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Associated Injuries with Floating Knee Injuries in Western Rajasthan

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Abstract: ***Objective: The main objective of this study was to see the associated injuries with floating knee injuries. Design: A prospective interventional study. Materials and methods: Our Study was conducted from May 2017 to December 2018 with a minimum duration of follow up of 1 year. We took 41 cases of floating knee who came to our tertiary level trauma center and all were classified according to fraser classification. Results: Most of the cases were in the age group of < 30 years with extreme of 18 and 60 years. Study had 35 male and 6 female patients. Road traffic accident was the mode of injury in all the patients Right limb was involved in 32 patients. According to Gustillos and Andersons classification 22 femur fractures and 23 tibia were closed. According to fraser classification, 28 patients had type I and 13 had type II fractures. Taking the associated injuries in account, 21 patients with floating knee had components of other associated injuries. There were 4 cases of headinjur, 4hoffas fracture, 2 Inter trochanteric fracture, 2 patella fracture, 1 neck of femur fracture, 1 shaft of humerus fracture, 1 mandible fracture, 1 distal femur fracture of the contralateral limb and 5 cases had neurovascular insufficiency. Conclusion: To conclude, associated injuries with floating knee were common and for good outcome of the floating knee injuries, the associated injuries should be evaluated early and managed appropriately.***

Keywords: associated injuries, floating knee

1. Introduction

Floating knee injuries are relatively rare and complex injuries. The type of fractures, soft tissue and associated injuries make this a challenging problem to manage[1].

The incidence of fractures resulting from motor vehicle accidents is on the rise. High velocity accidents are now more common producing violent and complex injuries.

Floating knee refers to the flail knee joint segment resulting from a fracture of the shaft or adjacent metaphysis of the ipsilateral femur & tibia. The fracture may be simple diaphyseal to complex intra articular types (Modified Fraserclassification).[2] This has increased in the proportion to population growth, number of motor vehicles on the road, and highspeed traffic.

These multiple fractures add a new dimension to the problem of their management. In addition to the complex fractures associated with these injuries, trauma to the soft tissues is often extensive. There also may be life threatening injuries to the head, chest or abdomen, fat embolism, neuro vascular insufficiency and other fractures.Floating knee injuries are prone to cause permanent disabilities if not managed aggressive. Through our prospective study we have tried to see the associated injury and its effect on outcome.The methods of surgical management depends on location and pattern of injuries, hemodynamic status of the patient, associated injuries and would need a judicious combination of internal and external fixation methods, often performed in stages.

2. Materials and Methods

Study Type: Hospital based interventional studyin a tertiary care center
Study Design: Prospective study
Study Duration: Study was conducted from May 2017 to December 2018 with a minimum duration of follow up of 1 year.

Study Population: Patient got admitted at our tertiary level trauma care center in the department of orthopaedics at Dr S N Medical College, Jodhpur with diagnosis of floating knee.

Inclusion criteria
Both sex, of age group above 18 years with floating knee injuries – open & closed both; with or without other associated injuries.
We took a sample size of 41 patients with floating knee injuries.

The floating knee injuries were classified according to modified fraser classification[2], which takes into account all types of floating knee injuries involving the articular surface around knee, metaphyseal and diaphyseal fractures. Openinjuries were classified according to gustillos and andersons[3] classification.

Modified Fraser classification of floating knee injuries[2] (figure1)
Type I involves extra articular fractures of both femur and tibia
Type II is subdivided into 3 groups, as follows:
Type IIa involves femoral shaft and tibial plateau fractures.
Type IIb includes fractures of distal femur and the shaft of tibia.
Type IIc indicates fractures of the distal femur and tibial plateau.

