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## Case Report

# Iliac bone biopsy complicated by hematoma: Hemostasis achieved with glue injection

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## ABSTRACT

Serious hemorrhage after a bone biopsy is a rare complication of the procedure. Due to the infrequency of this complication, there is limited literature available regarding the treatment. Here, we present a case of a 70-year-old male who developed a symptomatic gluteal hematoma after an iliac bone lesion biopsy. Hemostasis was achieved by injecting an N-butyl cyanoacrylate glue solution into the bone cannulation site under CT-guidance.

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## Introduction

Accessing the posterior ilium is commonly performed for bone marrow aspirations and less commonly for coaxial bone lesion biopsies. Indications for iliac bone marrow aspiration include evaluation of leukemia, lymphoma, pancytopenia, thrombocytopenia, anemia, fever of unknown origin, lymphadenopathy, and hepatosplenomegaly [1]. Indications for iliac bone lesion biopsies include assessment of neoplastic disease (e.g. metastasis, osteosarcoma, Ewing sarcoma, etc.) [2] and metabolic disease (e.g. renal osteodystrophy, Paget's disease, osteomalacia, etc.) [3].

Complications of bone marrow biopsies are rare. In fact, in a large study spanning 3 years with 19,259 bone marrow biopsies performed, only 16 adverse events were reported. The most common adverse event was hemorrhage, which occurred in 11 of these events [4]. This established a hemorrhage

complication rate of bone marrow biopsies of 0.06%. The complication rate is so low that there are virtually no contraindications. Iliac bone marrow biopsies have been performed safely on patients with severe thrombocytopenia and other hemorrhagic disorders [5].

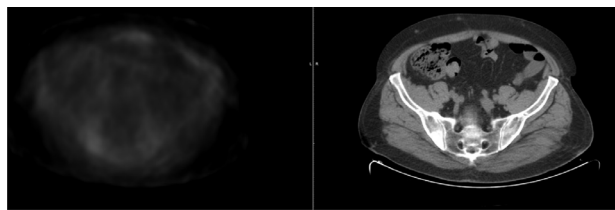
While procedurally iliac bone lesion biopsies and iliac bone marrow biopsies are very similar, it is important to recognize that the targets of the procedures are different. Bone lesions can be lytic, sclerotic, hypervascular, etc. and thus may have different complication outcomes. A 2-year prospective study involving 386 bone and soft-tissue biopsies helped to evaluate this distinction. Minor complications like mild pain and bruising were relatively common at 16.1% and 15.6% respectively. While these complication rates appear higher than in marrow aspirations there were no major complications and none of the minor complications altered patient management [6].

While the procedures are considered to be very safe, a hemorrhage can have devastating effects. There are reports of

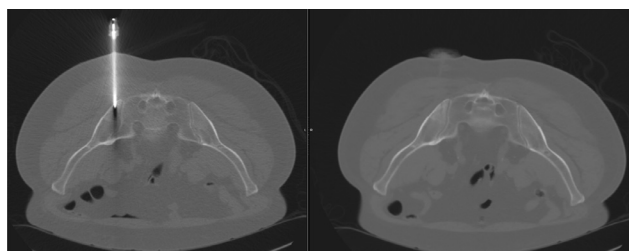
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**Fig. 1 – Described as subtle asymmetric metabolic activity in the right posterior iliac bone.**



**Fig. 2 – During and postbiopsy in bone window.**

patients dying due to bleeding into the retroperitoneal space after a bone marrow biopsy [7]. There is a scarce amount of literature discussing the treatment of a hemorrhage after an iliac biopsy. Some case reports describe endovascular embolizations and laparotomies to treat retroperitoneal hemorrhages [8,9]. There is even less information about the treatment for other locations of hemorrhage. We present a case of a patient receiving an N-butyl cyanoacrylate (NBCA) glue solution injection at the bone cannulation site to achieve hemostasis of a gluteal hematoma after an iliac bone biopsy.

## Case presentation

A 70-year-old African-American male with a history of mantle cell lymphoma in remission and bladder cancer status-posttransurethral resection of bladder tumor presents for a biopsy of a mildly positron emission tomography-avid sclerotic lesion of the right iliac bone (Fig. 1). This patient was orally anticoagulated due to the presence of a mechanical mitral valve. In accordance with the Society of Interventional Radiology guidelines, the warfarin medication was held for 5 days prior to the procedure and a satisfactory preprocedural international normalized ratio of 1.2 was obtained [10]. A preprocedural platelet count of 163,000 per microliter was also adequate. A hemoglobin of 9.5 g/dL and WBC of  $2.8 \times 10^9$  cells per liter were measured.

A preprocedural antibiotic, cefazolin, was given. The biopsy was performed using CT-guidance with the patient in the prone position. An OnControl bone biopsy set was used to obtain the tissue. The 10G penetration cannula was used to penetrate the cortex. A single pass was then coaxially performed with a 12G OnControl core biopsy cannula yielding a solid specimen (Fig. 2). The specimen was deemed adequate and prolonged manual pressure was applied after needle removal



