



COMPARTMENT SYNDROME AFTER ISOLATED CLOSED FIBULA FRACTURE- A CASE SERIES

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ABSTRACT Compartment syndrome in lower extremity has been commonly associated with fractures of the tibial plateau, tibia shaft, and tibial plafond. Three patients were included in our study with history of a motor vehicle accident. All of them sustained a closed fibular shaft fracture and had fullness in anterior/lateral compartments of leg but no pain with passive or active range of motion of ankle on initial presentation. Repeat examination demonstrated tense compartments of leg with severe pain during ankle range of motion. 2 out of 3 patients were on anticoagulant therapy. They were taken to operating room for four-compartment fasciotomies. On postoperative day 3 debridement & primary closure was done. Post-operative course in hospital was uneventful. No post compartment syndrome sequelae were seen in 2 months follow up. In conclusion, compartment syndrome in isolated closed fibula fracture is a rare possibility.

KEYWORDS : Compartment syndrome, closed fracture, fibula

1. INTRODUCTION -

Compartment syndrome is an orthopaedic emergency which can be diagnosed clinically with or without intracompartment pressure monitoring^{1,2}. Association between compartment syndrome and lower extremity fractures of the tibia is seen in several studies³. In this case series, we present 3 patients diagnosed with isolated nondisplaced fibular shaft fracture and subsequently developed impending compartment syndrome.

2. PATIENTS AND METHODS

This was prospective interventional non randomised study done over 2 years, which included 3 patients of both sex of age group of 18-60 years. Patients with previously operated, skeletally immature and with other associated lower or upper extremity fractures were excluded from the study.

2. PROCEDURE

All patients were clinically examined and radiographically assessed by help of X-rays of the affected leg. After proper counselling and preoperative tests patients were taken to the operation theatre.

All 3 patients complained of right leg/ankle pain after a motor vehicle collision. Initial examination showed no acute pain or distress but swelling in the left calf was seen with associated tenderness along the lateral leg or fibula. Neurovascular examination was normal. Imaging studies demonstrated a nondisplaced single fibular shaft fracture in 2 patients & segmental fracture in 1 patient. 2 out of 3 patients were on anticoagulant therapy (aspirin 150mg).

An above knee slab with non weight bearing was advised initially. Neurovascular examination was performed every 2 hours. The second examination demonstrated tense compartments and notable pain with passive ankle range of motion. Acute compartment syndrome was diagnosed using clinical symptoms and signs, compartment pressure monitoring, or a combination of the both with pressure threshold for decompression on the grounds of compartment monitoring was a ΔP of less than 30mm Hg, showing no improvement for at least 2 hours⁴. The patient was evaluated by the attending surgeon and was emergently taken to the operating room for fasciotomies due to concern for impending compartment syndrome.

Intraoperatively, the patient underwent a dual-incision four-compartment fasciotomy. After fasciotomy, the muscles in all compartments were contractile and viable without any evidence of necrosis.



Fig 1 Local condition of affected limb



Fig 2 Dual-incision four-compartment fasciotomy



Fig 3 segmental right fibula fracture in 1 of the patients

Postoperatively, the patients were managed with intensive care. On day 3, debridement and primary closure was done. Postoperative period was uneventful & discharge was done on postoperative day 7.

The patients were seen in the OPD approximately 3 weeks from the date of fasciotomy, and suture removal was done. Repeat radiographs were obtained, which showed healing fibula fracture. All 3 patients were subsequently seen two months postoperatively and noted to have painless ambulatory status without compartment syndrome sequelae. Incisions were well healed and follow up was done as required minimum till 2 months.

DISCUSSION:

Compartment syndrome is a common complication associated with tibia fractures⁵⁻⁹. Very few studies exist that describe compartment syndrome associated with an isolated fibula fracture.

The radiographic predictors of compartment syndrome in conjunction with tibial fractures were evaluated in a study by Allmon et al⁵. Retrospective evaluation was done for 978 adults with tibial plateau, shaft, and pilon fractures (326 patients with each type of fracture). The occurrence of an associated fibula fracture was also taken into account. Fifty-six of the 978 patients developed compartment syndrome (6%), with the majority occurring in combination with tibial plateau fractures (39), followed by shaft (10) and pilon fractures⁵. Compartment syndrome in tibial shaft and pilon fractures were not seen to have a higher prevalence with associated fibula fractures however, schatzker VI tibial plateau fractures had an increased risk with an associated fibula fracture

The mechanism of injury was secondary to a high-energy impact injury resulting in a transverse fibular shaft fracture. The patient was hit on the driver side at approximately 45-60 mph, resulting in a direct impact injury. The patient presented with fullness in leg compartments, which progressed to tense compartments with worsening of pain during ankle range of motion on serial examinations. 2 out of 3 patients were on anticoagulant therapy (aspirin 150mg), indicating anticoagulants to be a significant factor in our case series.

After dual-incision four-compartment fasciotomy, the patient underwent debridement & primary closure on postoperative day 3 and had no complaints at his 2-month follow-up with no compartment syndrome sequelae. Early diagnosis of compartment syndrome with immediate fasciotomy is essential for prevention of sequelae as demonstrated by Rorabeck and Macnab¹⁰.

CONCLUSION :

Compartment syndrome is frequently associated with tibial fractures in the lower extremity. Our case series demonstrated the association of compartment syndrome with isolated fibular shaft fractures. A thorough neurovascular examination is recommended in patients with isolated fibular shaft fractures to rule out rare but significant diagnosis of compartment syndrome.

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