CASE REPORT

Gluteal compartment syndrome with sciatic nerve palsy caused by traumatic rupture of the inferior gluteal artery: a successful surgical treatment

Brett Rocos,¹ Anthony Ward²

¹Department of Trauma and Orthopaedics, North Bristol NHS Trust, Bristol, UK

²Department of Orthopaedics, North Bristol NHS Trust, Bristol, UK

Correspondence to

Brett Rocos,
brett.rocos@bristol.ac.uk

Accepted 22 September 2016

SUMMARY

Gluteal compartment syndrome is a rare entity, usually caused by direct trauma. This occurrence with sciatic nerve palsy caused by inferior gluteal artery laceration and compressive haematoma has not been reported in the literature. We describe such a case treated successfully by urgent surgical decompression and resolution of the sciatic nerve palsy. A man aged 41 years sustained blunt trauma to the right gluteal region causing a rupture of the inferior gluteal artery, gluteal compartment syndrome and rapidly progressive sciatic nerve palsy. The condition was treated urgently with interventional radiology, open surgical decompression and debridement. Recovery was complicated by recurrent haematoma formation, treated successfully with subsequent complete resolution of the sciatic nerve palsy. A review of the literature of traumatic gluteal compartment syndrome is presented with discussion of the clinical diagnosis, multidisciplinary treatment and recommendations for treatment of this injury.

BACKGROUND

Gluteal compartment syndrome is a rare condition but has been reported following superior gluteal artery laceration, hip dislocation, pelvic and acetabular fracture and bone marrow biopsy.^{1–5} Typically, gluteal compartment syndrome occurs most commonly in men, of average age 45 years, and usually as a result of external compression.⁶ Several case reports describe superior gluteal artery injury causing a gluteal compartment syndrome, but few report inferior gluteal artery injury and nerve palsy.^{5 7 8} The published literature contains a single case report of an inferior gluteal artery aneurysm causing a sciatic nerve palsy but, to the best of our knowledge, there are no reports of inferior gluteal artery injury giving rise to rapidly progressing haematoma formation, gluteal compartment syndrome and evolving sciatic nerve palsy.⁹ This case report defines the aetiology, diagnosis, emergency treatment and definitive management of such a case with a good clinical outcome.

The authors have obtained the patient's informed consent for print and electronic publication of the report in any nation.

CASE PRESENTATION

A man aged 41 years was admitted to the emergency department via air ambulance. The patient had been pruning a tree and fallen 3.5 m from a

ladder, landing on his back over a felled branch of the tree. At the scene, the patient was assessed by paramedical staff to have a Glasgow Coma Score of 15/15, with no signs of head, chest or abdominal injury. The patient reported of severe right buttock and leg pain. A pelvic binder was applied and the patient given 120 mg of ketamine, 10 mg of morphine and 1 g of tranexamic acid in the prehospital phase.

On admission during log roll assessment of the patient, a large contusion over the right gluteal region, superficial abrasions and absence of penetrating wound were documented ([figure 1](#)). There was evidence of an expanding mass within the buttock with tight, incompressible overlying skin. There was a dense right sciatic nerve palsy, with muscle strength of Medical Research Council grade 0/5 at the foot and ankle, with absent sensation over the lower leg and foot. The attending paramedical team reported that the neurological deficit had deteriorated since their arrival at the accident scene.

INVESTIGATIONS

The trauma CT scan with contrast showed a blush of intravenous contrast from the region of the inferior gluteal artery within the gluteus maximus muscle, suggesting the diagnosis of an arterial laceration or rupture at this site. A large gluteal haematoma was seen ([figure 2](#)).

TREATMENT

The patient was transferred to the interventional suite for further imaging and treatment to stop the

Figure 1 Clinical photograph of the external appearance of the injury. Note the gross swelling and impact point.

CrossMark

To cite: Rocos B, Ward A. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2016-216709

Figure 2 Trauma CT with contrast showing a 'blush sign' in the right gluteus maximus and associated haematoma.

arterial haemorrhage. On repeat examination, the patient was documented to have worsening, uncontrolled pain in the right buttock with complete absence of sciatic nerve function in the right ankle and foot. Digital subtraction angiography was performed under general anaesthesia with cannulation of the right femoral artery. Angiography showed an abrupt termination of the superior gluteal artery due to compression from the gluteal haematoma, and extravasation of contrast due to bleeding from the inferior gluteal artery (figure 3). Successful occlusion of the inferior gluteal artery and cessation of haemorrhage was achieved by embolisation with a coil.

