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Research Article

Prognostic Factor of Ipsilateral Lowerlimb Femur and Tibia Fractures

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Abstract: Prospective study of fifty cases of ipsilateral fractures of femur and tibia treated in Sri Ramachandra medical collage between June 2012 to June 2014. The inclusion criteria were femoral fractures distal to the level of lesser trochanter with an ipsilateral tibia fracture proximal to the tibial plafond and minimum follow up of one year. The exclusion criteria were patients who succumbed to craniocerebral, thoracic, or abdominal injuries resulting in death within forty-eight hours and patients below twenty years of age. We had sixty percentage of excellent/good results in group I compared to thirty percentage of excellent/good result in group II. While we had thirty five percentage of acceptable results in group I compared to fifty eight percentage of acceptable results in group II. We had six percentage of poor results in group I compared to fifteen percentage of poor results in group II. The Floating Knee is a complex injury with more than just ipsilateral fractures of the femur and tibia. The associated injuries and the type of fracture (open, intra-articular, comminution) are prognostic indicators of the initial and final outcome in patients. We recommend thorough initial assessment of patients with regards to life threatening associated injuries, surgical fixation of both fractures preferably by intramedullary nailing, knee ligament assessment to detect injuries and rigorous post-operative rehabilitation for a good final outcome.
Keywords: Floating knee, Ipsilateral fracture, Femur fracture, Tibia fracture

INTRODUCTION

Each year road traffic accident claim some 6,00,000 lives and thirty times this number, that is over fifteen million, are injured according to the World Health Organization. This represents more than one life lost every minute and an injury every two seconds. Two third of these victims are from the third world countries[1]. The commonest site of fracture was the lower limb (43.4%),followed by upper limb (19.0%) and facial bones (10.9%)[2]. Ipsilateral fractures of the femur and tibia are called 'floating knee' injuries and may include a combination of diaphyseal, metaphyseal, and intra-articular fractures[3] Floating Knee is the term applied to the flail knee joint segment resulting from a fracture of the shaft or adjacent metaphysis of the ipsilateral femur and tibia [4]. Management of this injury has been variously described in the literature [5-8].In this article we are going to discuss about the prognostic factors of ipsilateral lowerlimb femur and tibia fractures following road traffic accidents.

The objective of this study is to identify the prognostic fractures for the management of ipsilateral lowerlimb femur and tibia fractures.

MATERIALS AND METHOD

Prospective study of fifty cases of ipsilateral fractures of femur and tibia treated in Sri Ramachandra medical collage between June 2012 to June 2014. The inclusion criteria were femoral fractures distal to the level of lesser trochanter with an ipsilateral tibia fracture proximal to the tibial plafond and minimum follow up of one year. The exclusion criteria were patients who succumbed to craniocerebral, thoracic, or abdominal injuries resulting in death within forty-eight hours and patients below twenty years of age. In our study forty six were male and four were female. The age group was from twenty one to sixty five years. The mean age is thirty five years with the maximum incidence in the third decade. All the fractures were classified using the Fraser et al[9] classification and open wounds were classified using the Gustilo and Anderson classification[10].

We had six open fractures of femur and sixteen open fractures of tibia. Thirty two patients had closed femur and tibia fractures while four had open femur and tibia fractures. Twelve patients had closed femur and open tibia fractures while two patients had open femur and closed tibia fractures. Twelve patients had

associated thoracic injury, fourteen had cranio cerebral injury, two had abdominal injury, twenty had ipsilateral fibula fracture, two had mandible fracture while two had metacarpal and metatarsal fractures. In majority of the cases an average of four hours was lost before the patient reached the casualty. Once the patient was haemodynamically stable a detailed thorough clinical examination of the patient as a whole was performed. Radiological evaluation of the injured extremity, chest and other suspected injured parts were carried out. Head injury, abdominal injures and thoracic injuries were given priority.

The patients were segregated into two groups depending on the definitive treatment of the fractures. Group I patients had both fractures treated by surgical stabilisation (either internal fixation or external fixation) and Group II patients had one of the fracture treated by surgical fixation and other fracture treated nonoperatively. We had thirty six group I patients and forteen group II patients . Femoral fractures are surgically fixed within an average of nine days. None of the femoral fractures were treated conservatively. An average of five days was lost between surgical fixation and injury, in the case of tibial fractures. Fourteen tibia fractures were treated conservatively. All open fractures of femur and tibia were treated as emergencies. After haemodynamic stability of the patients, the open fractures were thoroughly irrigated and debrided. After initial debridement all the fractures were stabilised with AO type of external fixator.Fractures which did not show any radiological evidence of healing over a period of twenty four weeks were considered to be nonunion. In all cases of femoral and tibial nonunions secondary bone grafting was done to aid healing. The criteria described by Karlstorm and olerud was used for assessment and patients were graded as excellent , good, acceptable or poor. The patients were followed up regularly at three months interval upto one year.

RESULTS

We had sixty percentage of excellent/good results in group I compared to thirty percentage of excellent/good result in group II. While we had thirty five percentage of acceptable results in group I compared to fifty eight percentage of acceptable results in group II. We had six percentage of poor results in group I compared to fifteen percentage of poor results in group II. Results based on karlstrom criteria were tabulated in table1.

