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Case Report

Mucormycosis in compound grade IIIa tibial plafond with medial malleolus fracture: A case report

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ABSTRACT

Tibial plafond fracture is defined by intra articular involvement of the distal tibia with metaphyseal extension. The plafond fracture accounts for less than 1% of lower limb injuries and 3–10% of tibial fractures. The rate of deep infection in open ankle fractures is approximately 5%. Pilon fractures are frequently associated with severe soft- tissue injuries that alter the management plan. Here we describe the case of 35year old man brought to ER after sustaining machinery injury to right ankle. On local examination a Laceration of 7x2x2 cms present over left ankle anteriorly extending from Medial Malleolus to Lateral Malleolus and cut ends of tendons of extensor digitorum longus, extensor hallucis longus and Tibialis anterior were identified. X-ray left ankle Ap and Lateral views were taken. X-ray showed Left Distal Tibia fracture. Thorough Wound wash given. Under spinal anesthesia debridement of wound was done and K-wire fixation done for distal tibia fracture. Tendon repair for extensor digitorum longus, extensor hallucis longus and tibialis anterior done using Ethibond suture material using Modified Kessler Technique. On 2^{nd} Post operative day a swab from the wound site sent for culture and sensitivity which revealed fungal growth of zygomycetes species. In view of angioinvasive properties of Zygomycetes, after checking Renal parameters patient was started on Inj Amphotericin B 1mg/kg for 4 days and later converted to Tablet Posaconazole 600mg BD. Patient was kept on posaconazole tablet for 6weeks. Regular dressings were done. On regular follow ups and regular dressings wound healed well.

1. Introduction

Tibial plafond fracture is defined by intra articular involvement of the distal tibia with metaphyseal extension. The distal tibia along with fibula and ligaments around the ankle joint forms the ankle mortise which articulates with dome of talus. The Plafond fracture accounts for less than 1% of lower limb injuries and 3–10% of tibial fractures.[1] Treatment of plafond fractures mainly depends on the Fracture pattern and degree of injury. Mechanism of injury is mainly axial compression which causes impaction of articular surface proximally into the metaphysis and also associated with comminution of metaphysis. Distal tibial fractures remain one of the most substantial therapeutic challenges that confront the orthopaedic traumatologist. Numerous features are responsible for this, but perhaps none are as difficult as the accompanying soft tissue injury that is frequently present.[2]

The rate of deep infection in open ankle fractures is approximately 5%. Pilon fractures are frequently associated with severe soft tissue injuries that alter the management plan. A thorough understanding of the mechanism of injury is most important when first assessing a pilon fracture.[1] The amount of soft-tissue injury and the degree of complexity vary widely from low to high-energy injuries. Because of the severity of the soft tissue injury and the

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disastrous results of deep wound complications felt to be attributed to extensive surgical exposures and bulky internal fixation devices, external fixation emerged as a successful technique for decreasing significant septic complications that had been previously attributed to open surgical management. Mucormycosis is an aggressive fungal infection caused by zygomycetes.[3] The primary cutaneous form has a better prognosis than the deeply invasive form, but it is still associated with fatality and long-term morbidity if misdiagnosed. Mucormycosis has a growing importance because of the increasing population of immunocompromised patients. It is a devastating infection with high morbidity and mortality rates. It generally refers to infections caused by fungi of the class Zygomycetes.[4] Extensor tendon injuries of the dorsal foot are common in the setting of dorsal foot penetrating trauma. The extensor tendons of the foot are vulnerable to laceration as they are subcutaneous. Here, we describe a case of 35year old man brought to ER after sustaining compound injury to right ankle following machinery injury.

2. Case Report

A 35year old man presented to emergency with complaints of pain and deformity of left ankle. Patient had sustained machinery injury to left ankle. On local examination there was a laceration of 7x2x2 cms present over left ankle anteriorly which was extending from medial malleolus to lateral malleolus and cut ends of tendons of extensor digitorum longus, extensor hallucis longus and tibialis anterior were identified. Ankle movements are painful and restricted. There were no distal neurovascular deficits. Wound wash was given and wound dressing done and splint was applied and patient was shifted for x-ray left ankle Ap and Lateral views.

2.1. Investigations

X-ray left ankle Ap and lateral views were taken. X-ray showed left distal tibia fracture. Tarsals or metatarsal bones were normal.

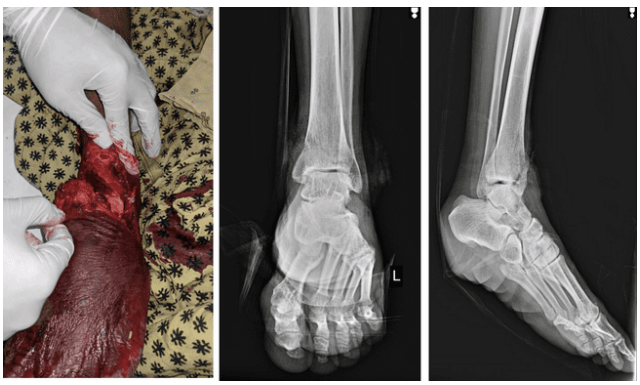

Fig. 1: Pre-operative wound picture and x-rays

2.2. Procedure

Thorough wound wash was given and patient was posted for emergency surgery. Under spinal anesthesia, position of the patient: Supine position. Wound wash was given using normal saline, Povidone-Iodine solution and hydrogen peroxide. Wound was inspected and cut tendons were identified and tagged. Debridement of wound was done and Fracture was reduced and was confirmed under C-arm. K-wire fixation done for distal tibia fracture. Three K wires were passed from medical aspect just above the medial malleolus. Tendon repair for Extensor digitorum longus, Extensor hallucis longus and tibialis anterior done with Ethibond suture material using Modified Kessler Technique. Below Knee slab was applied with ankle in dorsiflexion.

