



SUBTALAR DISLOCATION : SERIES OF 6 CASES AND REVIEW OF LITERATURE.

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ABSTRACT Isolated acute traumatic subtalar dislocations are quite rare due to inherent instability of the talus. We report six cases of acute traumatic subtalar dislocation of which four is closed and rest two are open dislocation, five cases were treated successfully by close reduction under general anaesthesia, one case required open reduction and percutaneous pin insertion for stability, followed by plaster immobilisation and wound care in open cases, all six cases followed for a period of 1 yr, clinical evaluation done using 'Gay and Evrard' criteria, radiological assessment using regular X-ray. The management and recent review of literature has been discussed.

KEYWORDS :

INTRODUCTION

Subtalar dislocation also known as 'peritalar dislocation' refers to simultaneous dislocation of the distal articulations of the talus at talonavicular and talocalcaneal joints.^[1] High energy mechanisms such as motor vehicle trauma and fall from height accounted for 68% of subtalar dislocation.^[2] Medial dislocations are thought to be more common comprising upto 85% of subtalar dislocations.^[3] Standard treatment includes closed reduction under general anaesthesia followed by below knee plaster immobilisation for 4 - 6 weeks.

Case illustration

In a span of 2.5 years six cases of acute traumatic subtalar dislocation got admitted and treated in our department. All cases treated under anaesthesia, none of them required open reduction. Reduction was done by giving traction at foot and counter traction by another person at proximal leg, gentral thrust was given to talus while maintaining the traction at foot, followed by immobilization in below knee POP slab.

Table 1: Details of cases and their comparisons.

	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Patient 6
Age	38	33	42	25	26	45
Gender	Male	Male	Male	Male	Male	Male
Side	Right	Right	Left	Right	Left	Right
Etiology	Playing football	Motor vehicle accident	Motor vehicle accident	Motor vehicle accident	Motor vehicle accident	Motor vehicle accident
Mechanism Of injury	Inversion of foot	Inversion of foot	Inversion of foot	Eversion of foot	Inversion of foot	Eversion of foot
Open/close	Close	Close	Close	Close	Type I open	Type II open
Dislocation direction	Medial	Medial	Medial	Lateral	Medial	Lateral
Associated fracture of talus	No	No	No	No	No	No
Other associated injuries	No	No	No	Ipsilateral Undisplaced fracture shaft of 3rd metatarsal	No	No
Type of reduction	Close	Close	Close	Close	Close	Open
Debridement	No	No	No	No	No	Yes
Ligament repair	No	No	No	No	No	No
Post surgical immobilisation (non weight bearing + partial weight bearing)	Posterior foot splint(4 + 2 weeks)	Posterior foot splint(4 + 2 weeks)	Posterior foot splint(4 + 2 weeks)	Posterior foot splint(6 + 2 weeks)	Posterior foot splint(6 + 4 weeks)	Posterior foot splint(12+ 4 weeks)
Time to full weight bearing	6 weeks	6 weeks	6 weeks	8 weeks	3 months	4 months
Rehabilitation period	4 weeks	4 weeks	4 weeks	4 weeks	4 weeks	3 months
Total follow up	14 months	12 months	12 months	12 months	14 months	16 months
Bony changes in tarsals at final follow up	None	None	Osteoarthritic changes at subtalar joint	None	Osteoarthritic changes at subtalar joint	Gross osteoarthritis with subchondral sclerosis
Final range of movement	Dorsiflexion 10 -15° Plantarflexion 40 - 45° Inversion 15-20° Eversion 5- 10°	Dorsiflexion 10 -15° Plantarflexion 40 - 45° Inversion 10-15° Eversion 5-10°	Dorsiflexion 10 -15° Plantarflexion 30 - 35° Inversion 5-10° Eversion 5°	Dorsiflexion 10 -15° Plantarflexion 40 - 45° Inversion 10-15° Eversion 5-10°	Dorsiflexion 10 - 15° Plantarflexion 20 - 30° Inversion 5° Eversion 0°	Dorsiflexion 5-10° Plantarflexion 10° Inversion. 0° Eversion 0°
Final clinical assessment: Gay & Evrard	14 Very good	14 Very good	13 Very good	14 Very good	12 Good	8 Moderate

