



SUBTALAR DISLOCATION OF LATERAL VARIETY WITH OR WITHOUT ASSOCIATED INJURIES OF FOOT -A CASE SERIES.

Orthopaedics

Dr. Ramniwas Bishnoi

Associate Professor, Department of Orthopaedics, Dr.S.N Medical College, Jodhpur

Dr. Mahendra Singh

Assistant Professor, Department of Orthopaedics, Dr.S.N Medical College, Jodhpur

Dr. Jayesh Chouhan

Senior Resident, Department of Orthopaedics, Dr.S.N Medical College, Jodhpur

Dr. Nandlal Bharwani*

Senior Resident, Department of Orthopaedics, Dr.S.N Medical College, Jodhpur
*Corresponding Author

Dr. Mahesh Bhati

Senior Professor and HOD, Department of Orthopaedics, Dr.S.N Medical College, Jodhpur

ABSTRACT

Introduction- Of all the injuries encountered around foot and ankle joint, subtalar dislocations are of rare occurrence. Most common mode of dislocation is high energy trauma (fall from height, road traffic accident and sports injuries). **Methods-** We conducted a prospective study from 1st January 2017- 31st December 2020 including four patients (3 males and one female) with closed lateral subtalar dislocations with (one) or without fractures (three). In our study, closed reduction was performed in all cases. **Results-** At final follow-up functional score was evaluated using AOFAS-AHFS score and radiological assessment. All four patients had good functional outcome at final follow-up and none of them had difficulty in daily routine activities. **Conclusion-** Closed lateral subtalar dislocations are purely ligamentous injuries and has good functional outcome if managed properly (short period of immobilization followed by early mobilization).

KEYWORDS

Subtalar dislocation, Eversion injury, Acquired flat-foot, AOFAS-AHFS, High energy-trauma.

INTRODUCTION-

Of all the injuries around foot and ankle joint, subtalar dislocation is a form of rare injury and accounts for approximately 1-2% of dislocations.¹ The joint capsule, ligamentous attachment in subtalar joint (between talus and calcaneum) and mechanics of tibio-talar joint are behind its rare occurrence.² In 1811 dislocation around subtalar joint was first described by Judcy.³ In 1853 subtalar dislocation were classified on the basis of the direction of foot with respect to talus as medial, lateral, posterior^{4,5} by 'Broca' whereas anterior type was described by 'Malgaigne and Burger'.⁶

It is commonly encountered in males of young age group and it occurs following eversion injury in dorsiflexed foot. Most common mode of injury around subtalar joint is high energy trauma (fall from height, road traffic accident and sports injuries).^{7,8}

Lateral type accounts for 17-26% of all dislocations around subtalar joint and is second most common type followed by medial type whereas anterior, posterior variety accounts for merely 1%.^{9,10}

Here associated bony injuries stands for talar process, talar neck, calcaneum and metatarsal fractures. Associated soft tissue injuries are not uncommon in the form of flexor and extensor tendon injuries.^{11,12} Prognosis of pure ligamentous injuries are good- excellent after anatomic reduction, which when associated with articular fractures can affect the outcome in terms of function.

Aim-

To study the outcome of conservative measures in lateral subtalar dislocation with or without associated injuries and its complications.

MATERIALS AND METHODS-

This prospective study was conducted in the Department of Orthopaedics in a tertiary health care centre between 1st January 2018 to 31st December 2021.

A total of four patients (3 males and 1 female) with subtalar dislocations of lateral variety were included in our study, out of which one had calcaneum fracture of depressed type in same extremity. All cases with open fractures and with neuro-vascular compromised limb were excluded from this study. All four patients came in emergency department of hospital on the day of injury. All the patients presented

with dislocations were assessed clinically (tenderness, overlying skin, swelling, deformity around foot and ankle, neurovascular status of limb) and radiologically.

Thereafter, closed reduction was performed under sedation, neurovascular status and stability was confirmed and patients were given below knee slab for 7 days followed by below knee cast for 3 weeks.

Reduction Maneuver- Reduction was done with patient lying supine with knee flexed for followed by traction followed by plantar-flexion and inversion of foot, after which below knee slab was given.

Post reduction digital radiograph was done and joint congruency and any associated injuries missed on radiograph were assessed with help of post reduction CT-scan.

Then all the patients were observed for one day and were discharged after that.

Rehabilitation-

The ankle and foot were immobilized for three weeks in below knee cast, then after removal of cast, full range of motion was allowed gradually under supervision. Partial weight-bearing with help of walker was started from 6th week and full weight bearing from 8th week. Follow-up protocol- The patients were followed up every month for first 3 months, followed by every 3 months till 1 year after closed reduction. AOFAS-AHFS score was calculated at 1 year follow-up. At each visit patients were assessed clinically and radiologically.

RESULTS-

A total of four patients were included in our study (3 males and 1 female). The mean follow-up period was 17.5 ± 4.51 months (range 12- 23 months). The mean age of study group was 27 ± 4.69 (range 21- 32 years). Two patients (50%) had history of fall from height, rest two (50%) had history of road traffic accident. One patient had depressed calcaneal fracture. The AOFAS-AHFS score was used for evaluation of function and then mean AOFAS-AHFS score was 82 ± 3.65

In this study, one patient had post-reduction stiffness which was resolved within four months post subtalar dislocation by intense physiotherapy.

