



Lisfranc Injury- Intervene early for better results

Authors

Varigonda Sivani¹, Madhavi Kammela¹, P. Ashok Kumar²

¹Junior Resident, ²Professor

Department of Orthopaedics, Andhra Medical College, Visakhapatnam, India

Abstract

Background: Lisfranc injuries are fractures and dislocations involving tarso metatarsal joints. They account for about 0.1% to 0.4% of all fractures. Most of these fractures are missed inspite of improved investigative modalities, especially in the settings of polytrauma. Delay in treatment of these injuries lead to painful secondary deformities and impaired function.

Aim: To evaluate the functional outcome following early open reduction and internal fixation of Lisfranc injuries and to emphasise different radiological parameters to diagnose the Lisfranc injuries

Methods and Methodology: 10 cases of Lisfranc injuries over a period of six months were considered. They were treated with open reduction and internal fixation within one week. They were followed up for 3 months and their functional outcome was noted using AOFAS midfoot scores.

Results: Using the radiological parameters, Lisfranc injury was diagnosed in these patients accurately and their post operative functional outcome was calculated. There was consistent improvement in their scores.

Conclusion: Identifying the Lisfranc injury and early intervention with open reduction and internal fixation helps in achieving better functional outcome in patients with Lisfranc injuries.

Introduction

Lisfranc injury or Tarso metatarsal injuries account for 0.1% to 0.4% of all the fractures^[1]. They are most frequently missed injuries. Especially those injuries with ligamentous injuries alone are most commonly missed. By following subtle clinical signs and radiological parameters, the chances of missing the fracture are minimised. Though conservative treatment was followed for Lisfranc injuries, it led to painful foot and secondary arthritis later. Surgical management of Lisfranc injuries not only restores the normal biomechanics of the foot but also prevents occurrence of secondary arthritis and improves the functional outcome.

Aim

To evaluate the functional outcome following timely diagnosis and early intervention of Lisfranc injuries by open reduction and internal fixation.

Methodology

This is a prospective study done in the Dept Of Orthopaedics, Andhra Medical College, from period of June 2017 to December 2017. 10 cases of Lisfranc injury, who sustained injuries due to road traffic accident are considered in the study. Only those cases which are treated within 48 hours, patients with no co morbidities like diabetes mellitus are included in the study. Cases of polytrauma and head injuries, patients with

diabetes and other co morbid conditions are excluded from the study.

Anteroposterior and oblique radiographs of foot are taken and the following radiological parameters are observed in the x-ray to diagnose a Lisfranc injury.

1. Co linearity of Medial border of 4th metatarsal and cuboid medial border on oblique view.
2. Medial border of 2nd metatarsal in line with medial border of intermediate cuneiform
3. A tangent drawn through medial border of medial cuneiform should pass through first metatarsal: medial column sign
4. Widening of 1st TMT joint
5. Fleck sign: fracture of the 2nd metatarsal.



Following the diagnosis of Lisfranc injuries and ruling out other injuries, the foot is stabilised temporarily in a below knee slab.

After pre anaesthetic check up, all the cases are treated within 48 hrs after the injury. All of the cases are treated with open reduction and internal fixation with k-wires. Dorsal approach between first and second metatarsals is used. Pointed reduction forceps is used to hold the reduction, before passing the k-wires and fixation is done using k-wires. The patients are discharged after 5 days and are advised regular dressings and non weight bearing for 3 weeks. The k-wires are removed after 4 weeks. The cases are followed up and evaluated using AOFAS midfoot scores pre operatively and at immediate post op period and after the period of 4 weeks and 12 weeks.

Score used for the evaluation

Midfoot Scale (100 Points Total)

Pain (40 points)	
None	40
Mild, occasional	30
Moderate, daily	20
Severe, almost always present	0
Function (45 points)	
<i>Activity limitations, support</i>	
No limitations, no support	10
No limitation of daily activities, limitation of recreational activities, no support	7
Limited daily and recreational activities, cane	4
Severe limitation of daily and recreational activities, walker, crutches, wheelchair	0
<i>Maximum walking distance, blocks</i>	
Greater than 6	5
4-6	4
1-3	2
Less than 1	0
<i>Footwear requirements</i>	
Fashionable, conventional shoes, no insert required	5
Comfort footwear, shoe insert	3
Modified shoes or brace	0
<i>Walking surfaces</i>	
No difficulty on any surface	10
Some difficulty on uneven terrain, stairs, inclines, ladders	5
Severe difficulty on uneven terrain, stairs, inclines, ladders	0
<i>Gait abnormality</i>	
None, slight	10
Obvious	5
Marked	0
Alignment (15 points)	
Good, plantigrade foot, midfoot well aligned	15
Fair, plantigrade foot, some degree of midfoot malalignment observed, no symptoms	8
Poor, nonplantigrade foot, severe malalignment, symptoms	0
Total=	100
American Orthopaedic Foot and Ankle Society	
From: http://www.aofas.org/14a/pages/index.cfm?pageid=3494	

