Case report

Case report: A rare case of pure tibio-talar dislocation without malleolar clamp fracture in a young athlete: Long-term functional results and recent reviews of the literature

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ABSTRACT

Introduction and importance: Ankle dislocation without fracture is an extremely rare injury, requires high-energy trauma, up to 1995, only 73 cases were reported in the literature and 154 cases up to 2017. It is therefore a post-traumatic ankle disease growing in parallel with the increase in road-traffic accidents requiring the study of incriminated factors such as hypoplasia of the medial malleolus.

Case presentation: The authors report the case of a young patient, a football player, who presented with a pure, closed dislocation of his ankle following a road-traffic accident. Management consisted of immediate reduction, followed by immobilization in plaster for 1 month.

Clinical discussion: The short, medium and long term clinical and radiological results are excellent with no evidence of ankle instability or osteoarthritis.

Conclusion: Ankle dislocation without associated fracture is an extremely rare injury. The posteromedial dislocation represents the most described variety in the literature. Early management, short-term immobilization, adapted and early rehabilitation seem to be associated with good long-term functional results.

1. Introduction

Pure dislocation of the ankle, or dislocation not accompanied by fractures of the malleoli or of the posterior border of the tibia, is an extremely rare injury,, requires high-energy trauma, up to 1995, only 73 cases were reported in the literature and 154 cases up to 2017. [1] D’Anca explained that this rarity was attributable to the mechanical efficiency of the mortise and the resistance of the ankle ligaments being greater than that of bone, thus causing malleolar fracture in the case of injury [2]. In the present report, we discuss a case of ankle dislocation that occurred without associated fracture in a young patient aged 21 years old that happened following an ankle traumatism during a road-traffic accident. We report also the literature review and the treatment protocol.

2. Case report

21 years old young, no significant pathological history, football player brought to the emergency room after being involved in a road-traffic accident with an acutely painful and obviously deformed right ankle. The diagnosis made clinically. The deformation of the foot with the deviation of the foot with respect of the leg determines an evident alteration of the normal articulation. The clinical examination had also revealed a laceration next to the lateral edge of the ankle. General, neurovascular examination showed no associated complication or abnormalities. Radiographs confirmed the clinical diagnosis of posteromedial dislocation without malleoli fracture.

Under general anesthesia, the reduction immediately performed. by an experienced surgeon. The knee was first flexed to relax the tendon Achilles then longitudinal traction with gentle forward force applied to

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This case report has been reported in line with the SCARE Criteria.
the heel with immediate reduction of the deformity achieved. Post reduction radiographs showed adequate reduction of the ankle joint with no talar shift or syndesmotic injury. The clinical exam confirms that there is no objective instability or ligament laxity. The evolution was marked by rapid regression of the edema of the ankle and total disappearance of the pain after 24 h. After the reduction, the joint is immobi-

3. Follow-up and outcomes

The patient was seen the first month, with a removal of plaster and authorization of the partial then total support after 6 weeks. The patient reported no signs of instability or pain. At follow-up 3-year post injury, the patient achieved full range of motion (ROM) of the ankle and was able to return to normal life.

The ankle X-ray confirmed the hypoplasia of the medial malleolus evaluated with the ratio between the length of the medial (B) and lateral (A) malleolus according to the methods of Elisé et al. [1] (B/A = 0.58–0.62 normal range).

4. Discussion

The ankle does not have discrete stabilization structures ventrally and dorsally. Only medially and laterally does the ankle have strong stabilization structures: the tibial and fibular malleoli and the two collateral ligamentous complexes that reinforce the thin capsule. The unstable position of the tibiotalar joint is plantar flexion because the narrow part of the talar body lies within the ankle mortise. In this position, all of the ligamentous and capsular attachments to the talus are stretched, with the exception of the posterior talofibular ligament. Sufficient force in inversion results in posterior medial displacement of the foot on the fixed tibia with tears in the anterolateral capsule attachments and in the anterior talofibular and calcaneofibular ligaments, allowing for talar ascent and tilt [1]. Likewise, an eversion force results in lateral displacement of the foot, with tearing of the medial capsule attachments and the talotibial ligament. In the case of an applied posteroanterior force on the foot in plantar flexion, the ankle is displaced anteriorly. Posterior dislocation is the result of an anteroposterior (AP) force on the foot in plantar flexion and inversion.

A review of the literature indicates that pure dislocation of the ankle is caused prevalently by road traffic accidents, while sports accidents represent the most frequent etiology of pure closed dislocations. 64 publications on this subject, with 154 cases, of which 45 are case reports and 18 case series [3], the male predominance is obvious and represents 73% of cases with an average age estimated at 29 years with a clear male predominance (Table 1). Pure posteromedial dislocation is the most common variety with an estimated rate of 46% (71 cases).

Neurovascular occurred in 30 cases (19%) apart two cases presenting anterior tibial artery injury with limb ischemia [4]. Few patients underwent bloody reduction, capsular or lateral ankle ligament repair. Open dislocations benefited from surgical debridement with sutures of the injured anatomical structures (Table 2), immobilization was short-term in a 90° ankle cast for 4 to 6 weeks followed by early rehabilitation.

