

**DISLOCATION OF THE SUBTALAR JOINT: MANAGEMENT AND PROGRESS
ABOUT 4 CASES**

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ABSTRACT

Subtalar dislocation or periastragalar dislocation is a loss of anatomical relationships between the talus, calcaneus and scaphoid. The congruence of the tibio-peroneo-talar joint is maintained. Our study concerns 5 cases of subtalar dislocations collected in the orthopedics department of the Rabat University Hospital. It makes it possible to compare the results obtained with those of the literature.

KEYWORDS: Sub Talar join – Calcaneus.

INTRODUCTION

Subtalar dislocation or periastragalar dislocation is a loss of anatomical relationships between the talus, calcaneus and scaphoid. The congruence of the tibio-peroneo-talar joint is maintained.

This is a rare lesion. It represents 1% of all dislocations observed in trauma according to Heitner.^[5] The internal variety is more common than the external. The reduction must be carried out urgently under anesthesia. If orthopedic reduction proves impossible, surgical treatment makes it possible to obtain an anatomical reduction by removing obstacles and performing osteosynthesis of the associated intra-articular fractures. The prognosis for this lesion is better if treatment is rapid and appropriate.

Our study concerns 5 cases of subtalar dislocations collected in the orthopedics department of the Rabat University Hospital. It makes it possible to compare the results obtained with those in the literature, and to identify a certain number of prognostic factors, as well as a course of action to take in the face of these lesions.

MATERIALS AND METHODS

This is a retrospective study including 5 patients with subtalar dislocation, observed between May 2022 and May 2024. The results were analyzed with a mean follow-up of 12 months and extremes of 8 months and 22 months.

We collected 5 files. This involved a population of 4 men and 1 woman with an average age of 29.2 years. The circumstances of occurrence were either public road accidents, work accidents with a fall from a high place, or sports accidents. The right side which is dominant is the most affected.

The clinical examination of the patient in the emergency room aims to first eliminate any associated vital lesions, the locoregional examination finds excruciating pain and total functional impotence of the affected limb which were constant in all patients with an obvious deformity of the foot which was characteristic depending on the site of the dislocation.

In internal dislocation, we notice

- The external projection of the head of the astragalus,
- The calcaneopedal block is displaced medially and supinated, with the external malleolus protruding under the skin that it threatens.

In external dislocation, we find

- The protrusion of the head of the astragalus inside,
- The calcaneo-pedal block is thrown outwards, in pronation, with protrusion of the tibial malleolus.

Very quickly, edema and hematomas make it difficult to describe the foot which is clearly deformed, suggesting: a club foot in the internal dislocation or a flat foot in the external dislocation.

Subtalar dislocations often cause skin lesions

Skin opening classified according to the CAUCHOIX and DUPARC classification.

We noted other skin lesions, such as bruises, abrasions.

The radiological study was based on standard radiographs which are sufficient to make the diagnosis and to study the displacement of the dislocation especially on the frontal view and the associated fractures.

All patients were hospitalized under emergency circumstances.

(No delay is tolerated): However, this delay is necessary in certain cases. It varies between 2 and 7 hours with an average of 4 hours.

For orthopedic treatment, the reduction is done by boot puller maneuver then immobilization with a cast boot.

For surgical treatment, an open dislocation is reduced in the operating room with washing trimming and stabilization by pinning supplemented by immobilization

with a fenestrated plaster boot, and if a dislocation has been judged unstable, it is stabilized by pinning.

Post-reduction restraint using a cast boot was carried out in all our patients for an average duration of 45 days.

The patients were followed regularly in consultation. With an average follow-up of 12 months. Our patients were evaluated functionally and clinically according to the Gay Evard criteria, based on 5 criteria: Pain, Walking, Stability, Mobility Professional or sporting activity. The overall result is obtained by adding the scores obtained for each criterion.

If the overall score is: 0 to 4: poor result

5 to 8: fair result

9 to 12: pretty good result

13 to 15: good result

The radiological evaluation at the last follow-up was based on a frontal and lateral x-ray of the ankle aimed at essentially documenting signs of osteoarthritis or necrosis of the talus. In the radiological follow-up we noted the occurrence of a single case of osteoarthritis.

Case1: Clinical and radiological appearance of an internal subtalar dislocation reduced anatomically and treated orthopedically with a cast boot for 45 days.



Case 2: Internal subtalar dislocation with partial posterior fracture which was unstable after reduction and required stabilization by calcaneal-talar pinning supplemented by cast support.



Case 3: Open external subtalar dislocation.

Standard radiograph of the F/P ankle showing an external subtalar dislocation

A CT scan of the ankle requested as part of a body scan revealing the subtalar dislocation



Case 4: Open external subtalar dislocation, reduction is made under AG by external maneuver then stabilization by calcaneo-talar pinning with plaster support by fenestrated boot.



Case 5: Internal subtalar dislocation associated with a fracture of the calcaneus which cannot be reduced with closed surgery.