The mean hospital stay in group I was forty two days and group II was fifty nine days. In group I the mean healing of femur fracture was twenty weeks and tibia fracture was twenty five weeks. In group II the mean healing of femur fracture was twenty three weeks and tibia fracture was twenty seven weeks. In group I the range of flexion at knee was 30-130 degrees. In Fractures which did not involve the knee joint the average flexion at knee was 90 degree whereas fractures which involved the knee joint had an average motion of only 80 degrees. In group II the range of flexion at knee was 30-90 degrees. None of the patient in this series had restriction of hip movements.

Table 1- Results of functional assessment based on Karlstrom criteria

	Excellent	**Good**	**Acceptable**	**Poor**
Group I	2(5.5%)	20(55%)	12(34%)	2(5.5%)
Group II	-	4(28.6%)	8(57.1%)	2(14.3%)

DISCUSSION

Ipsilateral fractures of the femur and tibia was a serious injury complex which was often associated with other major injuries to the head, chest, visceral and musculoskeletal system. In the present series, we had analysed fifty cases of ipsilateral fractures of femur and tibia clinically and radiologically and evaluated their management and functional outcome over a minimum period of one year.On the basis of the present series, it was evident that ipsilateral fractures of femur and tibia commonly occur as a result of high energy violence This was also stressed by Omer et al[11]. In our study, the maximum number of cases was in the third decade which was comparable to the series of Ravindra.B. Gunaki[12].

Ipsilateral fractures of femur and tibia in our series were classified as described by Fraser et al. In our study, Type-I fractures (seventy two percent)were commoner and there was no case with type IIc fractures. This incidence was comparable to the incidence of these fractures seen in the studies done by Fraser et al and Ravindra.B.Gunaki.In our study, we had three cases of Fat embolism and three cases of hypovolemic shock. This finding stresses the importance of routine arterial blood gas analysis in patients with this injury complex and the prime importance of resuscitation in these cases. In our study, the first priority in the management was given to life threatening, associated head and abdominal injuries which was followed by definitive management of musculoskeletal injuries.

The management was according to two different protocols. Group-I -Both fractures were treated by surgical stabilisation either internally or externally. Group-II - One of the fractures was treated non operatively and the other fracture was treated surgically. The average period of hospitalisation in Group-I patients was forty two days and in Group-II was fifty nine days. On comparison, Ravindra.B.Gunaki had an average of twenty eight days hospitalization for group I and forty two days hospitilisation for group II patients. The average time for femoral fractures to heal was

twenty weeks and twenty five weeks in tibial fractures in group-I patients. In group-II patients the mean healing time was twenty three weeks and twenty seven weeks respectively. The results in our series were better than that achieved by Gillquist et al[13]. The mean healing time for both femur and tibial fractures in this dual injury complex was long compared to that of isolated fractures of tibia or femur.

The results of treatment was graded using the Karlstorm and Olerud criteria[14]. Based on the results of our series, we emphasise the superiority of operative stabilisation of both fractures over combination of surgical and non operative methods. In general, the patients with intra-articular fractures of either femur and tibia (twenty eight percent) had poorer functional outcome compared to the series of Ravindra.B.Gunaki. This was because of the prolonged immobilisation of knee in our patients compared to that of Ravindra.B.Gunaki. In our study there were twenty cases of ipsilateral knee ligamentous laxity. In all these patients the laxity was identified only during the follow-up period. The importance of early detection of ligament injuries assumes relevance because of better results following early repair of such ligamentous injuries. Moreover it was noteworthy that Fraser et al have posted a higher incidence of degenerative osteoarthritis of the knee in such injuries in their long term follow up studies. Therefore, we suggest that the possibility of ligamentous disruption should always be thought of in patients with ipsilateral fractures of the femur and tibia which were mostly detected only after stabilisation of both fractures.

In group I we had twelve percent of healing disturbances and eight percent of osteomyelitis. In group II we had twenty four percent of healing disturbances and no case of osteomyelitis. This variation was attributed to the fact that there were less number of open fractures .We recommend that, if fixation of both fractures was to be attempted, the operative conditions must clearly be good enough for stable fixation to be achieved without risk of infection. Stiffness of the knee and ankle joints was associated with more prolonged immobilisation than when these joints were mobile. This finding emphasises the importance of early mobilisation of joints. More than half the patients in this study are under thirty five years of age: Stiffness of the knee or ankle can be an enormous handicap to these young patients, whose demands and expectations were high. Surgical fixation of the fractures with thorough surgical planning and prolonged rehabilitation are recommended. A combination of these determines the ultimate outcome of these patients[15].

CONCLUSION

Concomitant Ipsilateral fractures of the femur and tibia were commonly due to high energy violence. Thorough clinical and radiological evaluation of the patient was essential for finding out associated musculoskeletal and other system injuries. In general, patients treated by operative stabilisation of both fractures did better than patients in which one fracture was treated by non operative methods. A rigid protocol of management cannot be followed and each fracture should be judged on its own merit. The goal of treatment was to optimise the patient's ultimate level of function. Early mobilisation of these multiply injured patients and of their injured limbs was imperative in order to avoid complications and to achieve the best functional end result. Ultimately, it was the condition of the patient that should dictate the treatment approach taken. The Floating Knee is a complex injury with more than just ipsilateral fractures of the femur and tibia[16]. The associated injuries and the type of fracture (open, intra-articular,comminution) are prognostic indicators of the initial and final outcome in patients. We recommend thorough initial assessment of patients with regards to life threatening associated injuries, surgical fixation of both fractures preferably by intramedullary nailing, knee ligament assessment to detect injuries and rigorous post-operative rehabilitation for a good final outcome.

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