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CASE REPORT PEER REVIEWED | OPEN ACCESS

Superior gluteal artery hemorrhage causing gluteal compartment syndrome and sciatic neuropathy following iliac crest biopsy: A case report

Meena Kothwal Patel, Manvek Jawanda, Rajkumar Srinivasan

ABSTRACT

Introduction: Iliac crest biopsy is a common procedure used in diagnosing hematological conditions. Although the procedure is generally safe, hemorrhagic complications may arise, especially in patients who are anticoagulated.

Case Report: This case report describes a 75-year-old male who developed a large gluteal hematoma and sciatic nerve compression following a biopsy of the right posterior iliac crest and resultant injury to the superior gluteal artery. The patient presented one week after the procedure with severe neuropathic pain in sciatic nerve distribution, resulting in significant functional impairment and immobility. Imaging demonstrated a large intermuscular gluteal hematoma, and the patient subsequently underwent surgical evacuation of the hematoma with ligation of the superior gluteal artery.

Conclusion: This case highlights the importance of early recognition and prompt management of this rare complication following iliac crest biopsy. Although anticoagulation is not routinely withheld for this low-risk bleeding procedure, clinicians should maintain a high index of suspicion for significant hemorrhagic complications in anticoagulated patients presenting with severe post-procedural pain, neurological symptoms, or functional decline.

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INTRODUCTION

Gluteal compartment syndrome (GCS) is a rare but severe condition often resulting from blunt trauma, surgery, or prolonged immobilization. Given its rare occurrence, the incidence of GCS is not well reported [1]. Gluteal compartment syndrome can be associated with significant morbidity and mortality if misdiagnosed and not treated appropriately [2]. The syndrome occurs due to increased pressure within the confined space of the gluteal compartment, impairing blood flow and leading to ischemic injury of the sciatic nerve. Symptoms of GCS include intense gluteal pain, sciatic nerve distribution of pain, muscle weakness, and functional impairment.

Bone marrow (BM) biopsy is a crucial tool for the diagnosis, staging, and follow-up of patients with hematological disorders. The most frequently encountered post-procedure complications include localized pain at the site of biopsy, sacroiliac joint pain, local bleeding, neurological damage due to nerve injury, fracture of a bone, local infection, and needle tract seeding [3].

We describe a rare case of superior gluteal artery hemorrhage causing gluteal compartment syndrome and sciatic nerve compression after iliac crest biopsy in an

anticoagulated 75-year-old male patient. Only three cases of GCS after bone marrow biopsy have been reported in the literature to date [2].

CASE REPORT

A 75-year-old male patient underwent right posterior iliac crest biopsy for histological confirmation of myelodysplastic syndrome. The patient was therapeutically anticoagulated at the time of biopsy with Rivaroxaban 20 mg once daily for Atrial Fibrillation. Following the procedure, the patient presented to the emergency department with significant pain the same day. A small hematoma at the biopsy site was noted on examination along with inability to mobilize due to pain. The patient was admitted under the care of oncologist for pain management and Rivaroxaban was withheld. The following day, pain slightly improved with persisting immobility, so the patient was transferred to a local district hospital for ongoing recovery for analgesia and physiotherapy.

However, he was transferred back from district hospital, a week later as the pain persisted despite high dose opioids and limiting mobility. On presentation, the patient was tachycardic with a heart rate of 104 bpm, febrile with a temperature of 38.3 °C, normotensive, and maintaining normal oxygen saturation on room air. The patient had low hemoglobin and raised inflammatory markers, pointing to a diagnosis of infected hematoma at biopsy site. Septic screen and computed tomography (CT) scan were done concurrently while resuscitating the patient with intravenous fluids and antibiotics. The CT scan showed a large right sided Gluteal hematoma deep to gluteus maximus muscle, without active extravasation of contrast (Figures 1 and 2).

Given the history of non-resolving pain crisis with clinical findings to suggest sciatic nerve involvement from hematoma, a clinical and radiological diagnosis of Gluteal compartment syndrome secondary to hematoma causing sciatic nerve compression was made.

The patient was admitted and taken to operating theater for hematoma evacuation the following day. An incision was made directly overlying the hematoma. Transmuscular entry via gluteus maximus to access hematoma cavity was achieved and the hematoma was evacuated. Post-evacuation, torrential bleeding from the superior gluteal artery occurred, likely secondary to the loss of the tamponade effect from the hematoma. Approximately 1 L of blood loss occurred intraoperatively, necessitating immediate hemostatic intervention by a vascular surgeon on site. The superior gluteal artery was successfully ligated using Liga-clips, which controlled the bleeding. The hematoma cavity was then irrigated, a drain was placed in the cavity and closed in layers, with confirmed hemostasis. Following this procedure, there was resolution of pain immediately with persisting paresthesia and motor symptoms. The patient had ongoing slow improvement of motor function with physiotherapy and was discharged home after five days with outpatient physiotherapy and recommencement of anticoagulation a few days later.

Twelve weeks following surgery, the patient presented incidentally for evaluation of sudden left lower limb weakness. A CT angiogram of the lower limbs was performed at that time. Postoperative imaging demonstrated complete resolution of the previously identified right gluteal intramuscular hematoma (Figures 3 and 4). A new left iliopsoas hematoma was identified; however, this was considered unrelated to the original presentation.

Figure 1. Preoperative axial CT scan demonstrating a gluteal hematoma (green arrow).

