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A rare case of early onset arthritis as a sequelae of fracture dislocation of ankle

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Abstract

Ankle Fracture-Dislocation (AFD) poses a significant risk to the joint and has the potential to lead to complications and functional impairment [1]. A young male patient was referred to the OPD with complaints of left ankle pain and swelling. He has had fracture-dislocation of the left ankle 5 years ago, surgically corrected with plating and cc screw. And the patient underwent Implant removal 3 years ago, with broken cc screw left in situ. He is diagnosed as Arthritis of left ankle with varus deformity as a sequel to fracture-dislocation, Venolymphatic malformation around left ankle and leg and possible Plexiform Neurofibromatosis.

Keywords: Ankle fracture-dislocation, osteoarthritis, venolymphatic malformation, plexiform neurofibromatosis, case report.

Introduction

Ankle fractures are commonly encountered injuries typically associated with a twisting mechanism [2]. Diagnosis relies on plain radiographs of the ankle, and the decision between non-operative or operative treatment hinges on factors like “fracture displacement, ankle stability, the presence of syndesmotic injury, and the patient's activity demands [3].”

The presence of fracture-dislocation injuries, a concurrent substantial posterior malleolus fracture, and articular incongruence are identified as risk factors for posttraumatic osteoarthritis after ankle fracture surgery [4]. Surgeons should emphasize the critical role of accurate reduction, particularly in patients with ankle fractures that include sizable PM fractures, especially those with severe initial injuries such as fracture-dislocation [5].

Vascular irregularities in medium and large-sized arteries and veins are recognized, though uncommon, occurrences in neurofibromatosis type I (NF1) [8]. The hyper vascular nature of plexiform neurofibromatosis (PNF) makes it challenging for diagnosticians to differentiate whether the underlying vascularity is intrinsic to PNF itself or indicative of a separate entity [8]. In situations where PNF is associated with arteriovenous malformation (AVM), significant hemodynamic disturbances may potentially arise [9].

Case report

A 23 years old patient was admitted under the Department of Orthopaedics with complaints of left leg and ankle swelling. The patient was apparently well until his father noticed abnormal gait at the age of 15 following which he was treated by a local bone setter with splintage for 2 weeks later, patient was ambulating well and a months later he developed swelling localised to left ankle which then progressed to involve the whole leg. Patient gives history of surgery of the left ankle 5 years back, reports to have had fracture-dislocation of the left ankle. He underwent implant removal 3 years ago, with broken cc screw in situ. He was also diagnosed with Plexiform neurofibromatosis and AV malformation. Surgical removal of the tumor was attempted but recurrence was seen in 6 months. He doesn't have any known comorbidities. On examination engorged veins over the medial and anterior aspect of left leg. Swelling is fluctuant in nature. CT features are suggestive of Intramuscular slow flow vascular malformation with extensive atrophy of anterior and posterior compartment musculature.

Reactive changes involving tibia, fibula. Ankle joint osteoarthritis with varus deformity. MRI features are suggestive of Intra muscular slow flow vascular. Malformation predominantly involving the anterior and posterior compartment of leg with associated significant atrophy of the involved musculature. Arterial Doppler of left lower limb showed no evidence of haemodynamically significant stenosis occlusion. Atherosclerotic changes in the

left lower limb arterial system. Venous Doppler showed no evidence of deep vein thrombosis. Few dilated subcutaneous venous channels at the level of ankle medially. Anteriorly and posteriorly. Possible post traumatic venous malformation. Few hypoechoic subcutaneous fluid containing channels at the level of ankle. Suspicious for dilated lymphatics Lymphatic malformation. Differential diagnosis: post traumatic venolymphatic malformation [10].



Fig 1: The above clinical photos show swelling and engorged vessels in the medial and anterior aspect of the left leg.

AP and lateral views of plain x-rays of ankle and tibia full length show multiple osteophytes around left ankle joint.

Medial deviation of distal tibio-talar joint and distal tibio-fibular joint is seen with a broken cc-screw in-situ.



Fig 2: CT 3D reconstruction of left leg & ankle, with CT venography show reactive changes involving tibia and fibula along with ankle joint arthritis. Intramuscular slow flow vascular malformation with extensive atrophy of anterior and posterior compartment musculature is also seen.

