



Case Report

# Psoas hematoma due to segmental vessel injury leads to paresis following CT-guided biopsy of lumbar vertebrae: A case report

Pratik Patel<sup>1</sup>, Dhanish Mehendiratta<sup>1</sup>, Vivek Bhambhu<sup>1</sup>, Samir Dalvie<sup>1</sup>, Aniruddha Kulkarni<sup>2</sup>, Bhavesh Popat<sup>2</sup>

Departments of <sup>1</sup>Orthopaedic and <sup>2</sup>Radiology, P D Hinduja National Hospital and Medical Research Centre, Mumbai, Maharashtra, India.

E-mail: \*Pratik Patel - patelpratik862@yahoo.com; Dhanish Mehendiratta - drdhanish@orthodocs.in, Vivek Bhambhu - vivekbhambhu88@gmail.com; Samir Dalvie - sdalvie@hotmail.com; Aniruddha Kulkarni - avkulk1@gmail.com; Bhavesh Popat - drbhaveshpopat@gmail.com



\*Corresponding author:

Pratik Patel,  
Department of Orthopaedic, P  
D Hinduja National Hospital  
and Medical Research Centre,  
Mumbai - 400016, Maharashtra,  
India.

patelpratik862@yahoo.com

Received : 24 October 2020

Accepted : 04 December 2020

Published : 22 December 2020

DOI

10.25259/SNI\_759\_2020

Quick Response Code:



## ABSTRACT

**Background:** Percutaneous bone biopsy is the first-line procedure for obtaining a tissue diagnosis to confirm focal, diffuse vertebral, and/or paravertebral metastatic lesions. Percutaneous bone biopsy to evaluate metastatic disease can be performed under fluoroscopy, ultrasonography, magnetic resonance (MR) imaging, and computed tomography (CT). Notably, CT-scans best direct and demonstrate the needle position for these procedures, decreasing the risk of injury to critical adjacent structures (e.g. major vessels, nerve roots). Hemorrhagic complication to lumbar segmental arteries following needle biopsy are uncommon; only a few cases have been reported. Although percutaneous bone biopsy is typically safe when performed utilizing computed tomography (CT) guidance, here we encountered a 60-year-old-female who developed a L4 lumbar segmental artery psoas hematoma following this procedure requiring emergent embolization.

**Case Description:** A 60-year-old female, with a history of breast cancer, underwent a CT-guided core needle biopsy of an L4 lytic lesion (e.g., likely a metastasis). This acutely resulted in the onset of radicular leg pain and weakness. When the postprocedural CT scan demonstrated a large psoas hematoma attributed to laceration of the left posterior L4 segmental artery, the patient required emergent embolization. Following this procedure, she exhibited a fully neurological recovery.

**Conclusion:** Following a CT-guided L4 vertebral biopsy to document metastatic breast carcinoma, a 60-year-old patient developed an immediate postprocedure CT-documented psoas hematoma due to laceration of the left posterior L4 segmental artery. Following emergent embolization, the patient recovered full neurological function.

**Keywords:** Angiography, Computed tomography-guided biopsy, Embolization, Lumbar segmental vessel injury, Psoas muscle hematoma

## INTRODUCTION

Percutaneous bone biopsy is typically the first-line procedure for obtaining a tissue diagnosis for unifocal, diffuse vertebral, and/or paravertebral metastatic disease; the complication rate typically ranges from 0% to 10%.<sup>[6,9,13]</sup> These procedures may be performed under fluoroscopy, ultrasonography, magnetic resonance imaging (MRI), or computed tomography (CT). Notably, CT scans provide for the most precise needle positioning and maximally reduce

This is an open-access article distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

©2020 Published by Scientific Scholar on behalf of Surgical Neurology International

the risk of injury to major vessels, nerve roots, and/or lung/pleural structures.<sup>[14]</sup> Few cases of hemorrhagic complications attributed to such procedures resulting in lumbar vertebral artery injuries have been reported.<sup>[1,4]</sup> Here, we present a 60-year-old female who, following an L4 CT-guided bone biopsy for suspected metastatic breast carcinoma, developed an acute postprocedure psoas hematoma attributed to laceration of a left L4 lumbar segmental vessel. Following embolization, the patient's deficit resolved.

## CASE PRESENTATION

A 60-year-old female, recently diagnosed with right-sided infiltrating pleomorphic lobular breast carcinoma, presented with back pain attributed to a positron emission tomography-CT documented L4 vertebral body lytic lesion. When the MRI showed a T1 hypointense/short-tau inversion recovery hyperintense lesion involving the L4 vertebral body (e.g., including the pedicles and lamina), a CT-guided core needle biopsy was performed to document whether this was a metastatic lesion [Figures 1a and b].



**Figure 1:** (a) Short-tau inversion recovery hyperintensity, (b) T1 hypointensity involving the L4 vertebral body including the pedicles and the lamina (arrow).



