

ISOLATED PERONEAL COMPARTMENT SYNDROME

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ABSTRACT

Compartment syndrome is a surgical emergency characterized by increased pressure within a closed space. It usually occurs in limb injuries, and requires urgent intervention to prevent necrosis and permanent damage. Although compartment syndrome is well known, isolated peroneal compartment syndrome is a rare, to the best of our knowledge. Herein we report a case of isolated peroneal compartment syndrome.

Keywords: Compartment syndrome, Fasciotomy

INTRODUCTION

Compartment syndrome is characterized by increased pressure in a closed muscle compartment (Alrayes *et al.*, 2023). Acute compartment syndrome is an emergency condition that requires urgent surgical intervention to prevent permanent damage (Matsen *et al.*, 1980). Increased pressure disrupts blood flow and capillary perfusion, causing fluid extravasation, muscle ischemia, and necrosis (Elliott and Johnstone, 2003). The management involves emergency fasciotomy. Chronic compartment syndrome typically builds up over a period of time, especially after intense physical activities or exercise and usually isn't an emergency but it can be extremely painful (Cleveland Clinic, No date). Isolated peroneal compartment syndrome is a rare entity that is often misdiagnosed due to atypical presentation of no trauma (Torlincasi *et al.*, 2025, Rorabeck and Macnab, 1976).

CASE

A 21 year old female presented to the emergency department with complaints of pain and swelling of the right lower limb, associated with decreased sensation and movement. She first noticed the symptoms 4 months ago and could not recollect any obvious trauma to her limb but informed that she was walking more than usual while commuting to her college. She was initially admitted to an outside center where she was treated with intravenous antibiotics and dressing of the limb following which she clinically improved and was discharged. Later she again developed swelling of her right lower limb following which she came to our center for further management.

On examination, there was swelling, tenderness, local rise in temperature over her right lower limb, and weakness of right ankle dorsiflexion. The arterial doppler were normal. Venous Doppler showed a diffusely swollen and heterogenous right peroneus muscle along it's entire extent. Initial blood investigations showed elevated inflammatory markers with an ESR of 55 mg/dl. MRI of the right lower limb was taken for further evaluation which showed diffuse ill-defined STIR hyper intensity involving the peroneus muscles of the lateral compartment of the entire right leg (Radsource, No Date). Diffuse ill-defined STIR hyper intensity noted involving the adjacent subcutaneous tissue and intermuscular fat planes [Figure 1A]. The muscle shows ill-defined T1 hypointense and mild hyper intense areas on T1. The muscles appeared bulky with mild bowing of the deep fascia laterally [Figure 1B]. Diffuse ill-defined hyper intensity in the subcutaneous tissue of the distal leg around the

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ankle and dorsum of foot suggestive of inflammatory changes [Figure 1C]. Rest of the muscles of the right leg showed normal morphology and signal intensity. There was no evidence of any collection or abscess.

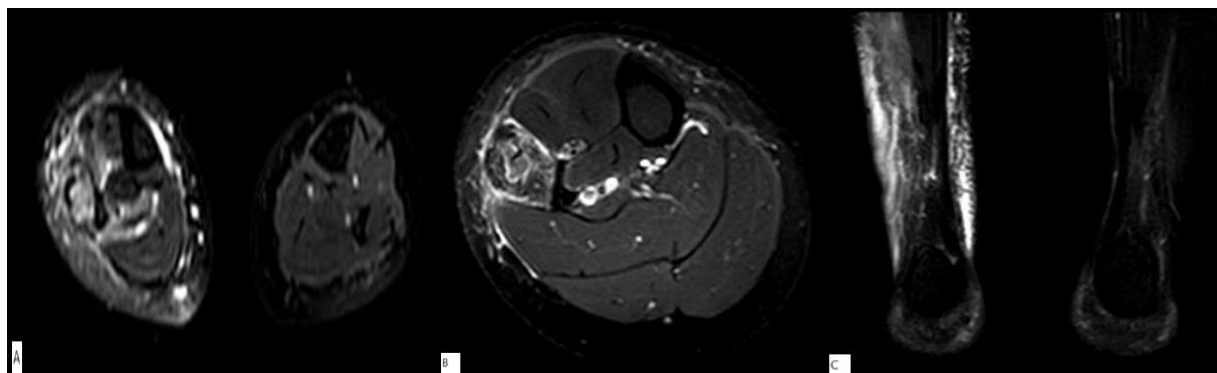


Figure 1: (A) Diffuse ill-defined STIR hyper intensity involving the peroneus muscles of the lateral compartment of the entire right leg. Diffuse ill-defined STIR hyper intensity noted involving the adjacent subcutaneous tissue and intermuscular fat planes, (B) The muscle shows ill-defined T1 hypointense and mild hyper intense areas on T1. The muscles appeared bulky with mild bowing of the deep fascia laterally, (C). Diffuse ill-defined hyper intensity in the subcutaneous tissue of the distal leg around the ankle and dorsum of foot suggestive of inflammatory changes

She underwent wound fasciotomy with biopsy of the right lower limb under nerve block and intravenous antibiotics following which she clinically improved and was discharged with advice to follow up as an outpatient [Figure 2].



Figure 2: Wound Fasciotomy with biopsy of right lower limb

DISCUSSION

Compartment syndrome was first described in 1881 by Richard von Volkmann a German surgeon who first described the Volkmann contracture in a publication called ‘Non-infective ischemic conditions of various fascial compartments in the extremities’. He believed at the time that the contracture was not due to nerve damage but rather to ischemia (Jimenez and Ganeshan, 2025). Isolated peroneal compartment

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syndrome is a rare entity (Torlincasi *et al.*, 2025, Rorabeck and Macnab, 1976) that is often misdiagnosed leading to delay in treatment and permanent impairment.

Compartment syndrome can be divided into acute and chronic compartment syndrome based on duration of onset (Cleveland Clinic, No date, Elliott and Johnstone, 2003)

In Acute compartment syndrome there is a sudden onset of symptoms usually after and injury or if a plaster cast is too tight. Symptoms can also come on gradually after exercising and go away during rest and this is known as chronic compartment syndrome (Cleveland Clinic, No date, Mubarak and Hargens, 1983).

Prompt recognition of signs of compartment syndrome such as swollen limbs, tenderness, local rise in temperature, paresthesia, severe pain and early institution surgical management in the form of fasciotomy is crucial to prevent permanent damage (Torlincasi *et al.*, 2025, Matsen *et al.*, 1980, Vaillancourt *et al.*, 2004).

Radiological investigation in the form of MRI is a useful adjunct to direct pressure measurements to confirm the diagnosis and facilitating management (Radsourc, No Date).

Chronic compartment syndrome may not need surgical management and can be managed by avoiding the activity that caused them or switching to low-impact exercise, using anti-inflammatory pain killers, physiotherapy and using orthotic shoes in case the patient wants to start running again (Cleveland Clinic, No date, Mubarak and Hargens, 1983).

CONCLUSION

Isolated peroneal compartment syndrome is a rare disorder by virtue of which diagnosing this condition is challenging. Diagnosis should be established based on clinical findings and radiological investigations to guide further management (Alrayes *et al.*, 2023, Radsourc, No Date, Rorabeck and Macnab, 1976).

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CONFLICT OF INTEREST

No conflicts of interest

FUNDING

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ETHICAL APPROVAL

No ethical approval was needed for this case report

CONSENT

Verbal consent was obtained from the patient for this publication

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