Open reduction, osteosynthesis of the calcaneus by screwing, and stabilization of the subtalar by pinning supplemented by plaster support



RESULTS

Our series includes 5 cases. These were 4 men (80%) and 1 woman (20%), the sex ratio = 4, with an average age of 29.2 years; the extremes being 22 years and 41 years.

The circumstances of occurrence were 2 road accidents, 2 work accidents involving a fall from a high place, and a sporting accident. The right side which is dominant is affected in 4 cases, the left side is only affected once. The subtalar dislocation was located internally in 4 cases, the external subtalar dislocation was only reported in one patient.

The skin opening was noted in one patient (20%), it followed an external dislocation and the opening was located internally, we classified it type 2 according to the CAUCHOIX and DUPARC classification.

Orthopedic treatment was carried out for 2 patients, reduction made by boot puller maneuver and immobilization by plastered boot for 45 days. Surgical treatment instituted for 3 cases (25%), the 1st was an open fracture which was reduced in the operating room with washing trimming and immobilization with a fenestrated plaster boot, the 2nd was an unstable dislocation which required stabilization by calcaneo-talar pinning supplemented by immobilization with a plaster boot and the 3rd was an internal subtalar dislocation associated with a fracture of the calcaneus with closed reduction impossible, he was given an open reduction, synthesis of the calcaneus and stabilization of the subtalar by pinning supplemented by a plaster boot for 45 days.

At the last follow-up, the clinical evaluation of patients by the GAY EVARD score, we noted 3 good results with a GAY EVARD score of 12.8/15 on average. Two patients had fairly good results (11/15), a 42-year-old man suffering from a PVA causing an open external subtalar dislocation who was treated surgically with a simple follow-up but who progressed to well-established osteoarthritis. tolerated by the patient, the 2nd is a 34-year-old man who was the victim of a work accident causing a subtalar dislocation associated with a calcaneus fracture which progressed towards osteoarthritis of the subtalar moderately tolerated.

DISCUSSION

Using an expression that has now become classic, if not common, let us recall that "subtalar dislocations are rare: but not exceptional"; and like Saillant^[1], we are not far from thinking that they are certainly more frequent than we think, because without doubt a good number of traumas labeled "ankle sprain" would be spontaneously reduced subtalar dislocations and misknown. Leitner^[4] estimated these dislocations at approximately 1% of all dislocations, and Delee and Curtis^[5] at slightly less than 2% of dislocations involving major joints.

It is a dislocation that affects young adult males with an average age of 29 years and more frequently the right side, which agrees well with other series in the literature.^[4,6,7,8,10] Concerning the circumstances of occurrence, our results are similar to those in the literature^[6,10], namely mainly public road accidents, falls from a high place and sports accidents.

In the literature we note a clear predominance of internal dislocation, almost the same figures of which were

reported in our series. This is explained by the theoretical and experimental studies of Allieu^[9] which shows that the foot is more exposed to inversion and equine mechanisms.^[1,4,6,7,8]

The treatment of these dislocations aimed to recover the function of the ankle (dolence, mobility and stability).

The treatment of these dislocations is mainly orthopedic. The reduction must be done as soon as possible and is usually carried out under general anesthesia.

The methods described by the classic authors (Boehler^[11]) remain valid and we will recall the essential points of an easy reduction

- Patient in supine position, Knee flexed to 90° to relax the triceps, one hand is placed on the antero-superior region of the tibiotarsal to maintain the lower limb, the other hand palms and pulls the foot forward in plantar flexion like tearing off a boot.

- Malgaigne^[12] recommends exerting an impulse on the head of the astragalus to guide it towards the joint sphere.

Sometimes the reduction can be unstable and impossible. This stability must be judged clinically and verified radiologically. Indeed, control x-rays are essential to ensure the anatomical nature of the reduction, an essential criterion for a good functional result.

The duration of immobilization of the dislocation by cast support depends on the nature of the dislocation.

In the majority of cases, compression with a plaster boot lasts 4 to 6 weeks for simple lesions, and 8 to 10 weeks in the case of associated osteoarticular lesions.

Surgical treatment is indicated

In case of skin opening where careful trimming, washing, drainage and suturing under rigorous aseptic conditions are required.

Or in the event of failure of orthopedic treatment due to instability of the reduction, in the case of dislocation to extricate the frondiform ligament, the astragalus which can remain trapped by its collar in a buttonhole pierced in the pedal muscle or interposition of the peroneals tendons between the talus and the external malleolus.

In external dislocation; irreducibility is even more common and can be due to an interposition of the tendon of the posterior tibialis muscle, an interposition of the capsular flaps of the astragaloscaphoid joint, or even an interposition of the LLI between the talus and the internal malleolus in case of subluxation associated tibiotarsal.

The surgical approach seems necessary in order to remove the interposition which is always located at the level of the talar head.

Stabilization of the joint can be done by

- *Pinning: It will be carried out when the stability of the reduction is precarious, astragalo-scaphoid and/or calcaneo-astragal pins are placed and do not dispense with plaster support.

- *Osteosynthesis: It is necessary in the event of associated fractures to fix the reduction and avoid instability and osteoarthritis which generally complicate this type of dislocation.