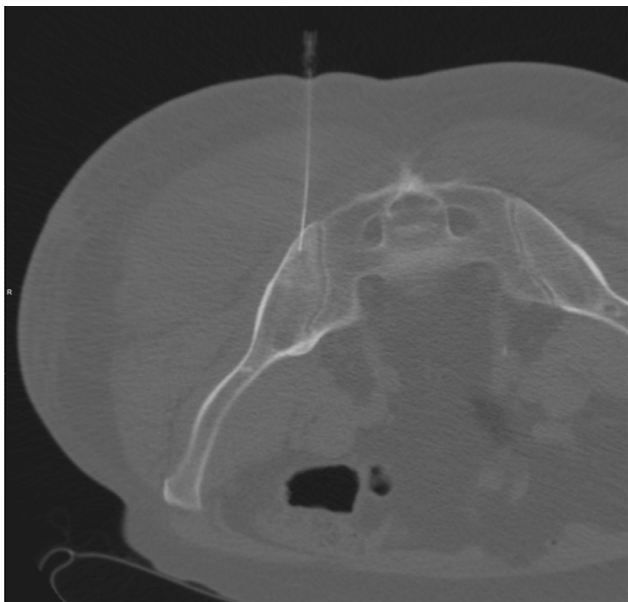
**Fig. 3 – Postbiopsy day 7 demonstrating right gluteal hematoma.**

due to delayed hemostasis. No discernable hematoma developed in the immediate postprocedural period and follow-up hemoglobin levels were stable. The patient was discharged in good condition. Histological evaluation of the specimen revealed sclerotic lamellar bone with peritrabecular collagen fibrosis and a hypocellular marrow cavity. Specifically, the lesion was ascertained as benign and thus negative for mantle cell lymphoma.

The patient resumed the warfarin 48 hours after the procedure with enoxaparin bridging. He was asymptomatic until post-biopsy day 6 at which point he developed worsening right hip pain. He presented on post-biopsy day 7 with inability to walk due to the right hip pain. Investigation with CT imaging revealed a 10 cm right gluteal hematoma with a hematocrit level (Fig. 3). A prothrombin time and complete blood count obtained at that time yielded an international normalized ratio of 1.9, platelet count of 180,000 per microliter, and hemoglobin of 8.6 g/dL. A follow-up CT on postbiopsy day 8 demonstrated slight enlargement of the hematoma. Due to inadequate pain control, the clinical and interventional radiology teams made the decision to intervene.

On postbiopsy day 9, the cortical access tract was recanalized with a 3.5-inch 20G spinal needle under CT-guidance (Fig. 4). Upon removal of the trocar, slow back-flow of blood to the needle hub was present. After flushing of extension tubing and needle with D5 solution, a 1:2 NBCA/lipiodol solution was injected through the needle into the bone. The NBCA solution was also injected during needle withdrawal to seal the cortical tract. In total, 2.5 mL of glue solution was used. There was expected glue distribution in the bone tract and adjacent marrow with some backtracking into the overlying soft tissues (Fig. 5).

On postbiopsy day 10, the hemoglobin level dropped from 8.0 g/dL to 6.0 g/dL. The cause of the decrease was unclear but deemed attributable to dilution or additional preinterventional bleeding. The patient received a transfusion with 3 units of packed red blood cells. A follow-up CT on postbiopsy day 11 demonstrated stable-to-decreased hematoma size with the glue in place. The patient reported improved pain and ambu-



**Fig. 4 – Intervention on postbiopsy day 8 – cannulation of biopsy site.**



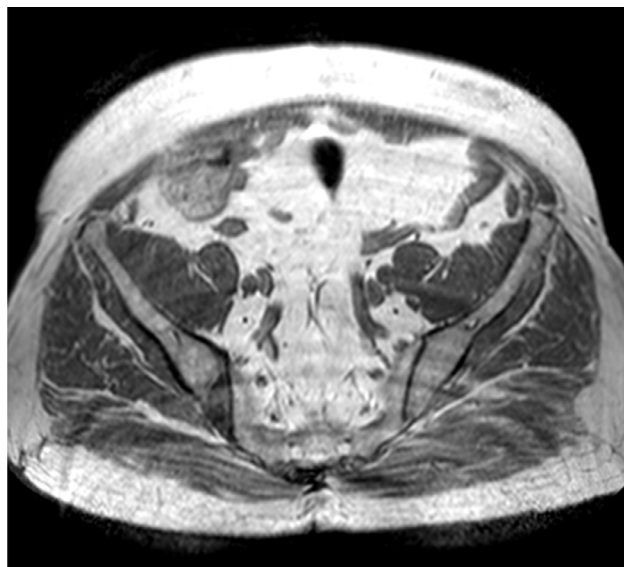
**Fig. 5 – Intervention on postbiopsy day 8 – postinjection.**

lation and was discharged on post-biopsy day 12 in good condition.

One year after the procedure, the patient had a follow-up MRI of the pelvis (Fig. 6) which demonstrated resolution of the hematoma and stability of the bone lesion.

## Discussion

Bone biopsies are safe procedures with low complication rates and effective in the establishment of a diagnosis. Using an On-



**Fig. 6 – MRI of the pelvis 1 year later demonstrating resolution of the hematoma and a stable lesion.**

Control drill device, like the one used in this case, further increases diagnostic yield and accuracy [11]. Based on the patient's history of malignancy and the safe, efficacious nature of the procedure, there was a clear indication for biopsy. However, due to a rare complication, possibly related to characteristics of the underlying benign lesion, this case demonstrated some unique features. As discussed previously, significant hemorrhage after iliac bone access is uncommon, even in patients that are anticoagulated or thrombocytopenic. This patient had discontinued anticoagulation and was not thrombocytopenic but still developed a hematoma. The hematoma did not occur in the immediate peri-procedural period but presented as a delayed complication. Based on the timing of the patient's pain, the hematoma possibly developed after the warfarin was reinitiated. The use of an image-guided spinal needle placement to inject NBCA glue at the bone cannulation site for a presumed hypervascular lesion appears to be the first documented application of this technique. NBCA glue is a liquid embolic typically used during an endovascular approach to treat arteriovenous malformations, fistulas, and hematomas [12,13]. This case demonstrates a situation where NBCA glue proved an effective hemostatic adhesive delivered in an extravascular approach.

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