The anaesthetised patient was transferred directly to the operating theatre for subsequent surgical treatment within 3 h of admission to hospital. The patient was placed in a semiprone position and a Kocher-Langenbeck approach performed to decompress the right gluteal compartment.¹⁰ Once the deep fascia was divided, a large volume of haematoma under pressure was evacuated from deep to gluteus maximus. The sciatic nerve was identified and noted to be intact. The deep fascia was divided further into the proximal thigh to ensure distal decompression of the nerve was achieved. Complete proximal decompression was confirmed following palpation deep to the medial border of gluteus maximus and deep to piriformis muscle. The gluteus medius and minimus muscles underlying the nerve were noted to be viable and not requiring debridement. No traumatic penetrating wound of the overlying skin of the buttock was found. A surgical drain was placed deep to gluteus maximus. The surgical wound was lightly packed superficially and left open, covered with an occlusive wound dressing.

OUTCOME AND FOLLOW-UP

Postsurgery, the patient's haemoglobin was 73 g/L and a transfusion of 2 units of packed red blood cells was administered. A persistent discharge of serous fluid from the wound was managed with absorbent dressings and temporary use of a stoma bag over the distal portion of the wound until healed 12 days after operation. However, 5 days later, the patient developed recurrent pain and swelling in the right buttock with neurogenic pain in the right foot. The patient was readmitted to hospital for surgical exploration and debridement of the buttock wound under general anaesthetic. A small recurrent haematoma was evacuated, a negative pressure dressing used on the wound and intravenous antibiotics started. Intraoperative tissue specimens were sent for microbiological culture and Coagulase-negative *Staphylococcus aureus* was isolated. The wound was treated by further debridement and delayed primary closure 3 days later. A 7-day course of antibiotic therapy was completed and the wound healed without further complication.

Figure 3 Arterial angiogram showing extravasation of contrast from the laceration of the inferior gluteal artery.

The patient experienced persisting neurogenic pain in the right foot and received treatment with amitriptyline, gabapentin and physiotherapy. On final review, 68 days after injury, the patient was fully recovered with complete resolution of pain, continuing normal sciatic nerve function and no medication.

DISCUSSION

This case report documents a rare traumatic cause of gluteal compartment syndrome secondary to non-penetrating injury to the inferior gluteal artery, with resultant haematoma formation and compression of the sciatic nerve. Complete neurological recovery occurred after rapid recognition of the clinical signs, use of diagnostic imaging, control of haemorrhage and surgical decompression of the gluteal compartment and sciatic nerve.

Gluteal compartment syndrome is a challenging diagnosis to make and a high index of clinical suspicion is required. Various causes of compartment syndromes have been documented in the literature, including trauma, prolonged immobility and surgical positioning, bone marrow biopsy, drug abuse, epidural anaesthesia, posterior hip dislocation, intra-abdominal surgery, sickle cell crises and Ehlers-Danlos syndrome.^{1-5 7 8 11-14} The diagnosis can only be made with clinical examination, the evaluation of any progressing symptoms and recognition of clinical signs.⁶ There is no definition of the threshold of abnormal raised intra-compartmental pressure needed to diagnose gluteal compartment syndrome.^{6 15} Normal values have been reported to be 13–14 mm Hg.¹⁶ Currently, these have not been integrated into clinical practice and may not be appropriate to surgical application, although these values have been used in some cases.^{6 16 17} Rapid diagnosis and surgical treatment is essential as neurological injury may occur within 33 min of ischaemia.¹⁸ There is limited role for electromyoneurography, which is impractical to organise in urgent situations and likely to be insufficiently sensitive.

The anatomy of the gluteal region is described as consisting of three non-distensible fascial compartments, each containing muscle susceptible to compartment syndrome.¹⁷ The gluteus maximus, gluteus medius and tensor fascia lata muscles each lie within their own definable compartment and should be individually considered during decompression. While no

neurological structures lie directly within any of the compartments, the sciatic nerve is vulnerable to extrinsic compression from a rapidly expanding haematoma under pressure as it emerges from beneath the piriformis muscle, passing deep to gluteus maximus and entering the posterior thigh.^{17 19} Decompression of the compartments can be achieved using the Kocher-Langenbeck approach as used here or the question mark incision described by Henry, both of which expose the glutei with minimal risk of injury to the superior gluteal artery and sciatic nerve.^{10 20–22} Both approaches allow exposure of the three compartments, access to the midline insertion of deep fascia at the sacrum and inspection of the sciatic nerve.

Bosch and Tscherné performed a detailed evaluation of subjective and objective outcomes in four patients with gluteal compartment syndrome and showed that three had residual deficits sufficient to compromise their activities of daily living, with two having persisting sciatic nerve dysfunction.²³ Other studies report varying degrees of disability and dissatisfaction following gluteal compartment syndrome.⁶ In comparison, despite the initial wound complication, our patient was satisfied with the clinical outcome, having no residual disability. This case report documents the successful treatment of gluteal compartment syndrome with associated sciatic nerve dysfunction, based on the high clinical suspicion, prompt recognition of clinical signs and rapid intervention with arterial embolisation and surgical decompression, resulting in complete recovery.

