IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 22, Issue 6 Ser.13 (June. 2023), PP 08-11
www.iosrjournals.org

Fractures Of Sustentaculum Tali And Operative Management Of Sustentaculum Tali Fractures

Dr Shiva P[1],Dr Venkat Kiran Pillella[2], Dr Madhukar chegu[3]
1. Department of orthopaedics, Sree Balaji Medical college and hospital, Chennai, Tamil nadu.
2. Department of orthopaedics, Sree Balaji medical college and Hospital, Chennai, Tamil nadu.
3.Department of Orthopaedics, sree Balaji medical college and Hospital, Chennai, Tamil Nadu.

Abstract
Isolated Fractures Of The Sustentaculum Tali Are Relatively Rare And Most Of The Fractures Are Missed. Conservative Management In Most Of The Cases Leads To Complications Like Non-Union And Hind Foot Problems. This Article Describes About The Approaches, Surgical Management And Complications Encountered During The Fixation Of Sustentaculum Tali Fractures. During 5 Years Follow Up About 16 Patients Underwent Operative Fixation Of The Sustentaculum Tali Fractures. Patients X-Ray, Ct Scans Were Reviewed For The Fracture Pattern And Injury Characteristics. Operative Fixation Was Done Through Two Cannulated Screw Fixations. Conservative Management Of The Sustentaculum Tali Fractures Do Not Give A Good Functional Outcome. Open Reduction And Internal Fixation Done Through Medial Approach Is Appropriate Method Of Surgical Management.

Keywords:*Sustentaculum Tali, Calcaneus, Open Reduction And Internal Fixation, Fracture.*

Date of Submission: 17-06-2023 Date of Acceptance: 27-06-2023

I. INTRODUCTION

Calcaneal fractures constitute around 1.2% annually (1,2).Isolated fracture of the sustentaculum taliis very rare (3).Sustentaculumtali fractures are regarded as extraarticular fractures of the calcaneum (4).The surrounding tendons supports the structure and makes it more stable part of the calcaneus (5). Sustentacular tali forms the medial portion of the calcaneus and forms the middle facet of the subtalar joint. Flexor hallucis longus tendon sits in the groove underneath the sustentaculum talifragment. The sustentaculum tali serves as an attachment of the deltoid ligament and the plantar calcaneonavicular ligament(spring ligament).Displaced fractures of the sustentaculum tali fractures can cause a tarsal tunnel syndrome and Flexor hallucis longus tendon tendinopathy. A sustentaculum tali fractures can cause an incongruity of the extraarticular surface and compromise stability of the transverse tarsal joint and subtalar joint.Internal fixation of the isolated fractures of the sustentaculum tali are recommended to avoid complication (6). Improper management of a displaced fractures can lead to chronic pain and permanent disability (7)

The usual method of L shaped extensile lateral approach used for the calcaneal fracturefixation do not give a proper exposure to the sustentaculum tali.The sustentaculum tali lies just beneath the medial malleolus. A medial approach just below the medial malleolus gives a proper exposure of the sustentaculum tali. The main purpose of this study is to give a proper indication, fracture morphologyand surgical approach for operative internal fixation of the displaced sustentaculum talifractures. Here we report a case series of the sustentacular fractures that are managed surgically. The proper indication and surgical management are defined here.

II. Patients and methods

From march 2017 to June 2022, 16 patients with isolated sustentaculum tali fractures of the calcaneum was identified and managed surgically. It's anobservational prospective case series. Patients between age of 20-50yrs were included in the study. Patients with peripheral neuropathy, open fractures,pre-existing foot deformity and arthritis were excluded from the study. All the 16 patients were managed with open reduction and internal fixation.Sustentaculum tali are classified under extraarticular fractures of the calcaneum.The isolated fractures of sustentaculum tali withfracture displacement more than or equal to 1mm are considered for fracture fixation.Informed consent was obtained from all the patients. Both x ray and CT were taken to identify the fracture pattern. All patients were operated under general anaesthesia in supine positionwith medial approach to the calcaneus,a 5 cm incision below the medial malleoli along the path of the tibialis posterior tendon. During the approach the flexor hallucis longus tendon was identified and it is made sure that it does not lie between the fracture fragment. Initially the fracture fragment is held with the calcaneum using a k-wire then two cannulated