- *Arthrodesis: Arthrodesis can be justified from the outset, if there is an obvious risk of necrosis and collapse of the bone. This is either an arthrodesis:

- tibio-talcaneal, tibio-calcaneal after ablation of the talus or triple arthrodesis.

Arthrodesis always remains a second-line therapy in the event of failure of osteosynthesis.

The prognosis for this dislocation is relatively good among most authors if the reduction is carried out in the hours following the accident. Jarde^[12] had 24 excellent and good results in a series of 35 cases collected over a long period.

Mechan^[78] had fair results for pure subtalar dislocation in 80% of cases. In our series, we noted 3 satisfactory results with a GAY EVARD score of 14 on average.

Several complications can punctuate the treatment of subtalar dislocations

- Infection: This is classically one of the negative factors in the development of subtalar dislocation. It occurs after an initially open dislocation, or after a bloody intervention.

- Skin necrosis: It is due to ischemia secondary to tension of the integument, requiring rapid intervention through urgent reduction; it can be complicated by an opening secondary to the formation of a skin ulcer.

Lately, subastargal dislocations can develop into two complications

- Necrosis of the astragalus

It is a formidable complication, however it appears to be quite exceptional. Indeed: Christensen^[7] finds 2 cases out of 30, saillant^[1] finds 2 cases out of 20, Marotte^[14] finds: 1 case out of 20, Déloux and Razemon^[2] found: 4 cases out of 17, According to Watson-Jones^[17], in fractures without displacement of the neck of the talus and in subtalar dislocations, blood supply is not not interrupted but only damaged. According to Allieu^[1] in internal subtalar dislocation, the main feeder pedicle of the talus, taking the internal lateral ligament, is preserved, in addition, the tarsal pedicle can be unharmed.

Clinically, this necrosis appears approximately 2 to 8 months after the trauma, and can be suspected in the presence of: spontaneous pain in the instep, severe in the morning when removing rust, which subsides during the

day before reappearing in the evening with fatigue, difficulty walking, slight edema, limitation of flexion and extension movements.

But it is radiology which makes it possible to make the diagnosis by showing opacification in the form of homogeneous or non-homogeneous condensation: such as geodes, opaque spots, or modification of the bony trabeculae.

If it is detected in time and treated by prolonged avoidance of weight bearing on the affected side, it can regress in a few months.

-Subtalar osteoarthritis is the second complication to be feared because it seems that this late complication represents the pejorative element in the evolution of these dislocations, it is in fact the cause of most of the bad results: Christensen^[7] found 19 cases of osteoarthritis out of 30 subtalar dislocations, or 57.5%, Marotte^[14], found 60%, Foul^[15] found 3 cases out of 8 subtalar dislocations, or 37.5%. In our series, two patients developed scaphotalar and subtalar osteoarthritis which appeared at an average of 18 months following trauma following an open subtalar dislocation for the first, and a subtalar dislocation associated with a calcaneus fracture. , they were treated surgically.

Its appearance appears to be linked to a certain number of predisposing factors such as: age, but especially the association with serious bone or ligament lesions, skin opening which darkens the prognosis; as well as the quality of the reduction, and the duration of the immobilization.

This osteoarthritis can affect all joints, but it seems that it first affects: the talus-scaphoid joint, then the posterior subtalar joint.

It can be suspected by clinical signs such as mechanical pain, stiffness, edema, painful limitation of movements. As well as radiological signs at their onset: pinching of the interline spaces, osteophytes, subchondral condensation.

This osteoarthritis can be the cause of minor pain to justify a consultation, and tolerated for a long time (Allieu reports 77% good results despite osteoarthritis), or lead to a surgical procedure very quickly (subtalar arthrodesis and tibio-tarsal).

-Other complications can occur late such as Sinus tarsal syndrome, instability of the subtalar joint, recurrence of subtalar dislocation, trophic disorders.

CONCLUSION

Subtalar dislocations are rare and serious lesions of the posterior tarsus. Unrecognized or poorly treated, it can lead to permanent disability and major rearfoot surgery. The diagnosis depends on the quality of the radiological

examination to assess the type of dislocation and the associated osteocartilaginous lesions. Their management requires a precise clinical and radiological assessment of the lesions, and therapeutic management is urgent, including anatomical reduction and reliable stabilization. Emergency orthopedic treatment consists of a reduction followed by a cast for 6 weeks. Treatment is surgical in the event of skin opening, irreducibility or displaced intra-articular fractures.

Close monitoring is necessary to detect developing complications in the short, medium and long term in time. The long-term prognosis is better if these principles are respected. They will help avoid painful instability and joint incongruence with necrosis of the talus and osteoarthritis of the subtalar which often result in arthrodesis of the subtalar joint and/or the Chopart joint.

CONSENT

The patients have given their informed consent for the case to be published.

Competing Interests

The authors declare no competing interest.

Authors 'Contributions

All authors have read and agreed to the final version of this manuscript and have equally contributed to its content and to the management of the manuscript.

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