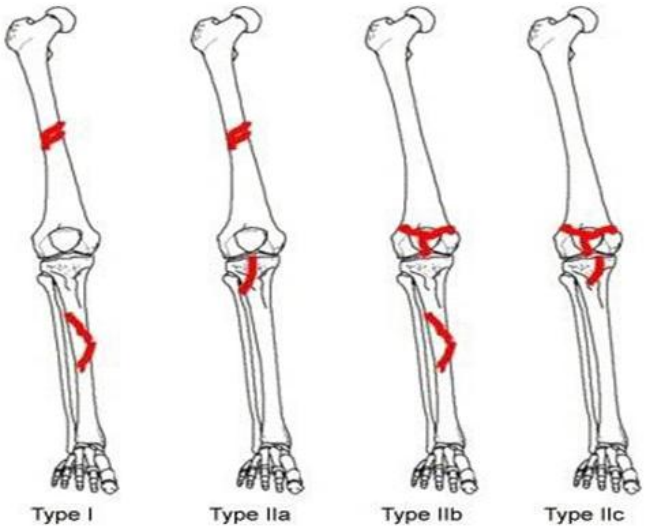

Figure 1

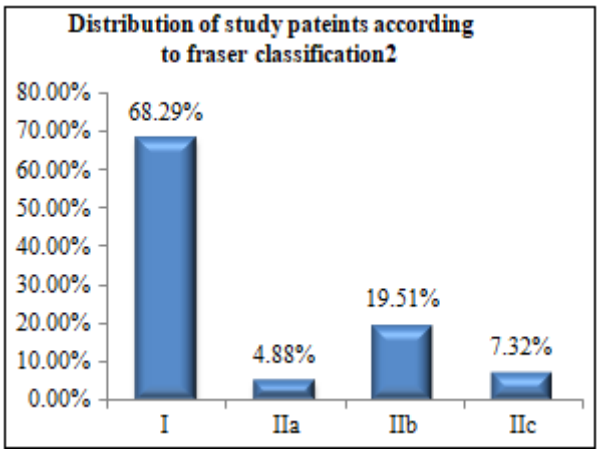

Figure 2

3. Results

Most of the cases were in the age group of < 30 years with extreme of 18 and 60 years. Study had 35 male and 6 female patients. Road traffic accident was the mode of injury in all the patients. Right limb was involved in 32 patients. According to gustillos and andersons[3] classification 22 femur fractures and 23 tibia were closed. According to fraser[2]classification 28 patients had type I and 13 had type II fractures (figure 2)

Taking associated injuries in account, 21 patients with floating knee had components of other associated injuries. There were 4 cases of head injury, 4 hoffas fracture, 2 Inter trochanteric fracture, 2 patella fracture, 1 neck of femur fracture, 1 shaft of humerus fracture, 1 mandible fracture, 1 distal femur fractureofthecontralateral limb and 5 cases had neurovascular insufficiency (figure3).