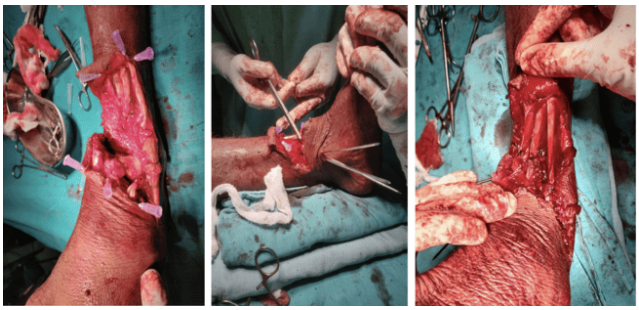

Fig. 2: Intra-operative pictures showing cut ends of tendons and K-wire fixation of fractures

2.3. Postoperative period

Postoperatively patient was kept on IV antibiotics and regular dressings were done. On Postoperative day 2 discharge from wound site was observed and swab from wound site was sent for culture and sensitivity. Sutures were removed and debridement was done on postoperative day 7. Culture sensitivity report has revealed fungal growth of zygomycetes species. In view of angioinvasive properties of Zygomycetes, after checking renal parameters patient was started on Inj Amphotericin B with dosage of 1mg/kg. Inj Amphotericin was given for 4 days and later it was converted to Tablet Posaconazole 600mg BD and patient was asked to continue Tablet Posaconazole 600mg BD for 6 weeks.

2.4. Follow up

Patient was kept on Tablet Posaconazole for 6 weeks. Wound dressings were done regularly. During further follow up wound healed well.

3. Discussion

Mucorales fungi of the Zygomycetes class are found ubiquitously in the environment. Zygomycetes, especially

Fig. 3: Post-operative x-rays

Fig. 4: Wound on post operative day 2

Fig. 5: Wound picture on post-operative day 7 before debridement (left) and after debridement (Right)

Fig. 6: Wound picture at 6 weeks follow up

Fig. 7: Wound picture at 3 months follow up

Mucorales, are widespread in nature, subsisting on decaying vegetation and diverse organic materials. Diagnosis of cutaneous mucormycosis is made by culture or biopsy. A potassium hydroxide preparation of the biopsy reveals nonseptate, thick-walled hyphae with right angle branching. Hyphae can also be seen on tissue sections on hematoxylin-eosin and Gomori's methenamine silver stain. Post-traumatic mucormycosis is a rare and underdiagnosed condition.[3] Definitive diagnosis is hard to establish and it often requires invasive procedures such as tissue biopsy by histology or culture. Cultures of infected tissues are often

negative, when it is positive, identification to species level is time-consuming and requires expertise.[4] Mucormycosis is uncommon and typically associated with patients who are diabetic or otherwise immunocompromised. Wilson et al[5] in their study have observed that Cutaneous mucormycosis in healthy patients is frequently the result of trauma and occurs via direct inoculation of fungi into a traumatic wound.[6] Although Mucorales show minimal intrinsic pathogenicity towards immunocompetent persons, they can initiate aggressive and fulminant infections under certain clinical conditions (Ribes et al., 2000). Ganesan A et.al have observed that the Cutaneous invasive fungal infection occur in deep tissue wounds contaminated by environmental debris; such wounds are caused by agricultural accidents, tornadoes, and blast trauma. These infections were associated with substantial morbidity (e.g., Surgical amputations) and considerable death rates.[7] The severity of cutaneous zygomycosis in otherwise healthy trauma patients with open wounds, ranges from contamination to extensive necrotizing fasciitis.[8] A high level of clinical suspicion is important in Trauma patient, especially in the presence of open wound soft tissue injuries contaminated with soil, even in the absence of immunosuppression. Zygomycosis is found in immunocompromised individuals, it has also been reported in immunocompetent patients. Serious soft tissue injury and wound contamination within an agricultural environment appears to be a predisposing factor in the development of cutaneous mucormycosis in immunocompetent individuals.[5] Complete or serial radical wound debridement of all the necrotic tissue is the single most effective management. Since zygomycosis rapidly disseminates through the vasculature, a wide zone of excision is required. Management of zygomycosis comes secondary to extensive surgical debridement. The commonly used anti fungal agents do not have any effect on zygomycosis. High dose amphotericin B is the drug of choice. Despite improvement in diagnostic modalities leading to early diagnoses and increasing therapeutic options, treatment of mucormycosis is still challenging. Treatment of cutaneous mucormycosis requires a combined approach. Early and repeated surgical debridement of involved tissue is important and limb amputation is often required to control infection. Liposomal amphotericin B is the most reliable antifungal agent. Resistance to amphotericin B has been reported.[5] The adverse effects of amphotericin included hypokalemia, renal impairment and infusion related intolerance reactions.[9] Azoles have no consistent activity against mucormycosis. But, newer azoles, such as posaconazole, are effective.[5] Posaconazole has shown good in vitro sensitivity against Rhizopus, mucor, and other zygomycetes. Hyperbaric oxygen therapy has been reported to be beneficial.[3] Hyperbaric oxygen has been used as auxiliary treatment in cutaneous and rhinocerebral forms.[4] Mortality in these patients is high even after aggressive treatment with antifungals and surgical debridement. The mortality rate of Zygomycosis is around 50% due to angioinvasion. In conclusion this study helps to understand that high index of suspicion, thorough wound debridement and appropriate treatment are required to prevent infection following a compound injury.

4. Source of Funding

None.

5. Conflict of Interest

None.

Acknowledgments

None.

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