Discussion

Lovy *et al.* [11] identified a significantly elevated complication rate in “nonoperative treatment for displaced ankle fractures in diabetic patients.” Loïc Fonkoue *et al.* Arrived at the result that – PTAOA (post traumatic ankle osteoarthritis) was found in 19 Complications during the healing process were associated with an accelerated onset of post-traumatic ankle osteoarthritis [4]. Y. Tourné *et al.* [6] highlighted the underestimation of isolated syndesmosis lesions without associated bone lesions in 20% of cases. Gauthé *et al.* [12] underscored the importance of anatomical precision in “surgical reduction for ankle fractures, even in elderly patients [12].” However, Warner *et al.* reported a substantial 33% mal-reduction rate in “ankle fracture-dislocations despite open reduction and internal fixation (ORIF) in the United States [13].” Similarly, Bible *et al.* found a 70% incidence of post-traumatic ankle osteoarthritis after “high-energy transsyndesmotomic ankle fracture-dislocation”, despite achieving an 87% anatomic reduction [14].

Keith Willet *et al.* concluded, through a comprehensive “multicentre randomized clinical trial in the UK”, that close contact casting yielded outcomes comparable to surgery at the 6-month mark for “older adults with unstable ankle fractures [7, 15].” This supports the idea that, for patients who cannot undergo surgery, close casting with optimal achievable reduction remains a relevant and viable option.

Conclusion

The case report underscores the intricate nature of posttraumatic complications, placing emphasis on the risk factors for posttraumatic osteoarthritis following ankle fractures. This is particularly notable in cases involving substantial posterior malleolus fractures and articular incongruence [4]. Furthermore, the association between vascular lesions and Neurofibromatosis type I (NF1) adds complexity to diagnosing the origin of vascularity, as seen in the presented case where Plexiform Neurofibromatosis coexists with arteriovenous malformation (AVM) [8].

The surgical correction involving plating and cc screw implantation initially addressed the fracture-dislocation, but subsequent implant removal three years ago left a broken cc screw in situ. The patient’s condition evolved into a multifaceted challenge, encompassing arterial, venous, and lymphatic malformations.

In conclusion, this case report sheds light on the complexities and challenges in managing a sophisticated case of ankle

fracture-dislocation with associated arterial, venous, and lymphatic malformations. Surgeons should be attuned to the potential long-term complications and comorbidities, necessitating a multidisciplinary approach for optimal patient care.

Summary

The presented case involves a 23-year-old patient with a complex medical history, including a fracture-dislocation of the left ankle that occurred five years ago. Despite surgical intervention, complications persisted, leading to the diagnosis of arthritis with varus deformity. Notably, the patient also presented with venolymphatic malformation around the left ankle and leg, along with a challenging aspect of possible Plexiform Neurofibromatosis.

The patient’s history of abnormal gait, initial treatment by a local bone setter, and subsequent progression to ankle swelling and leg involvement underscore the challenges in managing such cases comprehensively. The attempted surgical removal of the tumor, coupled with recurrence within six months, further emphasizes the intricacies of dealing with conditions like Plexiform Neurofibromatosis.

The clinical examination and imaging findings reveal engorged veins, fluctuant swelling, and CT and MRI features suggestive of extensive vascular malformation with associated musculature atrophy. Arterial and venous Doppler studies contribute to the comprehensive assessment, highlighting atherosclerotic changes and dilated subcutaneous venous channels.

Ankle fracture-dislocations, poignant injuries afflicting the robust and physically dynamic demographic, impart a substantial proclivity for premature post-traumatic ankle osteoarthritis in settings characterized by resource constraints. Despite resultant anatomical deficiencies, a majority of afflicted individuals manifest commendable functional recuperation. Covariant factors, notably mal-reduction of fractures and the temporal distance from the inciting trauma, emerge as affirmative predictors in the genesis of post-traumatic ankle osteoarthritis. Intriguingly, the incidence of post-traumatic ankle osteoarthritis subsequent to ankle fracture-dislocation exhibits a comparable trajectory irrespective of the therapeutic approach, be it surgical intervention or conservative management. Within resource-deprived landscapes, strategic emphasis must be accorded to the optimization of reduction strategies for ankle fracture-dislocations, employing available modalities such as surgical

fixation or judicious close casting.

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