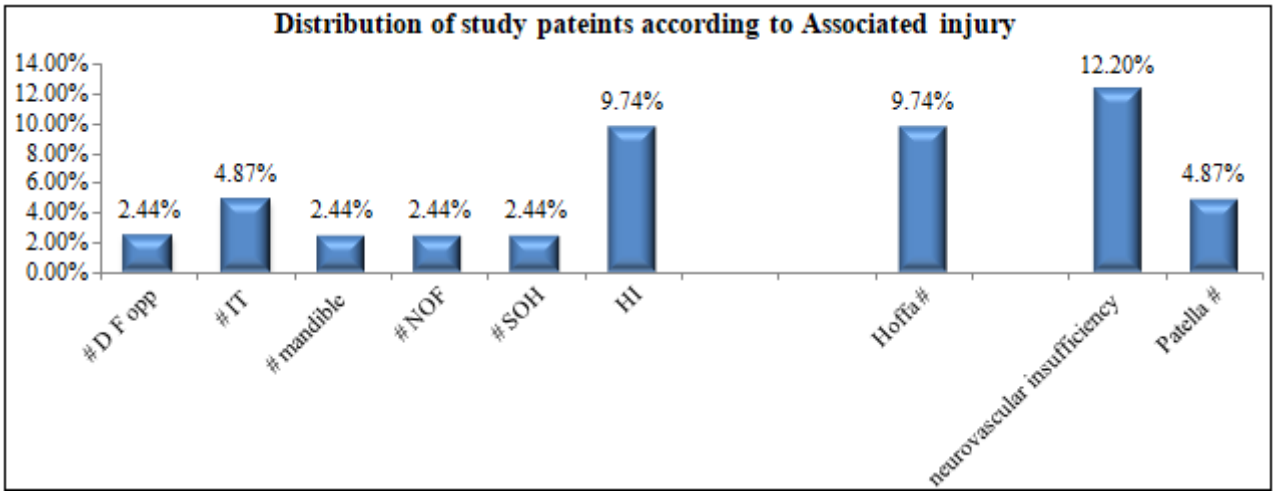

Figure 3

4. Discussion

As floating knee is due to high velocity trauma, so it's obvious that it affects the other system and limbs of the body as well. Majority of patients in this study were male (85.37%), aged from 18 to 40 years (78.04 %), involving the right side of the limb (78.05%) following a high velocity road traffic accident.

In our study we reported 16 patients of floating knee, with polytrauma. Zrig[5] and shiedt[6] have reported 59 % and 100 % of polytraumatism respectively. In our study no death were registered but some studies have registered mortality rate varying from 5.6 % to 15 % [3567]. We reported head injury in 9.74 % cases whereas according to Rethnam[10]reported in 10.34% of the cases and Pietu[11]in 37.8% of the cases.

In our 4 cases of floating knee, they had head injury with altered conscious level, so a NCCT brain was done following which the hematoma was evacuated and once patients were stabilized physiologically, then the fracture fixation were done.

Behrman[13]and Riska[14] insisted that pulmonary complications such as - fat embolism, aspirationpneumonia and adult respiratory distress syndrome were decreased when both fractures were surgically stabilized as early as possible, although in our study we did not have any pulmonary complications. As floating knee which was due to high-energy trauma, thorough abdominal clinical assessment was

required and all the suspected cases of BTA went under FAST, although we did not report any blunt trauma abdomen case in our study.

Few studies also mentioned about associated injuries with floating knee. We registered 1 upper limb fracture (fracture shaft humerus) where as Rethnam[10] reported 5 upper limb fractures (4 humerus fractures and 1forearmb fracture) in his 29 patients of floating knee.

Pièt[11] in his retrospective multicentric study noted 68% of associated fractures of other limbs. In our study 29.2% cases had fractures of other bones apart from the floating knee. We did not had any pelvic ring injuries, butElmrini[15] and Zrig.[5]had reported about 1 case of fracture acetabulum in 18 floating knees and 2 cases in 39 floating knees respectively.

In our study, Among the 41 femur fractures, according to gustillos and Andersons[3] classification 19 were of open grade, among 19 open, grade I were three (15.79%), grade II were fourteen (73.68%), grade III B were two (10.52) and rest 22 (53.66%) femur fractures were closed . Among the tibia fractures, 18 were of open grade, among 18 patients, grade I was one (5.56%), open grade II were thirteen (72.22%) and open grade III B were four (22.22%). There are studies which have reported 60% to 90% of open fractures .[8 9 11 15 18]We also registered 5 patients with neurovascular insufficiency, 3 patients had thrombosis in the popliteal vessel, one in the anterior tibial artery and one in the posterior tibial artery. Out of these 5, one patient recovered by conservative method, and rest 4 underwent under embolectomy but due to the loss of the golden hour their limb could not be salvaged. Although Rethnam[10] suggested that repair of the vascular injury is best doneafter surgical stabilization ofthe fractures, as the floating knee is an unstable injury and manipulation ofthefracture, afterrepair ofa vessel can put stress on the repair leading to failure. In our study also, all the patients with neurovascular insufficiency were first stabilized by external fixator and then followed by embolectomy.

5. Conclusion

To conclude, neurovascular insufficiency were most common associated injuries, followed by head injury and fractures to other parts of the limb. It was seen that for good outcome of floating knee injuries, all the associated injuries required early evaluation and promptmanagement

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