The most described complication in the literature is ankle stiffness [5] this may be due to long-term immobilization. The average duration of cast immobilization is 4 weeks. Studies have shown that the therapeutic strategy vis-à-vis the lateral ankle ligament after dislocation, does not overcome immobilization for 2 to 3 weeks followed by a range of rehabilitation sessions of the ankle can provide patients with results similar to surgical repair. Furthermore, studies have suggested that surgical ligament repair should be reserved for chronic ankle instabilities.

The rupture of the syndesmosis is a rare association occurring in case of superior dislocation. If it is not managed immediately, that may cause poor clinical results conditioned by the functional prognosis of ankle mortise. [1] (Table 3).

Medial malleolar hypoplasia is the most incriminated risk factor in pure ankle dislocations. In fact, Elise S, and Maynou [2] performed a study on 16 cases of pure ankle dislocations with calculation of the degree of coverage of the mortise of the ankle, this lack of coverage was found in 1/3 of the cases. Other Risk factors for these injuries include excessive ankle joint laxity, weakness of the peroneals, and a history of chronic ankle sprains.

Altogether, we believe that pure ankle dislocation is a very rare entity, requiring the combination of high-energy trauma with structural

Fig. 1. Clinically evident ankle deformity.
abnormalities of the malleolar clamp. The hypoplasia of the medial malleolus constitutes the most detailed element in the literature. Indeed we found it in our case but this element has no impact on the prognosis of the ankle. Indeed, we insist on the surgical reduction before the six hours by an experienced surgeon and in the operating room. Immobilization for more than 4 weeks has no beneficial effect on the ankle.

Fig. 2. Standard front and side radiograph showing pure posteromedial tibiotar dislocation.

Fig. 3. Post reduction radiograph.
Immobilization for 1 month seems logical to us and largely sufficient to begin a fairly early rehabilitation. Walking is authorized as soon as the cast is removed.

5. Conclusion

Ankle dislocation without associated fracture is an extremely rare injury that requires high-energy traumas usually caused by an axial load through a foot in plantar flexion. The posteromedial dislocation represents the most described variety in the literature. Known risk factors for pure dislocation include hyperlaxity, medial malleolar hypoplasia, history of recurrent ankle sprains and the weakness of the peroneals. Early management, short-term immobilization, adapted and early rehabilitation seem to be associated with good long-term functional results and avoids stiffness, which remains the most common complication.

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Ethical approval

None.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Guarantor

Walid BOUZIANE.
**Table 1**
Epidemiology of pure ankle dislocations.

| Kind      | Number of cases | Middle age |
|-----------|-----------------|------------|
| Male      | 112 (73 %)      | 28 (9-70)  |
| Feminine  | 42 (27 %)       | 30 (7-73)  |
| Total     | 154 (100 %)     | 29 (7-73)  |

**Table 2**
Open vs. closed dislocation.

| Closed vs opened | Number of cases | Male | Feminine |
|------------------|-----------------|------|----------|
| Closed           | 77 (50 %)       | 53 (69 %) | 24 (31 %) |
| Opened           | 76 (50 %)       | 58 (76 %) | 18 (24 %) |
| Unknown          | 1               | 1    | 0        |
| Total            | 154 (100 %)     | 154  | 154      |

**Table 3**
Therapeutic methods.

| Strategy          | Simple reduction | Reduction + trimming | Ligament repair | Others | Total |
|-------------------|------------------|----------------------|-----------------|--------|-------|
| Opened            | 4 (5 %)          | 32 (42 %)            | 37 (48 %)       | 5 (5 %) | 77 (100 %) |
| Closed            | 67 (88 %)        | 0 (0 %)              | 4 (5 %)         | 3 (7 %) | 76 (100 %) |
| Total             | 71 (46 %)        | 32 (21 %)            | 41 (27 %)       | 10 (6 %) | 154 (100 %) |

*Fig. 6. Clinical and radiological results at 3 years.*
Research registration

Not applicable.

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All authors contributed to the conduct of this research and read and approved the final version of the manuscript.

Declaration of competing interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

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References

[1] B. Leitner, The mechanism of total dislocation of the talus, J. Bone Joint Surg. 37A (1955) 89-95.
[2] A.F. D’Anca, Lateral rotatory dislocation of the ankle without fracture, J. Bone Joint Surg. 52A (1970) 1643-1646.
[3] S. Elise, C. Maynon, H. Mestdaghe, P. Forgess, P. Labourdette, Tibiotalar dislocations without associated fracture: report on 16 cases, Acta Orthop. Belg. 64 (1998) 25-34.
[4] W. Lachlan, D. Owen, Pure Ankle Dislocation: A systematic review of the literature and estimation of incidence, international journal of the care of the injured, VOLUME 46, ISSUE 10, P2027-2034, OCTOBER 01, 2017.
[5] E. Stani, M. Cahiddu, P.P. Cara, P. Mura, A. Usala, Pure ankle dislocation, Chir Piede 16 (1992) 139-144.