



Case Report

Is sports a pain in the leg? Isolated peroneal compartment syndrome: Case report and literature review

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Abstract

Compartment syndrome of the leg in sports is often due to repetitive strenuous activity and is relieved with rest. The anterior compartment is the most commonly affected. We report a rare case of isolated sub acute peroneal compartment syndrome after horse riding. The diagnosis was suspected on clinical grounds and supported by intracompartmental pressure measurements, after which a decompression fasciotomy was performed. It is important that clinicians and athletes alike are aware of this condition and its risk factors to prevent the potentially catastrophic sequelae of a delayed diagnosis.

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1. Introduction

Compartment syndrome is one of a few orthopedic emergencies and is defined as an increase in pressure of the musculofascial sheath such that the compartment pressure exceeds 40 mmHg or is within 30 mmHg of the diastolic pressure. This is usually caused by trauma, and subsequent swelling leads to impaired perfusion of the muscle. If not treated urgently, the ischemia causes destruction of the muscles involved. It is seen most commonly in the anterior compartment of the leg but can affect any area contained within a fascial compartment. Repetitive sporting activity can also lead to this condition over time, and in this case it is termed chronic exertional compartment syndrome. We report a rare case of subacute isolated peroneal compartment syndrome after a seemingly

innocuous sporting activity, and review the published literature on this condition.

2. Case report

A 42-year-old lady presented to our hospital with a 3-day history of sudden onset pain and swelling over the lateral aspect of her right leg. She had been horse riding for over 3 hours prior to onset of pain, but there was no trauma to her leg. She was seen at her local hospital on the day of occurrence where the possibility of a deep-vein thrombosis was raised but excluded after an ultrasound scan. The unrelenting pain led her to seek a second opinion.

The pain, which was refractory to strong analgesics, had kept her awake at night. She was previously fit and well and did not have any past medical history. On examination she was unable to bear weight through the right leg. There was some patchy discoloration over the lower part of the lateral leg, which appeared tense and swollen with a stony hard consistency in contrast to the other leg compartments, which were soft and nontender. Passive supination of the foot exacerbated

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the pain and there was diminished sensation over the dorsum of her foot.

An urgent ultrasound scan revealed swelling and edema of the peroneal longus and brevis tendons throughout their length. The cross section area of the swollen right peroneal muscle was 6.2 cm² compared to the left side, which was 4.2 cm². The Doppler scan showed normal arterial vascularity, but venous perfusion was difficult to assess. There was no evidence of any deep vein thrombosis. A magnetic resonance imaging scan performed the same day showed moderate diffuse swelling and edema around the right peroneal muscles but no evidence of any muscle necrosis or tear. Her blood tests revealed creatinine kinase elevated to 9900 IU/L (normal 40–300 IU/L).

She was promptly taken to the operating theater and under general anesthesia, several peroneal compartmental pressure readings using a using a needle attached to a calibrated electronic pressure transducer set revealed pressures between 70–105 mmHg, compared to 15–20 mmHg in the other compartments of her right leg. She underwent a decompressive fasciotomy of the right peroneal compartment using two small incisions proximally and distally, with release of the fascia underneath the skin. After the fascia was incised the peroneal muscles bulged out of the wound and early ischemic changes were noted initially but had improved upon completion of the procedure.

Her recovery was uneventful, and she woke from the anesthetic with virtually no pain. Her leg and ankle were immobilized in an air cast boot for comfort and she was discharged the following day.

Four days later her wounds were healing well and she had full range of knee and ankle movement but still had some residual lateral leg swelling. A second ultrasound scan was negative for a deep-vein thrombosis. Ten days postoperatively she was walking comfortably but complained of continuing numbness over the dorsum of her foot. At 2 months post-procedure the numbness over the dorsum of her foot was still present, but she had full leg, foot and ankle function.

3. Discussion

Compartment syndrome can be a devastating condition. The excruciating pain is distressing and precludes physical activity. Untreated, it leads to a functionless muscle compartment that may subsequently get infected. The necrotic tissue can also cause rhabdomyolysis and renal failure,¹ all of which are potentially life threatening. Prompt diagnosis is therefore essential in ensuring timely decompression of the compartment and prevention of the aforementioned consequences.

Compartment syndrome can be divided into acute and chronic types. In the chronic kind, pain arises gradually after an exertional threshold is reached and subsides with rest.² It may be associated with slight swelling but clinical findings are minimal. Acute compartment syndrome in contrast is characterized by severe pain at rest, swelling and tension in the affected compartment with pain on passive stretching of

the muscles as well as on attempted active movement. If the diagnosis is delayed, paresthesia may occur followed by signs of vascular compromise.³ These cases require urgent surgical decompression by fasciotomies of the affected compartments.

Compartment syndrome most commonly occurs after trauma and repetitive sporting activity. A literature search of *spontaneous* compartment syndrome in the leg revealed very few cases where there was not thought to be an activity related cause.^{1,4} During muscle activity there is an increase in muscle volume and consequently in tissue pressure.^{5,6} If sustained, these small increments in pressure can result in muscular dysfunction.⁷ Overuse related compartment syndromes seem to occur most commonly in the anterior compartment⁸ although there are two reported cases of isolated lateral (peroneal) compartment syndrome.^{9,10} This is thought to arise due to ankle position: it has been proved that dorsiflexion of the ankle increases peroneal pressure.¹¹

Our patient had a case of *subacute* compartment syndrome, in that it displayed features of both acute—severe pain at rest exacerbated by stretching the muscles of the compartment, swelling — and chronic — slowly progressing, after possible exertion, compartment syndrome. The activity that was thought to have precipitated her condition merits special attention. It has been postulated that, in addition to ankle dorsiflexion,¹¹ hip flexion and abduction may also lead to impaired venous return and thereby indirectly contribute to a compartment syndrome.¹² In addition to this, the boots the rider wears effectively decrease the volume of the compartment and may cause direct repetitive microtrauma.¹⁰ Two other cases in the literature detail compartment syndrome after prolonged horse riding.^{13,14} In our case, the delayed presentation to our hospital probably caused injury to the superficial peroneal nerve. There is also the likelihood that the superficial peroneal nerve was injured during the fasciotomy, and we are uncertain as to whether the sensation will ever return to the dorsum of her foot. It must be argued as well that she did have several investigations that may have delayed definitive treatment and halted an insult to her superficial peroneal nerve but these were necessary due to the unusual nature of her symptoms. In daily activities there will probably be an absence of protective sensation, which may predispose her to ulcers and fractures later on in life. This illustrates the urgency with which a prompt diagnosis must be made and treatment swiftly instituted. On a positive note though, we were fortunate that despite the length of time she had the compartment syndrome, her muscle tissue was still viable.

4. Conclusion

Health care professionals and individuals who participate in sporting activities must be aware that in cases of unrelenting lower limb and particularly leg pain after activity, compartment syndrome may be present and as such must present early to the emergency department to prevent the catastrophic effects of a delay in diagnosis and treatment.

Conflicts of interest

All contributing authors declare no conflicts of interest.

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