Table-1 showing follow-up score of patients.

Cases	Age(Year s)	Sex	Mode of injury	Follow-up (Months)	AOFAS-AHFS score	Injured Side	Associate fractures	Complications
1	21	M	Fall from height	18	84	R	-	-
2	26	F	RTA	12	78	L	Depressed calcaneum fracture	Stiffness
3	32	M	RTA	17	86	R	-	-
4	29	M	Fall from height	23	80	L	-	-

At final follow-up all four patients showed good results in terms of function assessed by AOFAS-AHFS score. Clinical examination showed no laxity or instability. In all four patients, complete range of motion (ROM) was achieved and none of them had difficulty while performing activities of daily routine.

DISCUSSION-

Of all the dislocations around foot and ankle, subtalar dislocations accounts merely for 1% in which talus is centre around which navicular and calcaneum are displaced.¹³ Lateral variety of subtalar dislocations are complex injuries that are rarely encountered in emergency department and outdoor by orthopaedic surgeons.

Lateral subtalar dislocation or acquired flat foot occurs as result of forced eversion of forefoot in relation to dorsi-flexed foot.¹⁴

Subtalar dislocations and high energy trauma have significant association such as fall from height, road traffic accident. In study by Hoexum et al fall from height in 32.9%(118/359), road traffic accident in 43.7%(157/359), sports injury in 5.3%(19/359)^{15,16} whereas in present study, 2(50%) out of 4 had history of fall from height, rest 2(50%) had history of road traffic accident, whereas In our study of four patients with lateral subtalar dislocation with (1 depressed calcaneum fracture) and without fractures(3 cases), males were commonly affected (M: F- 3:1) which was similar to studies conducted in past.^{17,18}

Closed subtalar dislocations of lateral variety had good functional outcome when early closed reduction and immobilization for adequate period was performed. In this study, three out of four (3/4, 75%) cases had isolated subtalar dislocation of lateral type and had good functional outcome at final follow-up which when compared to studies conducted by Wagner et al¹⁹ (6/21 patients) and Inokuchi et al²⁰ (4/17 patients) of closed lateral subtalar dislocation as shown in table 2.

In these rare injuries, bony involvement is varied in the form of extraarticular and intraarticular components, such involvement affects functional outcomes as fracture healing requires prolong immobilization. In our study, one patient(1/4 = 25%) with associated tarsal fracture (depressed calcaneum fracture) had good functional outcome, similar results observed by Inokuchi et al²⁰ in associated bony injuries (13/20= 65%). In our study, one patient had fracture around subtalar joint, we need larger cohort of patients (with associated bony injury) to reach on any outcome related inference.

Post reduction CT- Scan was performed to assess articular congruity and associated fractures of tarsal and meta-tarsals, as suggested in various studies.^{21,22} Prompt diagnosis of such rare injuries and associated osseous component, around subtalar region guides in management of these rare entity.

Till date, debate is on regarding duration of immobilization post-reduction of subtalar joint dislocation. In present study, four weeks of immobilization in below knee cast was given in three cases with simple lateral subtalar dislocation, whereas in one case with associated depressed calcaneal fracture extremity was immobilized for six weeks, followed by physiotherapy under guidance and as per tolerance weight-bearing was allowed, which similar to protocols undertaken by Rida-Allah et al²³ and Giannoulis et al² for lateral subtalar dislocation with or without articular fractures.

In our study, one patient with associated tarsal fracture(depressed

calcaneal type) had post-reduction stiffness which resolved within four months by physiotherapy. Incidence of subtalar dislocation is low and that of lateral variety is very less. Conservative treatment in form of closed reduction and immobilization for proper time period followed by physiotherapy and weight-bearing as per tolerance to achieve plantigrade foot for doing activities of daily routine. In present study the cases are less in number and patients with associated fractures are less, so we need large number to comment upon the functional outcome.

CONCLUSION-

Isolated closed subtalar dislocations are rare injuries encountered around foot and ankle joint. The mechanism of injury being (Fall from height, RTA, sports injury). For such injuries, closed reduction followed by immobilization being treatment of choice. These injuries had good functional outcome in terms of range of motion, daily routine activities which depends upon short period of immobilization followed by early rehabilitation.

Source of funding- None

Conflict of interest- None



Fig-1 showing eversion of foot and prominence of talar head.



Fig-2 Antero-posterior and lateral radiograph of the ankle joint suggestive of lateral subtalar dislocation.

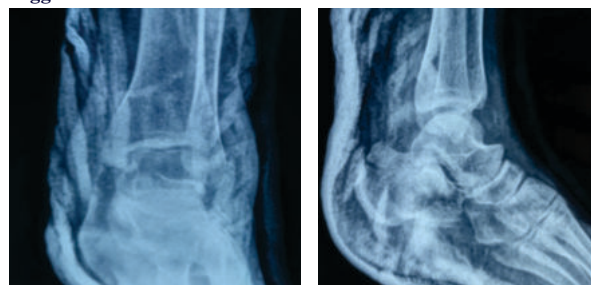


Fig-3 Antero-posterior and lateral radiograph of ankle joint post reduction showing articular congruity.



Fig-4 Post reduction CT-scan of ankle and foot suggestive of ankle and subtalar joint congruity with depressed calcaneum fracture.



Fig-5 Lateral radiograph of ankle showing healed calcaneum fracture with maintained subtalar and talo-navicular joint congruity.

REFERENCES-

1. Leitner B: Luxation sous-astaliennerecente du pied avec subluxation tibiotarsienne de l'astragale. Rev Chir Reparatrice Appar Mot 1954.
2. Giannoulis D, Pappadopoulos DV, Lykissas MG, Koulouvaris P, Gkiatas I, Mavrodontidis A. Subtalar dislocation without associated fractures: Case report and review of literature. World J Orthop 2015;6:374-9.
3. Jucy P: Observation d'une luxation metatarsienne. Bulletin de la faculte de medecine. Bull Fac Med Paris 1811.
4. Hoexum F, Heetveld MJ. Subtalar dislocation: two cases requiring surgery and a literature review of the last 25 years. Arch orthop Trauma Surg 2014.
5. Jungbluth P, Wild M, Hakimi M, Gehrman S, Djuricic M, Windolf, Muhr G, Kalicic T. Isolated subtalar dislocation. J Bone Joint Surg Am 2010.
6. Malgaigne JF, Buerger CG. Die Knochenbrüche und Verrenkungen Stuttgart: Rieger, 1856.
7. R. Saini, M.S. Dhillon, and S.S Gill, " Congenital subtalar dislocation- a case report", Foot, vol.19.
8. R.A. Kaufmann, R. Davidson and J.McCarthy, " Bilateral congenital subtalar dislocation: a case report", Clinical Orthopaedics and Related Research, vol.397.
9. C.Bibbo, R.B.Anderson , and W.H Davis, " Injury characteristics and the clinical outcome of subtalar dislocations: a clinical and radiographic analysis of 25 cases". Foot and Ankle International.
10. S.H.H. Hui and T.H. Lui, " Anterior subtalar dislocation with comminuted fractures of the anterior calcaneal process", BMJ Case Reports.
11. H.Budd, J. Winhurst, B.Davis, and R. Hutchinson, " Irreducible posterior dislocation with incarceration of a fracture of the anterior process of the calcaneum. " Journal of Bone and Joint Surgery".
12. J.Hsu, T.C.Demos, L.M Lomasney, and E.J. Mitchell, " The case: Talar neck fracture with tibiotalar and posterior subtalar dislocation". Orthopaedics.
13. Perugia D, Basile A, Massoni C, Gumina S, Rossi F, Ferretti A. Conservative treatment of subtalar dislocations. Int Orthop 2002;26:56-60 [PMID: 11954852 DOI:10.1007/s002640100296]
14. Inokuchi S, Hashimoto T, Usami N. Posterior subtalar dislocation. J Trauma 1997; 42: 310-313 [PMID: 9042888 DOI: 10.1097/00005373-199702000-00023]
15. De Palma L, Santucci A, Marinelli M et al (2008) Clinical outcome of closed isolated subtalar dislocations. Arch Orthop Trauma Surg 128 (6):593-598.
16. Wagner R, Blattner TR, Weckbach A (2004) Talar dislocations. Injury 35 (Suppl 2): SB36-SB45.
17. Edmunds I, Elliott D, Nade S. Open subtalar dislocation. Aust N Z J Surg 1991; 61: 681-686 [PMID: 1877937 DOI: 10.1111/j.1445-2197.tb00320.x]
18. Ruhlmann F, Poujardieu C, Vernois J, Gayet LE. Isolated Acute Traumatic Subtalar Dislocations: Review of 13 cases at a mean Follow-Up of 6 years and literature review. J Foot Ankle Surg 2016 [PMID: 26947001 DOI: 10.1053/j.jfas.2016.01.044]
19. Wagner R, Blattner TR, Weckbach A (2004) Talar dislocations. Injury 35(Suppl 2):SB36-SB45.
20. Inokuchi S, Hashimoto T, Usami U et al (1996) Subtalar dislocation of the foot. Foot 6:168-174.
21. Jerome JT, Varghese M, Sankaran B. Anteromedial subtalar dislocation. J Foot Ankle Surg 2007;46:52-4.
22. C.Bibbo, S.S. Lin, N. Abidi et al. , "Missed and associated injuries after subtalar dislocation: the role of CT", Foot and Ankle International, vol.22, no.4, pp.324-328,2001.
23. Rida-Allah B, Hicham A, Mahfoud M, Elbarddouni A, Berrada MS, Elyacoubi M. Rare case of pure medial subtalar dislocation: Conservative treatment and 32 months follow-up. J Emerg Trauma Shock 2015;8:174-5.