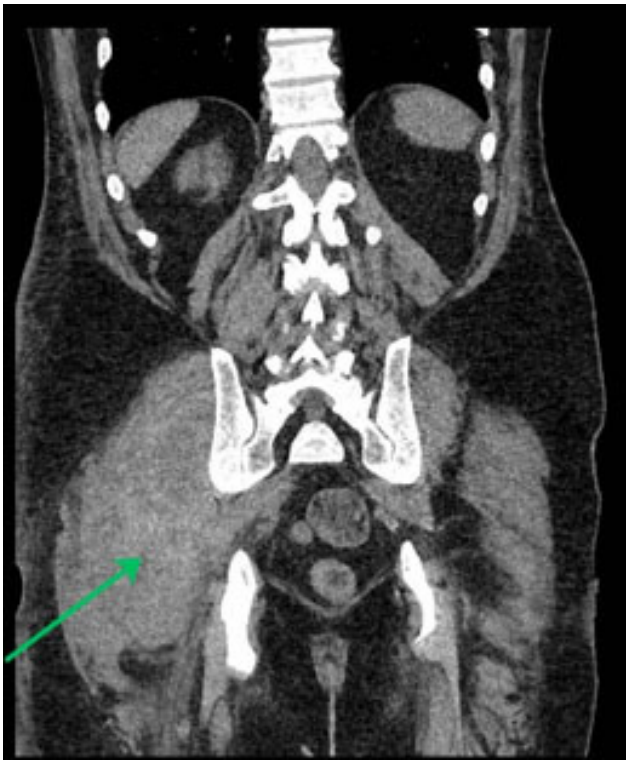

Figure 2. Preoperative CT scan in the coronal plane demonstrating the right gluteal hematoma (green arrow).

Figure 3. Twelve-week postoperative CT angiogram (portal venous phase), axial view, demonstrating complete resolution of the previously identified right gluteal intramuscular hematoma following interval drainage, with no residual blood collection. A new acute large left iliopsoas intramuscular hematoma is also visible (orange arrow) unrelated to the previous surgery.

Figure 4. Twelve-week postoperative CT angiogram (portal venous phase), coronal section, demonstrating complete resolution of the previously identified right gluteal intramuscular hematoma following interval drainage, with no residual blood collection.

DISCUSSION

There are limited cases of GCS reported in the literature. For the reported cases, a systematic review and meta-analysis conducted by Adib et al. (2022) noted the following etiologies of GCS—postoperative (41%), immobilization (35%), traumatic (19%), other causes (5%). Postoperative cases were further subdivided into orthopedic surgery (14%), urologic surgery (8%), vascular surgery (9%), bariatric surgery (6%), bone marrow biopsy (2%, 3 cases), and other (2%). Early diagnosis and management are crucial because GCS, like other compartment syndromes, is a medical emergency that may be associated with a higher mortality rate (7% incidence of inpatient mortality) and morbidity rate (41% incidence of permanent neurological deficit) [2].

Local hemorrhage, resulting from vascular injury, is the most frequent serious complication encountered after a bone marrow trephine biopsy. Post-biopsy complications may not be evident immediately post-procedure, and delayed presentations can occasionally occur emphasizing the need for adequate observation and close clinical monitoring and evaluation [3].

The risk of hemorrhagic complications is even greater in anticoagulated patients. Oliveira et al. (2023) reported two cases of GCS due to hematoma development after reintroducing therapeutic anticoagulation within 24 hours of orthopedic intervention for fixing pelvic fracture and right hip fracture. The authors held the conviction that the anticoagulation treatment constituted an important risk factor for the development of this condition [4].

However, given bone marrow biopsy is considered a low to moderate bleeding risk procedure, periprocedural withholding of anticoagulation is not routinely recommended. According to a review by Moore and Kotchetkov (2021), the incidence of significant hemorrhage after bone marrow (BM) biopsy was very low (0.007–1.1%) and stopping anticoagulation periprocedural was not consistently recommended. The review also stated that patients with myeloproliferative neoplasms can develop an acquired Von Willebrand syndrome which increases their risk for bleeding and therefore require extra vigilance to ensure appropriate hemostasis [5].

Neurological deficit at the time of presentation is an indication for fasciotomy for GCS in selected cases. In patients without neurologic deficit at presentation; however, the indications for fasciotomy are controversial [2]. Fasciotomy was deemed not necessary in our patient.

The Iliolumbar, superior gluteal, hypogastric, median sacral, and circumflex iliac arteries are the most commonly reported arteries injured during the bone marrow biopsy. Endovascular management is the gold-standard management option in treating patients with bleeding complications as it provides a minimally invasive and rapid treatment option with favorable outcome and low complication rates [3]. However, there was no active arterial hemorrhage or pseudoaneurysm noted on CT angiogram in the case, so this option was not considered. In this case, the superior gluteal artery ligation was performed based on the presence of a trochanteric anastomosis between the ligated artery and adjacent vascular structures, including the inferior gluteal artery and the circumflex femoral arteries arising from the profunda femoris artery [6].

CONCLUSION

Cases of gluteal compartment syndrome (GCS) and sciatic nerve compression due to iliac crest biopsy-related hematoma formation in anticoagulated patients are very rare in the literature. Prompt diagnosis and immediate management are essential to avoid significant life-threatening and neurological complications. In anticoagulated patients, extra caution must be taken during the procedure to avoid arterial injuries and achieve strict hemostasis. Periprocedural anticoagulation management is individualized to each patient and stopping anticoagulation before bone marrow biopsy is not routinely recommended.

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Author Contributions

Meena Kothwal Patel – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Manvek Jawanda – Acquisition of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Rajkumar Srinivasan – Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

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Conflict of Interest

Authors declare no conflict of interest.

Data Availability

All relevant data are within the paper and its Supporting Information files.