Clinical and radiological pictures

Case 1 :



1A. Clinical picture,



1B. X-ray at the time of presentation



1C. X-ray post reduction



1D. Post reduction plantar flexion

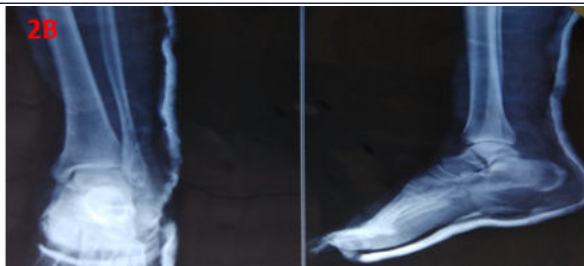


1E. Dorsal flexion.

Case 2 :



2A. X-ray at the time of presentation



2B. X-ray post reduction



2C. Post reduction dorsal flexion



2D. Plantar flexion

Case 3:



3A. X-ray at the time of presentation



3B. X-ray post reduction

RESULTS

The mean age of the patients was 34.83 years. All 6 were men. 66.7% of cases were right sided and 33.3% were left sided. 83.4% of cases are due to road traffic accidents, and one patient sustained injury while playing football. 4 cases had close dislocation, one type I open and one type II open. 4 patients had medial subtalar dislocation and 2 had lateral subtalar dislocation, Inversion of foot is the mechanism of injury in patient with medial subtalar dislocation, and Eversion of foot in lateral subtalar dislocation.

All close dislocation and type I open dislocation were reduced in close method as described above. Type II open dislocation required surgical extension of wound, thorough debridement followed by reduction and percutaneous fixation with steinmen pin for stability, wound closure was not possible so left open and patient underwent subsequent

debridement followed by skin grafting to cover the raw area. Soft tissue reconstruction was not attempted as the wound was contaminated. All cases were immobilised in below knee POP slab.

Immobilisation was continued for 4 weeks in closed cases to allow healing of soft tissue injuries followed by ankle mobilisation by plantar and dorsiflexion. Partial weight bearing was allowed after 4 weeks and after 6 weeks in type I open injury. Immobilisation was continued for 3 months in type II open as wound was not healthy, rehabilitation started later on. Full weight bearing was allowed by 6 - 8 weeks in close injuries and 12 - 16 weeks in open injury case.

Mean duration of total followup was 13.4 months. Type II open injury patient had gross osteoarthritis changes with subchondral sclerosis at subtalar joint, one case of close injury and one of open injury had mild osteoarthritis changes

Post reduction CT scan was done in all cases and none of the cases had any associated fracture of tarsal bones. One case with close dislocation had ipsilateral undisplaced fracture of shaft of 3rd metatarsal, which was treated conservatively.

The final range of movement at ankle and subtalar joint was near normal in close case, reduced in type I open case and restricted in type II open. Clinical assessment according to the Gay and Evrard scale (Table 2), showed very good results in the closed cases and good results in type I open case and moderate in type II open with a mean value of 12.5 points. (Table 1)

Table 2. Gay and Evrard scale (described by Elise et al⁴)

Note	Pain	Edema & tropic problems	Mobility	Stability	Occupational activity
0	Permanent	Marked permanent edema	Severe stiffness	Frequent accidents	Impossible
1	Function limiting	Marked edema on effort	Moderate stiffness	Occasional accidents	Change
2	After a great tiredness	Slight or intermittent edema	Minimal stiffness	Walking in rough terrain	Same activity with restrictions
3	Absent	Absent	No stiffness	No notion of instability	Identical

In the Gay Evrard assessment, several points in the scale, from 0 to 3 depend on parameters that determine pain, instability, mobility, tropic sequelae and professional activity after trauma. This scale was originally used for tibial pilot fractures. Elise et al⁵ modified the results decreasing the score by 3 points if the distance walked is less than or equal to 100 m, decreasing it by 2 points if walking is limited to a distance of between 100 and 500 m and decreasing it by 1 point if it is limited to between 500 and 1000 m. In this manner the results are considered **very good** (if sum total of points is between 13 and 15), **good** (if sum total of points is between 10 and 12), **moderate** (if sum total of points is between 7 and 9) and **poor** (if sum total of points is less than 6 points).

