Scholars Journal of Medical Case Reports
Abbreviated Key Title: Sch J Med Case Rep
ISSN 2347-9507 (Print) | ISSN 2347-6559 (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

Orthopaedics

An Unusual Case of Large and Mixed Fracture Blisters: How to Manage?

Abdellatif Benabbouha[1*], Ibtissame Boubnane[2], Faycal Rifki[1], Hicham Sallahi[1], Omar Mergad[1]

[1]Department of Orthopaedics, Military Training Hospital Avicenne, University Cadi Ayyad, Marrakech, Morocco
[2]Department of Dermatology, Hospital Arrazi, University Cadi Ayyad, Marrakech, Morocco

DOI: 10.36347/sjmcr.2022.v10i11.015 | **Received:** 04.10.2022 | **Accepted:** 08.11.2022 | **Published:** 18.11.2022

***Corresponding author:** Abdellatif Benabbouha
Department of Orthopaedics, Military Training Hospital Avicenne, University Cadi Ayyad, Marrakech, Morocco

Abstract **Case Report**

Fracture blisters are an uncommon complication that accompany high energy trauma. They are defined as tense vesicles overlying a fracture. Occurrence of these lesions alters and delays surgical management with higher risk of infection. Hence, most orthopedic surgeons recommend prompt stabilization of the fractures to reduce the of bullae formation. The authors describe an unusual case report of extensive fracture blisters and review of literature.

Keywords: Blister, fracture, management, trauma.

INTRODUCTION

Fracture blisters are uncommon dermatologic complication that accompany high energy trauma. They are defined as vesicles or skin bullae overlying a fracture, always associated with soft tissue swelling. Development of these uncommon manifestations alters definitive management and remains a surgical challenge in orthopedics. However, there are no sufficient dermatology and orthopedic reports concerning the characteristics and management of these lesions. The authors describe an unusual case report of extensive fracture blisters and review of literature. The purpose of this report is to underline the severity of these lesions and to discuss the different therapeutic modalities.

CASE REPORT

A 42 year old male who had been followed for diabetes presented firstly to the emergency department of local hospital after sustaining knee injuries in a road traffic accident, a pedestrian was hit by a car. On physical examination, his left lower limb was deformed. There were no open wounds and no neurovascular deficits. Radiographs revealed a complex tibial plateau fracture (Figure1), which was immobilized initially in a posterior splint.

Twenty four hours later, the patient was evacuated to our unit for surgical management. Skin examination showed ecchymosis with numerous tense clear and hemorrhagic bullae ranging in size from 2 to 70 mm. Lesions were located along the left leg overlying the fracture (Figure 2). The patient was hospitalized for fracture blister. His left lower limb was elevated. The vesicles were left intact and treated with povidone-iodine solution and a sterile dressing. After spontaneous resolution, a silver sulfadiazine paste was applied to decrease the risk of infection. Fifteen days later, the blisters had healed completely (Figure 3); the fracture was fixed with two Plates shaped like an “L”. Postoperatively, there were no wound complications. At 6-month after injury, the patient returned to normal activities with bony consolidation of fracture seen in the follow-up radiographs.

Figure 1: Initial radiographs showing a complex tibial plateau fracture

Figure 2: Clinical photographs of clear and hemorrhagic bullae

Figure 3: anterior view of left leg after 15 days when the blisters had healed

DISCUSSION

Fracture bullae are relatively rare. Moreover, the incidence of these complications has been estimated at 2.9% of all acute fractures [1]. They can appear in any site but are frequently developed on the lower extremities. The ankle, foot, elbow and distal tibia are the most often anatomic areas with tight skin and minimal muscle coverage [1, 2]. Typically, these blisters arise 24 to 48hours following injury and they may occur as early as 6 h [3].

The mechanism of fracture bullae formation is multifactorial. It has been reported that they are caused by lesion of dermal-epidermal junction due to torsional and shearing forces during initial injury deformation. Other factors can be involved in blister formation such

as smoking, alcoholism, peripheral vascular disease, lymphatic obstruction, hypertension and diabetes [2, 3].

Clinically, two subtypes of vesicles are commonly seen: clear filled and blood filled [2, 4]. In their histological study Giordano *et al.*, [4] demonstrated that the principal difference between both types is the retention of epithelial cells in the clear blisters that can help in faster healing. Whereas the dermis of hemorrhagic blisters is stripped of epidermal cells, which may have an impact on healing time approximately 16 days [4]. Varela *et al.*, [1] performed a microbiologic study of fracture blisters, finding that intact bullae fluid is a sterile transudate; but when these bullae ruptured promptly became colonized with skin flora, which affected patient surgical management, compromised wound healing and ultimately prolonged recovery.

Although the fracture blisters are a severe posttraumatic complication, there is no consensus regarding their management. Most orthopedic surgeons recommend prompt stabilization of the fractures to prevent bullae formation. Various treatment techniques have been described in literature: aspiration, unroofing the blister with application a topical antibiotic, and leaving the bullae intact. Giordano and Koval [5] compared these methods and they found no significant advantage to any therapeutic modality. Recently, Strauss *et al.*, [6] proposed unroofing the blisters and application of silver sulfadiazine paste that would lead to successful re-epithelializaiton.

Most studies concerning blister healing demonstrated that depends on the type and the size of bullae. Generally, spontaneous healing takes within 10 to 14days [7, 8].

CONCLUSION

Fracture blisters are uncommon dermatologic complication. Occurrence of these lesions alters and delays surgical management. Hence, most orthopedic surgeons recommend prompt stabilization of the fractures to prevent bullae formation and to reduce the risk of infection.

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