Learning points

- ▶ Compartment syndrome can strike any enclosed compartment.
- ▶ The large muscles in the gluteal region make it susceptible to catastrophic compartment syndrome following injury unless rapid treatment is initiated.
- ▶ Treatment in this case included interventional radiological procedure and surgical decompression with successful outcome.
- ▶ Complete resolution is possible with rapid diagnosis and treatment.

Contributors AW conceived the case report. BR obtained patient consent. BR drafted the manuscript. BR and AW edited and approved the final version.

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- 1 Berumen-Nafarrate E, Vega-Najera C, Leal-Contreras C, *et al.* Gluteal compartment syndrome following an iliac bone marrow aspiration. *Case Rep Orthop* 2013;2013:812172.
- 2 Kumar V, Saeed K, Panagopoulos A, *et al.* Gluteal compartment syndrome following joint arthroplasty under epidural anaesthesia: a report of 4 cases. *J Orthop Surg (Hong Kong)* 2007;15:113–17.
- 3 Matta A, Kelley SR. Gluteal compartment syndrome after robotic left adrenalectomy. *Am Surg* 2014;80:E101–2.
- 4 McGoldrick NP, Green C, Connolly P. Gluteal compartment syndrome following bone marrow biopsy: a case report. *Acta Orthop Belg* 2012;78:548–51.
- 5 Taylor BC, Dimitris C, Tancevski A, *et al.* Gluteal compartment syndrome and superior gluteal artery injury as a result of simple hip dislocation: a case report. *Iowa Orthop J* 2011;31:181–6.
- 6 Henson JT, Roberts CS, Giannoudis PV. Gluteal compartment syndrome. *Acta Orthop Belg* 2009;75:147–52.
- 7 Smith A, Chitre V, Deo H. Acute gluteal compartment syndrome: superior gluteal artery rupture following a low energy injury. *BMJ Case Rep* 2012;2012:■■■■.
- 8 Brumback RJ. Traumatic rupture of the superior gluteal artery, without fracture of the pelvis, causing compartment syndrome of the buttock. A case report. *J Bone Joint Surg Am* 1990;72:134–7.
- 9 Papadopoulos SM, McGillicuddy JE, Messina LM. Pseudoaneurysm of the inferior gluteal artery presenting as sciatic nerve compression. *Neurosurgery* 1989;24:926–8.
- 10 Kocher T. *Text-book of operative surgery*. London: Adam and Charles Black, 1895.
- 11 Adrish M, Duncalf R, Diaz-Fuentes G, *et al.* Opioid overdose with gluteal compartment syndrome and acute peripheral neuropathy. *Am J Case Rep* 2014;15:22–6.
- 12 Ferrie R, Loveland RC. Bilateral gluteal compartment syndrome after 'ecstasy' hyperpyrexia. *J R Soc Med* 2000;93:260.
- 13 Heyn J, Ladurner R, Ozimek A, *et al.* Gluteal compartment syndrome after prostatectomy caused by incorrect positioning. *Eur J Med Res* 2006;11:170–3.
- 14 Schmalzried TP, Eckardt JJ. Spontaneous gluteal artery rupture resulting in compartment syndrome and sciatic neuropathy. Report of a case in Ehlers-Danlos syndrome. *Clin Orthop Relat Res* 1992;253–7.
- 15 Tiwari A, Haq AI, Myint F, *et al.* Acute compartment syndromes. *Br J Surg* 2002;89:397–412.
- 16 Yoshioka H. Gluteal compartment syndrome. A report of 4 cases. *Acta Orthop Scand* 1992;63:347–9.
- 17 Bleicher RJ, Sherman HF, Latenser BA. Bilateral gluteal compartment syndrome. *J Trauma* 1997;42:118–22.
- 18 Phillips JH, Mackinnon SE, Beatty SE, *et al.* Vibratory sensory testing in acute compartment syndromes: a clinical and experimental study. *Plast Reconstr Surg* 1987;79:796–801.
- 19 David V, Thambiah J, Kagda FH, *et al.* Bilateral gluteal compartment syndrome. A case report. *J Bone Joint Surg Am* 2005;87:2541–5.
- 20 Henry A. *Extensile exposure*. New York: Churchill Livingstone, 1987:1.
- 21 Osborne R. The approach to the hip-joint: a critical review and a suggested new route. *Br J Surg* 1930;18:3.
- 22 Henry AK. *Extensile exposure applied to limb surgery*. Edinburgh: E. & S. Livingstone, 1945.
- 23 Bosch U, Tscherné H. The pelvic compartment syndrome. *Arch Orthop Trauma Surg* 1992;111:314–17.

Copyright 2016 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>.
BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- ▶ Submit as many cases as you like
- ▶ Enjoy fast sympathetic peer review and rapid publication of accepted articles
- ▶ Access all the published articles
- ▶ Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow