



## Gluteal compartment syndrome following bone marrow biopsy : A case report

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Compartment syndrome is a well described limb-threatening and potentially life-threatening condition. Compartment syndromes of the upper and lower limbs are well documented in the literature. The gluteal region, however, is often not considered as a compartment despite having three osseofascial boundaries. We report a case of gluteal compartment syndrome which resulted from a bone marrow biopsy. The patient was anticoagulated at the time. The outcome was residual right sided foot drop due to sciatic nerve palsy. This case describes an unusual presentation of a rare condition. Gluteal compartment syndrome is a potential complication of bone marrow biopsy.

**Keywords :** gluteal compartment syndrome ; bone marrow biopsy.

### INTRODUCTION

Bone marrow biopsy from the posterior iliac spines is a common and generally safe medical procedure undertaken worldwide. Haemorrhage is a recognised potential complication of the procedure. We describe a case where significant haemorrhage following a bone marrow trephine biopsy taken from a patient's right posterior superior iliac spine evolved into a gluteal compartment syndrome with associated sciatic nerve palsy on the ipsilateral side.

### CASE REPORT

A 53-year-old lady was admitted medically for investigation of ascites, which was thought to be secondary to a suspicious left-sided adnexal mass. Her past medical history was significant for metallic mitral and aortic valve replacements, for which she had been commenced on warfarin therapy. She also had a history of iron deficiency anaemia, thrombocytopenia, hypertension and non-insulin dependent diabetes mellitus.

As an ultrasound-guided diagnostic ascitic tap was planned, the patient's warfarin was stopped. Her International Normalized Ratio (INR) was brought down from a therapeutic level with 2 mg oral Vitamin K. Her anticoagulation was maintained

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with therapeutic-dose twice-daily subcutaneous low-molecular weight heparin injections.

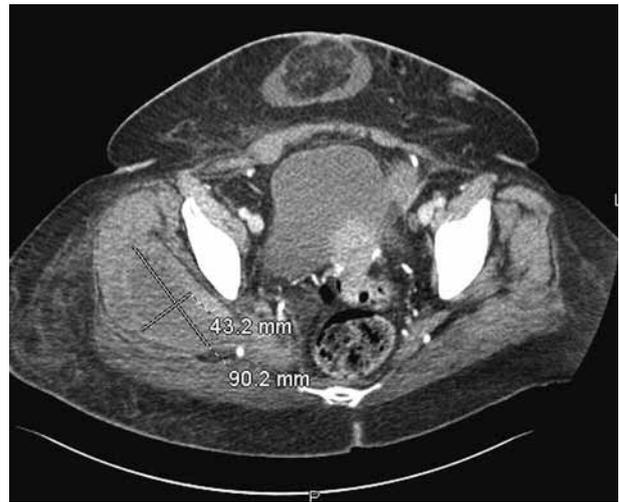
Twelve days into admission, a bone marrow aspiration and trephine biopsy was performed. Specimens were obtained from the right posterior superior iliac spine. The procedure was initially reported as being uneventful. On day 5 post-procedure, the medical notes reveal the patient began to complain of severe lower back pain, which she localized to the site of her bone marrow biopsy. No bleeding was noted at the site, and her observations were within normal limits. The back pain was attributed to the bone marrow biopsy, and felt to be within appropriate limits.

Overnight on day 6 following the procedure, the patient was reviewed with regard to ongoing severe right lower limb pain. She reported severe pain over the site of her bone marrow biopsy, across her buttocks, and which now radiated down the posterior aspect of her right leg as far as her knee. The site of biopsy was noted to be “non-tender, non-erythematous, but firm to palpate”. No neurological deficit, motor or sensory, was detected clinically at the time. It was further noted that neither paracetamol nor tramadol helped ease the pain. Subcutaneous morphine was prescribed.

By morning time, the patient reported her pain as excruciating. It was described as the “worst imaginable”. She also complained of numbness in her right foot. The patient’s haemoglobin decreased from 8.0 mg/dL to 6.7 mg/dL. She was transfused three units of red cells. A Computed Tomography (CT) Abdomen/Pelvis was requested.

CT revealed a large haematoma measuring approximately 9 cm × 5 cm, located in the right gluteal region. The haematoma was noted to extend 24 cm in cranio-caudal dimensions along the posterior thigh (Figs. 1-3).

Orthopaedic opinion was sought as there was now concern for compartment syndrome. Initial examination revealed a soft anterior compartment, with mildly tense medial and posterior compartments. Passive stretch testing was negative. The patient was noted to have a right-sided foot drop. She had power MRC grade 0 out of 5 in right L4-L5 myotomes, and reported decreased sensation MRC grade 0 of 2 in the same distribution. Dorsalis



**Fig. 1.** — Transverse cut through CT Abdomen & Pelvis revealing large haematoma in the right gluteal region.

pedis and posterior tibial pulses were palpable. Her right lower limb was noted to be grossly swollen. She suffered acute renal failure.

As the patient’s symptoms were more than 48 hours old by time of assessment for compartment syndrome, and coupled with her American Society of Anesthesiologists (ASA) Grade 4E, a decision for conservative management was taken. Her pain resolved the following day. She continues to have a right-sided foot drop.

## DISCUSSION

Compartment syndrome is a condition occurring due to raised intra-compartmental pressures in closed myofascial compartments (7). The result is decreased blood flow to the tissues, causing subsequent muscle ischaemia, breakdown and electrolyte disturbance. It is considered a limb-threatening condition, and potentially even life-threatening if severe and not treated.

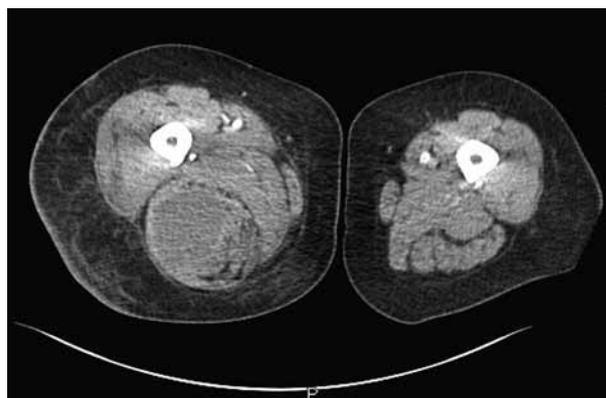
Compartment syndromes involving the upper and lower limbs are well described. The gluteal region however is often not considered as a compartment. Nevertheless Bleicher *et al* have identified three non-distensible osseofascial boundaries in the gluteal region: gluteus maximus, gluteus medius and minimus, and tensor fasciae latae (1).



**Fig. 2.** — Coronal view of CT showing the haematoma extending distally through posterior compartment of right leg.

The presentation may be unilateral (2), as in this case, or more rarely there may be bilateral involvement of the gluteal compartments (5,15).

Numerous causes have been identified in the literature. These include drug abuse (6,14), surgical anaesthesia (4,8), serious illness leading to coma (13) and trauma (9,10). In this case, the patient's pain and sciatic neuropathy were explainable by the clinical findings of a tense posterior compartment, along with CT confirmation of extensive haematoma tracking distally from the glutei down the posterior thigh. The origin of the haematoma formation is less clear. Spontaneous bleeding within the gluteal compartment due to the patient's anticoagulation is conceivable, and has been reported previously (12). Equally, the precipitant could have been iatrogenic injury to a gluteal vessel at the time of bone marrow biopsy. To our knowledge, such a scenario has only



**Fig. 3.** — Transverse cut of CT demonstrating large haematoma in posterior compartment of right leg.

been described once before, and bears striking similarities to the case presented here (11).

Regardless of the exact cause, this presentation is unusual. By the time of orthopaedic examination, the patient's compartments were beginning to soften, her pain was beginning to lessen, and neurological injury had become established. Gluteal compartment syndrome is rare and has often been mistaken for simple contusion, or indeed missed completely. This case emphasizes the need for a high index of suspicion for the possibility of gluteal compartment syndrome. This is all the more important in the elderly, immobile or unconscious patient, and in those on anticoagulation medications.

Once identified, urgent surgical decompression by fasciotomy is the gold standard. Exposure of the gluteal compartments by "question-mark incisions" has been described (3). The incision begins at the posterior superior iliac spine, and runs anterolateral along the iliac crest before turning distally over the greater trochanter to reach the inferior gluteal fold.

Prompt recognition and surgical treatment is essential to help prevent adverse neurological and potentially fatal sequelae. A relationship is known to exist between functional deficit and the duration of the compartment syndrome (11). Sciatic neuropathy, as in this case, is invariably present in gluteal compartment syndrome (11).

This case is a reminder of the importance to have a high index of suspicion for the possibility of an

evolving compartment syndrome, particularly in the patient requiring increasing pain relief. Moreover, it highlights the neurological sequelae that may be the result of a gluteal compartment syndrome. This case describes an unusual presentation of a rare condition. Gluteal compartment syndrome is a possible complication of bone marrow biopsy, particularly in the anticoagulated patient.

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