DISCUSSION

Peritalar dislocations are rare injuries represent about 1% of all traumatic dislocations⁶¹. 87% of patients were male from the review of literature conducted⁶¹, which is seen in our case series where 100% of cases are males.

The most widely used classification has been described by Broca who distinguished 3 types of subtalar dislocation: (1) the medial dislocation; (2) the lateral; and (3) the posterior dislocation. Direction of the foot in relation to the talus was the major element to classify dislocation as medial, lateral or posterior. Malaigine and Burger described an additional type of subtalar dislocation, the anterior dislocation¹⁷

With an estimated rate of 65%-85% medial dislocation, is the most frequent type, which is seen in our cases series too. Medial dislocation, also known as "acquired clubfoot", is result of forceful inversion of forefoot which applies stress on lateral collateral ligament when foot is in plantarflexion. The talus pivots on sustentaculum tali. If the strong talocalcaneal and talonavicular ligaments rupture, talus remains in

normal position at ankle joint and subtalar joint dislocation occurs. The second most frequent type is lateral dislocation, also known as "acquired flat foot", which account for 15%-35% of all subtalar dislocations⁸¹.

In most of cases there is an associated fractures, such as fracture of fifth metatarsal, talus or malleoli⁹¹. But one of our cases had associated undisplaced fracture shaft of 3rd metatarsal. Most of the patients (83.3%) were treated conservatively with closed reduction under general anesthesia and immobilization with a shortleg cast for 3-6 wk. The intermediate results were described as good to excellent¹⁰⁰. In cases which are non-reducible by closed means it is recommended to proceed to open reduction¹¹¹

Five of the six cases were treated by close reduction and one required extension of wound as soft tissue impingement restricted reduction. In all cases, in addition to plain ankle and foot radiographs, a CT scan should be performed after reduction to document additional bony injury to the subtalar area and adjacent bones¹²¹.

The duration of immobilization remains controversial. In complicated dislocations an initial immobilization by means of posterior splint is recommended. In this way, a more safe way of monitoring the condition of the skin and soft tissue envelope is achieved¹⁹¹. Immobilisation in closed cases was upto 6 weeks, and in open cases mean duration was 12 weeks to allow wound and soft tissue healing showed good results in our study. Subtalar joint stiffness in cases of immobilization for less 4 wk is minimal¹³¹. Two open cases which had prolong duration of immobilisation, rehabilitation period was increased due to ankle stiffness. Excellent outcomes can be achieved if 3 conditions are fulfilled: (1) low energy forces are applied on soft tissue envelope during injury; (2) a prompt reduction is performed; and (3) immobilization is applied for a short period of time¹⁴¹.

Long-term complications are post traumatic arthritis (usually of the subtalar, the talonavicular or the tibiotalar joint), osteonecrosis of talus, and subtalar joint stiffness¹⁵¹. Except for stiffness and wound infection, not many complications encountered in our study. Eventually 80% of subtalar dislocations will demonstrate a small reduction of subtalar and/or ankle range of motion, while in 50%-80% of subtalar dislocations there will be subtalar arthritic changes in X-rays¹⁶¹ which is about 50% in our study. Incidence of post traumatic osteonecrosis of the talus ranges from 10% to 29%¹⁷¹. Post traumatic fibrosis of the periarticular soft tissue envelope due to high energy forces is the main cause of ankle joint stiffness. These forces except from soft tissue fibrosis will not result to degenerative changes¹⁸¹. Since the duration of follow up is less, long term complications and couldn't be elicited and may require further followup.

In summary, isolated subtalar dislocations occurs with an extremely low incidence rate. In cases with successful closed reduction and no signs of remaining instability conservative treatment can prove beneficial. The limb should be immobilized in a short leg splint and early mobilization should be allowed to achieve full range of motion without pain.

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