**Figure 2:** (a-c) Computed tomography-guided left sided transpedicular biopsy of L4 vertebral body.

## CT-guided biopsy of L4

The CT-guided biopsy of the L4 vertebral body was performed under local anesthesia, and the histopathological examination was consistent with metastatic breast carcinoma [Figures 2a-c and 3a-d]. However, immediately following the procedure, the patient complained of acute worsening pain, paresthesia, and weakness in her left lower extremity (e.g., left dorsiflexion and extensor hallucis longus weakness [3/5]) that warranted emergent postprocedural CT (with/without contrast) assessment.

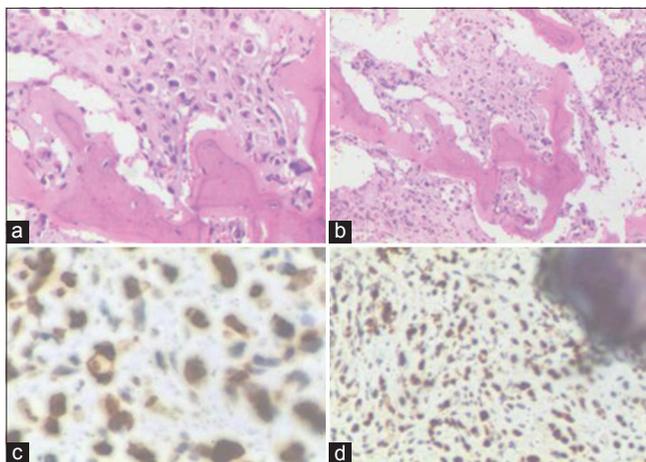
## Diagnosis and treatment of psoas hematoma

The emergent postprocedure CT scan confirmed an acute left psoas hematoma [Figure 4]. When the CT angiography (e.g., CTA) suggested a laceration of the L4 left lumbar segmental artery, the patient underwent immediate transcatheter selective embolization [Figures 5a-d and 6]. She additionally received 1 g IV of methyl prednisolone sodium succinate. Notably, her neurological deficit completely resolved within 24 h without further surgical intervention being warranted. One year later, the patient had no residual pain or weakness and had returned to all previous activities.

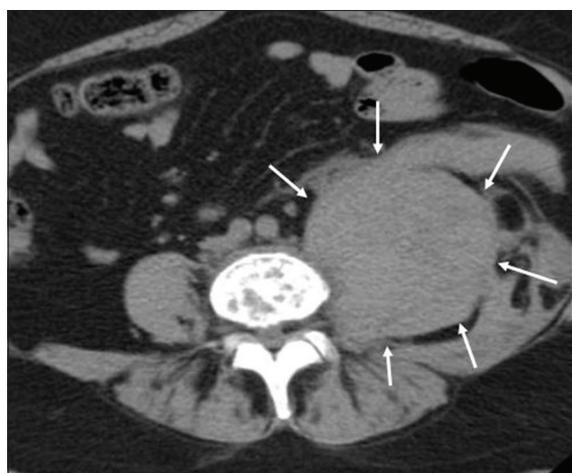
## DISCUSSION

The complication rate for spinal percutaneous vertebral body biopsies ranges from 0% to 10%.<sup>[6,9,13]</sup> Most complications occur in the thoracic spine due to the proximity of the major blood vessels, pleura/lung, esophagus, and the posterior mediastinum.<sup>[7,10]</sup> Neural injury, particularly to the spinal cord and nerve roots, is a serious acute complication that can result in deficits varying from a foot drop, to transient and/or permanent paralysis.<sup>[12]</sup> Bleeding near the needle puncture site can also result in acute arterial hemorrhages or more chronic progressive venous bleeds.<sup>[5,12]</sup>

Many case reports document how CT-guided spinal biopsies provide for more optimal/accurate needle position, thus reducing the risk of neural or vascular injuries.<sup>[1,8,15]</sup> The lumbar arteries L1–L4 are particularly vulnerable to injury during these procedures as they are small paired vessels that



**Figure 3:** Histopathological images of the computed tomography-guided biopsy from L4 vertebrae, (a) ×40 and (b) ×20 H and E stained image – showing bony trabeculae infiltrated by neoplastic cells having hyperchromatic nuclei, (c) ×40 and (d) ×20 immunohistochemistry image – tumor cells show GATA 3 positivity.