screws were fixed for the proper reduction of the fracture fragment. All the 16 patients were assessed based on American Orthopaedic foot and ankle society (AOFAS), a standardised clinical scoring system for the hind foot. The AOFAS clinical scoring system considers the following criteria 1. pain(40points)2. Function(50 points)-Activity limitations, Maximum walking distance, walking surfaces, Gait abnormality, sagittal motion, Hindfoot function, Ankle hindfoot stability 3. Alignment (10 points). The results are categorised as excellent with 90 to 100 points, good with 80 to 89 ,70 to 79 as fair and poor with results less than 70 points.

A B

C D

A. preop x-ray B. CT scan C. intra op c-arm image D. post op x-ray

The average age of 16 patients is 33yrs.10 patients sustained fracture on left foot and 6 patients sustained fracture on the right foot. Of the 16 patients 8 patients are motor vehicle accidents6 patients were fall from height,2 patients were with direct blow injury. All the patients underwent operative management of the fracture by same surgical team. All the details were recorded such as age, site of injury, mechanism of injury and associated other musculoskeletal injuries. Based on the fracture pattern x rays and CT scan were recorded.

III. RESULTS

Radiographs and CT scan clearly showed about the isolated fracture of sustentaculum tali. All patients underwent open reduction and internal fixation of the sustentacular talifracture at an average of 5 days. Medial approach just below the medial malleoli along the tibialis posterior tendon was adopted. Fixation was done with two Cannulatedscrews. All the patients were followed up post operatively for 6months. Mean time of bony union was7weeks. Radiographic healing of all the patients were of minimum of 2 months.4 patients developed

FHL tendinopathy post operatively during the follow up, which resolved with conservative management. No wound complication was noted for 15 cases except one case with surgical site infection which subsided with debridement and antibiotics.The outcome was assessed using the hind foot scale to AOFAS (American orthopaedic foot and ankle society). The outcome was excellent in 8 patients and good in 8 patients.

IV. Discussion

Isolated fractures of the sustentaculum tali are relatively rare. very few literatures are available regarding its existence.Usual symptoms are pain around the ankle but most of the patients loose the ability to walk properly. Antalgic gait is the most common presentation. On examination there is tenderness around the medial malleoli obvious by physical examination. A three-dimensional CT scan can provide a clear definition of the fracture. Magnetic resonance imaging can be considered for involvement of the soft tissue structures.

Sustentacular tali fractures are considered as the extraarticular fractures of calcaneum. Usually, conservative management like plaster cast is advocated, especially in minimally displaced fractures. In case where there is more displacement, the FHL tendon may get interposed between the fragments leading to injury to the tendon and hindering bony non-union (8). Inadequate treatment for sustentaculum tali fractures can cause early and late complication. Flexor hallucis longus tendon and tarsal tunnel syndrome are the common early complication of the sustentaculum tali fractures and post traumatic arthritis is often recognised as the late complication (9,10)

Tarsal tunnel syndrome can also occur secondary to hypertrophy of the sustentacular taliafter non-union. Only anatomical reduction and rigid fixation can avoid all these complications.

McReynolds first described about the medial approach to fixation of the sustentacular tali fractures (11).Burdeaux (12) published a review of 61 calcaneus fractures treated through a medial approach at a mean follow-up of 4.4 years, and demonstrated good-to-excellent results in 46 patients, as assessed with the AOFAS scoring system. Gath et al (13) reported only four cases from 15 year as a trauma surgeon.Wagner et al (14) assessed about the operative fixation,and found that small fragment should be reduced to avoid complication secondary to non-union. Operative fixation achieves reduction of the small fragment and attains indirect reduction of the articular fragment.Mc Raynaulds (15)introduced medial approach for the reduction of the sustentacular fragments. zwipp et al (16) explained about the medial approach for the comminuted articular fractures and reduction of the sustentacular fragments as the key block to reducing the fragments.

Wajdi et al found that for platelet rich plasma enhanced,tissue regeneration and healing for calcaneal non-union (17).The use of cancellous screws is important to replace the fracture fragments in to an anatomical reduction and to correct the Bohler's angle and hind leg varus and to reduce the subtalar joint (18)

Our study provided successful outcome with cancellous screw fixation of sustentaculum tali fractures. Very limited number of cases validates about the rarity of injury.With the limited cases we were able to draw conclusions regarding the outcomes and approach to the sustentaculartali fracture.

REFERENCES

[1]. Sanders R. Displaced intra-articular fractures of the calcaneus. J Bone Joint Surg Am 2000;82(2):225-250.
[2]. Rammelt S, Zwipp H. Calcaneus fractures: facts, controversies and recent developments. Injury 2004;35(5):443-461.
[3]. Romash M. Fracture of the calcaneus: an unusual fracture pattern with subtalar joint interposition of the flexor hallucis longus. A report of two cases. Foot Ankle Int 1992;13(1):32-41.
[4]. Tim Schepers, Abida Z. Ginai, Esther M. M. Van Lieshout &Peter Patka .Demographics of extra-articular calcaneal fractures: including a review of the literature on treatment and outcome Archives of Orthopaedic and Trauma Surgery volume 128, pages1099–1106 (2008)
[5]. A.Razik,M Hattis,Trompeter,Calcaneal fractures where are we now?strat Trauma Limb Reconstr.13(2018)
[6]. Garchar DJ, Lewis JE, DiDomenico LA. Hypertrophic sustentaculum tali causing a tarsal tunnel syndrome: a case report. J Foot Ankle Surg 2001;40(2):110-112.
[7]. R.A Agha.M.R Borrelli, R.Farwana.k.Koshy, A.Fowler, D.P Orgill For the SCARE Group.The SCARE 2018 statement: updating consensus Surgical Case Report(SCARE) guidelines.int.J.Surg 60 (2018)132-136
[8]. Myerson MS, Berger BI. Nonunion of a fracture of the sustentaculum tali causing a tarsal tunnel syndrome: a care report. Foot Ankle Int 1995;16(11):740-742.
[9]. H.Mu,X Xiangyang,B.Gang,Isolated fractures of the sustentaculum tali:injury characteristics and surgical technique for reduction management.Foot Ankle Surg(Asia-Pacific)1 (2) (2014) 48-51
[10]. P.Moonot,GSharma,A.R Kadakia,Malunion of the sustentaculum tali fracture with talo-calcaneal coalition leading to tarsal tunnel syndrome. a case report. Foot(2021)1-5.
[11]. P.Phisitkul J.P Sullivan,J.E Goetz,J.J Marsh,Maximizing safety in the screw placement for posterior facet fixation in calcaneal fractures:a cadaveric radio anatomical study,Foot Ankle int.34 (9) (2013) 1279-1285
[12]. Burdeaux BD Jr. The medial approach for calcaneal fractures. Clin Orthop 1993;290:96-107.
[13]. Gatha M, Pedersen B, Buckley R. Fractures of the sustentaculum tali of the calcaneus: a case report. Foot Ankle Int 2008;29(2):237-240
[14]. Wagner UA, Sangeorzan BJ, Harrington RM, et al. Contact characteristics of the subtalar joint: load distribution between the anterior and posterior facets. J Orthop Res 1992;10(4):535-543.
[15]. McReynolds IS. The case for operative treatment of fractures of the oscalcis. In Leach RE, Hoagland FT, Riseborough EJ. Controversies in Orthopaedic Surgery, Philadelphia, Saunders; 1982.

[16]. Zwipp H, Tscherne H, Thermann H, et al. Osteosynthesis of displaced intra-articular fractures of the calcaneus: results in 123 cases. Clin Orthop 1993;290:76-86.
[17]. B.Wajdi,M.A Rebai. W Baya, N.Krid. , H.Keskes, Pseudoarthrosis of the calcaneus: advantages of regenerative medicine in the management of a rare entity. a case report and review of the literature open Orthop.J.12(2018)141-146W.Zribi
[18]. C.D. Basa.E.Sarieckiz,L.EKacmaz,A.Er,V Zhamilov,A.Reigsoglu et al.Definitionsustentacular screw length based on computed tomography measurements for calcaneus intraarticular fracture surgery,J DEU Med 34(3) (2020) 203-207.