *et al* (7) in a prospective study of 21 patients with fractures of both bones, advocated immediate stabilization of tibia by external or internal means, followed by intramedullary fixation of femur within two weeks. They reported excellent results, though their criteria for grading was not defined.

In a study of 31 patients, Karlstrom and Olerud (8) reported 59% good or excellent, 26% acceptable and 15% poor results. They used same criteria and guidelines as used in our study.

Ratliff (9) reported that best results were obtained with internal fixation of both fractures. He found good results in eleven of twelve limbs treated by internal fixation, compared with only three good results in the eleven patients treated conservatively. Similarly Arslan *et al* (10) suggested that in spite there is not an ideal method but still rigid internal fixation seems to be more appropriate in fractures other than type 3 open tibia fractures.

Bansal *et al* (5) in their series of forty patients concluded that fixation of at least one fracture preferably femur by internal fixation in their twelve of forty patients produced seven good and excellent results.

Veith *et al* (11) and China A (6), in their operative series of twenty-four of forty-seven and seventy patients reported no poor results. They reported twenty-two and sixty good and excellent results respectively.

In our study we had similar results, ten of twenty-two and seven of eleven patients in operative and combined groups had good and excellent results where as seven of nine patients had good and acceptable results in conservative group.

Conclusions

Ipsilateral fracture of femur and tibia are commonly seen with road traffic accidents especially in unprotected two wheeler riders. Males are more vulnerable and compound injuries are common in tibia.

Internal fixation of both fractures with intramedullary interlocking implants is ideal for early mobilization of both patients and joints. When ever possible intramedullary interlocking nail should be choice of treatment for fracture

femur as external fixation of femur results in non union and stiffness because of transfixation of thigh muscles.

External fixation of femur should be kept an alternative in compound fractures till soft tissue healing. Being subcutaneous bone external fixation of tibial fracture is acceptable treatment but intramedullary implants should be opted for all closed and grade one injuries.

In to-days advanced world where surgeon is equipped with variety of operative advances, equipment and better antibiotics role of conservative management seems to decline. However in our society where majority of patients belong to low socio-economic strata, role of conservative treatment should not be forgotten. Combined treatment can also produce good results provided femur be fixed internally as soon as possible to allow early mobilization and weight bearing.

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