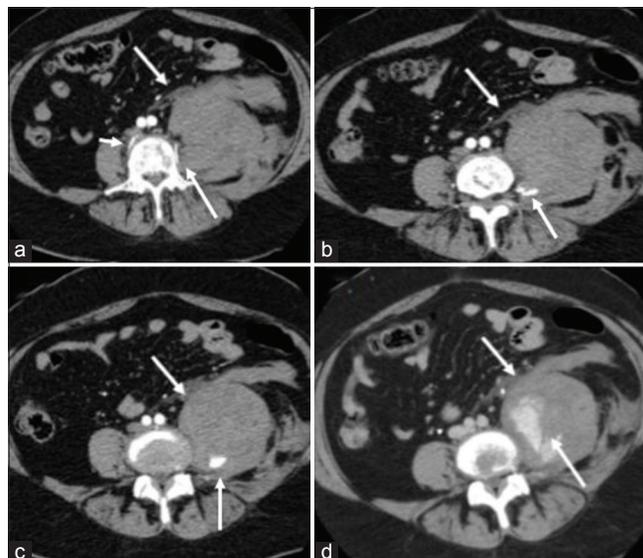


**Figure 4:** (Axial view) Computed tomography scan shows left side huge psoas hematoma (arrow).

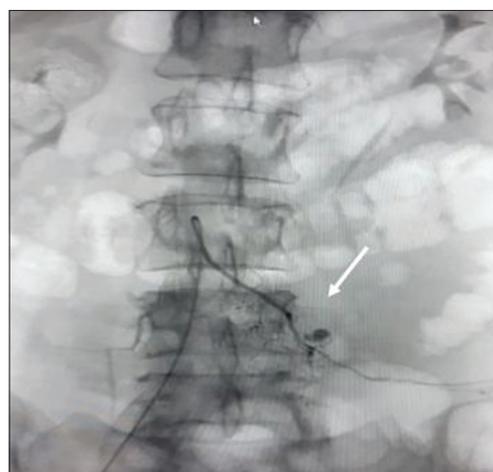
originate from the dorsal aspect of the abdominal aorta at the level of the transverse processes, and run laterally along the bodies of the lumbar vertebrae where they divide along the medial border of the psoas muscle into anterior and posterior branches.<sup>[4]</sup>

Monitoring of clinical symptoms and vital signs for patients undergoing such procedures is critical to rapidly diagnosing complications like the neurovascular injury seen in this case.

CTA is the diagnostic study of choice as it best defines the site of active bleeding following a CT-guided biopsy (e.g., resultant hemorrhage potentially attributed to traumatic laceration of lumbar vertebral arteries).<sup>[2,3,6]</sup> If one suspects a retroperitoneal hematoma, immediate endovascular



**Figure 5:** (a-d) Sequential images of computed tomography angiography were suggestive of breach in the left lumbar segmental vessel at L4 level (arrow).



**Figure 6:** Transcatheter selective embolization at the left L4 segmental vessel (arrow).

embolization of the injured lumbar artery should be performed.<sup>[2,4,11]</sup> Here, the patient suddenly developed left leg numbness and weakness attributed to a psoas hematoma readily identified on the immediate postprocedure CTA that was successfully embolized, resulting in stabilization of the patient’s neurological status, and full neurological recovery within 24 h.

## CONCLUSION

Following a CT-guided vertebral body biopsy, a psoas hematoma arising from a lacerated L4 lumbar vertebral artery injury was successfully treated with endovascular embolization.

**Ethical approval**

Not applicable. As this submission is a single case report an ethical approval is not necessary. However, written informed consents were obtained from the patient for publication of this case report and any accompanying images.

**Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent.

**Financial support and sponsorship**

Nil.

**Conflicts of interest**

There are no conflicts of interest.

**REFERENCES**

- Ashizawa R, Ohtsuka K, Kamimura M, Ebara S, Takaoka K. Percutaneous transpedicular biopsy of thoracic and lumbar vertebrae-method and diagnostic validity. *Surg Neurol* 1999;52:545-51.
- Babu NV, Titus VTK, Chittaranjan S, Abraham G, Prem H, Korula RJ. Computed tomographically guided biopsy of the spine. *Spine (Phila Pa 1976)* 1994;19:2436-42.
- Ceyhan M, Belet U, Aslan S, Ayyildiz S, Gol K. Traumatic lumbar artery pseudoaneurysm: The role of CT angiography in diagnosis and treatment. *Diagn Interv Radiol* 2010;16:162-4.
- Chan KT, Korivi N. Lumbar artery pseudoaneurysm in traumatic spinal cord injury: A case report. *Arch Phys Med Rehabil* 2003;84:455-7.
- Dupuy DE, Rosenberg AE, Punyaratabandhu T, Tan MH, Mankin HJ. Accuracy of CT-guided needle biopsy of musculoskeletal neoplasms. *AJR Am J Roentgenol* 1998;171:759-62.
- Fyfe IS, Henry AP, Mulholland RC. Closed vertebral biopsy. *J Bone Joint Surg Br* 1983;65:140-3.
- Hadjipavlou AG, Kontakis GM, Gaitanis JN, Katonis PG, Lander P, Crow WN. Effectiveness and pitfalls of percutaneous transpedicle biopsy of the spine. *Clin Orthop Relat Res* 2003;411:54-60.
- Kornblum MB, