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Lisfranc fracture fixation with a Herbert screw

[1]Dr Vinod Nair, M.S Orthopaedics, D Y Patil Medical Collage and Hospital

[2]Dr Shreyas Kappalguddi, D Y Patil Medical Collage and Hospital

[3]Dr Sanjay Deo, M.S Orthopaedics, D Y Patil Medical Collage and Hospital

[4]Dr Swaroop Solunke, M.S Orthopaedics, D Y Patil Medical Collage and Hospital

Corresponding Author: Dr Shreyas Kappalguddi, D Y Patil Medical Collage and Hospital

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Abstract

Introduction: Lisfranc fracture is a tarsometatarsal fracture dislocation characterized by traumatic disruption between the articulation of the medial cuneiform and base of the second metatarsal. According to hard castle and Myerson type c1 and c2 Herbert screw fixation carried with closed reduction internal fixation done

Materials and methods: 20 patients taken as sample size with Lisfranc fracture due to trauma. Closed reduction internal fixation with Herbert screw fixation done and cases was followed up till 8 months with physiotherapy and rehabilitation. Herbert screw set, k wire, cannulated cancellous set, guide wire, screw drivers.

Results: Fracture heeling after the Herbert fixation is 4 weeks with radiological evidence and the post op physiotherapy and rehabilitation done for 12-16 weeks for early mobility and pain free movements.

Conclusion: This technique is quick, Easy to perform with minimal exposure. Provide good stability and long term excellent prognosis as compared to results with other established procedure.

Keywords: TMT Joint, Herbert Screw, Radiological Evidence

Introduction

TMT joint complex injuries are extremely rare, accounting for about 0.2% to 0.8% of all fractures. Midfoot sprains or minor Lisfranc disruptions, on the other hand, are significantly more common. 3, 4, and 5 Up to 20% of these injuries go undetected during the initial evaluation. 5 Injuries can be direct (high-energy blunt trauma) or indirect (axial or rotational force delivered to a plantar flexed foot). 1 through 5 In order to adequately evaluate a midfoot trauma, a thorough clinical examination and bilateral anteroposterior (AP) and true lateral weight bearing (WB) as well as oblique X rays6 are required. Fracture dislocations of the foot's Lisfranc (Tarso Metatarsal) joint are infrequent but significant injuries with a high risk of permanent impairment. Standard radiographs may only indicate a little incongruity of the joint, making these injuries easy to notice in the emergency room (1). The accuracy of anatomical reduction is critical to the outcome of these injuries (2-8). Non-rigid methods, such as smooth k-

wires, are frequently used to treat complex fracture-dislocations (2,5,9).

However, this type of fixation is frequently found to be unable to correctly and adequately hold the reduction for the needed healing time (10). These results in late reduction loss, or in certain situations, these wires are unable to sustain reduction during surgery.

Between 2019 and 2021, we treated 20 cases of Lisfranc fracture dislocation with open reduction and internal fixation with Herbert screw

Internal fixation was achieved by Herbert screw of 4mm and 6mm with the open method.

Materials and Methods

1. Institute Ethics Committee Clearance will be obtained before the start of the study

2. Type of study: Prospective study.

3. Period of study: June 2019 – june 2022

4. Period required for data collection: 2 years.

5. Period required for data analysis and reporting: - 6 months.

6 .Sample size : 20 cases of Lisfranc fracture cases are taken for study

7. Place of study: Dr. D.Y Patil Medical college, Pimpri, Pune.

8. Source of data and patients: Orthopaedic ward and OPD, Dr. D.Y Patil medical college.

9 Source of funding: All investigations and procedures will be done If clinically indicated. No specific or additional investigation will be done for the purpose of study. Most of the investigations /procedures are done free of cost, any investigation/procedure/implant if indicated clinically will be borne by the patient as per hospitals policy.

Inclusion Criteria

1. All direct and indirect trauma to foot
2. Sports injuries
3. Age group 18-65 years

Exclusion Criteria

1. Congenital bony defects
2. Ankle injuries
3. Previous surgeries on foot
4. Age > 65 years and <18yrs
5. Septic and rheumatoid arthritis
6. Bad skin condition and operative site

We will select 20 patients with Lisfranc fracture which will be treated with Herbert screw. Preoperatively clinical examination will be done and documented with radiographs i.e. anteroposterior and oblique. If indicated MRI will be done to rule out soft tissue injuries and limited CT scan to know more about the morphology of the fracture.

Surgical Technique

Arntz et al. demonstrated how several dorsal longitudinal incisions were used to correct tarso-metatarsal joint dislocations in the majority of patients (10). The main fixation technique consisted of open reduction and Herbert screwof 4mm screw fixation of the 2nd Tarso-Metatarsal joint from the Postero-Medial corner of the Medial Cuneiform to the bases of the 2nd Metatarsal. The reduction and fixation of the entire injury complex are dependent on this first lagging screw.

Position

The position of the patient is supine position under spinal anaesthesia and with side support for the thigh with torniquet tied over the operating thigh.

Procedure

Position of the patient is properly secured. Patient is scrubbed using betadine solution and scrub thoroughly from the knee to the toe end next torniquet was applied to the operating limb on the thigh, under aseptic

condition the limb was painted with betadine and spirit and then the patient was draped with sterile whole sheets and proper exposure of the leg done with covering of the whole body. Sterile cling drape and iobane was put over the operating site. Fracture site visualised through the c arm and marking of the skin incision was done by using a sterile marker than incision of 3*4cm marked and incision done on the skin next with deep knife the tissue are cut and retracted, after proper exposure a k wire put as shown in the below diagram and two Herbert screws was put as shown in the post op x ray below reducing the Lisfranc fracture of size 4mm and 6mm put as shown than closure done with vicryl for subcutaneous tissue and ethilon for the skin closure done.

Figure 1: Pre op x ray of Lisfranc fracture

Figure 2: Intra op incision taken as shown above

Figure 3: Herbert screw fixation intraoperative

Figure 4: stabilization with a k- wire

Figure 5: closure of the wound

Figure 6: intra op c arm images

Figure 7: Final post-operative x ray of the foot

Results

Except in one case, when a missed cuboid fracture resulted in some slight lateral deviation of the forefoot due to lateral column shortening, anatomical reduction was achieved in all cases. At the follow-up, none of the instances showed any loss of reduction. Apart from the one example stated above, no longitudinal arch collapse or other defects were seen. There were no occurrences of profound infection or chronic osteomyelitis. At one year, one patient developed compartment syndrome as a result of delayed presentation, which resulted in clawing of the toes due to intrinsic muscular contracture. Two people reported chronic pain and two people reported numbness on the dorsum of their feet. Six months after surgery, ten out of eleven patients were able to return to work.

Discussion

Fixation of Lisfranc injuries has been described in a variety of ways. The majority of them use Kirshner wires for non-rigid attachment. Unfortunately, this results in the loss of correction or, in many cases, the inability to maintain the reduction. Arntz et al.(10) first described a more stiff form of fixation, emphasising the importance of precise open reduction of these injuries. The accuracy of reduction appears to be closely related to the success of treatment of these typically serious injuries, and tight fixation with screws looks to be an excellent option.

This type of open reduction and rigid fixation has proven to be quite efficient in our limited series, especially in severely unstable injuries. The rate of complications was minimal. There were no incidences of infection that went deep. In almost all situations, accurate reduction and maintenance of that reduction were achieved.

The need to remove implants 3 to 4 months after surgery and the high learning curve in precisely putting the lag screws are both downsides of this type of fixation. This necessitates a thorough understanding of the region's anatomy and patho anatomy. Fluoroscopy is useful for ensuring that the screws are properly reduced and positioned.

Another topic of debate is the possibility of the screws damaging the synovial tarso-metatarsal joints by crossing them. This did not appear to cause any issues, according to Arntz (10). We didn't detect any issues in our series either. In any event, the screws were removed early.

Conclusion

The use of closed or open methods to treat Lisfranc joint dislocation is still up for dispute. Percutaneous screw fixation, especially for Myerson type B (partial

incongruous) fractures and fracture dislocation injuries, is a successful, safe, and very straightforward technique of treating tarsometatarsal joint trauma. As long as anatomic reduction of the Lisfranc joint is performed, a favourable to outstanding functional outcome can be expected with PRIF. Anatomical correction affects the outcome of Lisfranc injury treatment. Internal stiff fixation with stability enables for anatomical repair using temporary screw fixation. Screws also keep their stability for a longer period of time, giving ligamentous injuries the time they need to recover. In conclusion, precise anatomical reduction and maintenance of reduction for healing were obtained using open reduction and transient stiff internal fixation of Lisfranc injuries. The long-term functional outcome is good, and the complication rate is low.

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