Results

Most of Lisfranc injuries are seen as a result of RTA (bike accidents). All are male patients. There are two cases of open wounds and rest are closed wounds. Associated injuries are fractures of necks of 3rd and 4th metatarsals in two cases and fractures of shafts of 2nd, 3rd and 4th metatarsals in three cases. All the patients showed significant improvement in the foot and ankle scores following surgery. All the patients had severe pain during pre op period. The average pre op midfoot score is around 3.6. In the immediate post op period, though alignment is achieved, due to pain, it becomes difficult to ambulate. So the average midfoot score is around 22.8. The average mid foot score at one month post op period is around 46.6. The average mid foot score at three months follow up is around 76.

By the end of 12 weeks, it is observed that the fractures of the metatarsals were united and by the end of three months, all the wounds healed well. Further, it is found at one month follow up, that three cases were complicated by pin tract infection. They are treated with antibiotics and the infection subsequently subsided. Stiffness of the ankle is observed, in two patients, not complying with the physiotherapy instructions, which improved subsequently on physiotherapy.

Case-1:

The AOFAS scores pre op, immediate post op and at 1 month and 3 months post operatively:

Patient no.	Pre op score	Immediate post op score	1 month post op score	3 months post op score
1	10	28	45	90
2	0	15	45	65
3	0	15	49	80
4	8	28	49	75
5	0	28	45	70
6	0	15	49	75
7	0	28	45	65
8	8	15	45	70
9	0	28	49	90
10	10	28	45	80
Avg	3.6	22.8	46.6	76

Discussion

Lisfranc injuries are the injuries affecting the tarsometatarsal joints. They are commonly missed injuries. Taking the help of clinical and radiological clues, these injuries can be diagnosed. There could be history of difficulty in bearing weight and clinical features like tenderness at the tarsometatarsal junction, ecchymosis at the sole of the foot in Lisfranc injuries. Though one cannot rule out a Lisfranc injury in the absence of these signs, these signs may aid in identifying the Lisfranc injury. Abduction pronation test and TMT squeeze test are some of the useful clinical tests used to diagnose the Lisfranc injury. Different radiological signs like medial column sign, Fleck sign etc. help in diagnosis of Lisfranc injury.

Early diagnosis and surgical management by open reduction and internal fixation is preferred mode of treatment to avoid secondary arthritis and improve the functional outcome.

In the present study, all the patients are males, showing male preponderance of the injury. Our results are consistent with that of Ifran Ahmed et al^[2] and Hesp et al^[3]. The main cause of injury is road traffic accident which is similar to the results of Ifran Ahmed et al^[2].

There is consistent improvement in the AOFAS scores. In the pre op period the scores are less due to pain and lack of alignment. However, there is improvement in the scores immediately after surgery as the alignment is restored. But still the scores are less as the patients could not ambulate because of pain. But in subsequent follow ups, there is improvement in the scores. At the final follow up, the AOFAS score is around 76. It is comparable with that of Ifran Ahmad et al^[2] and Perira et al^[4] whose scores are 78.23 and 77.53 respectively.

Lisfranc injuries should be paid adequate attention as any delay in diagnosis and fixation will lead to secondary arthritis and deformity. A study by Ramelt et al^[5], shows that any delay more than 6 weeks, will lead to fixed deformity. There are many modalities of fixation of Lisfranc injuries like: K-wire fixation, Cortical screw fixation, dorsal plate fixation^[6] and spanning external fixation.

K-wire fixation of Lisfranc injuries has some advantages. K-wire fixation can be done even in open wounds and in cases of soft tissue compromise. The hardware removal does not need extensive dissection and surgery. It is also cost effective. However, there are chances of pin tract infection and loosening. Studies which used plating techniques for fixation of Lisfranc injury also show good results with the fixation. A study by Sun-jun- hu et al^[6] shows better short term and medium term results using dorsal plate. Further studies are needed to evaluate different modalities of treatment and their long term results.

Conclusion

Timely diagnosis and early open reduction and internal fixation of Lisfranc injuries are very important as they prevent the occurrence of

secondary arthritis and deformity. Having a high index of suspicion and following different clinical signs and radiological signs are essential to avoid missing the Lisfranc injury.

Limitations of the study

- Small sample size
- The period of follow up is not long.

References

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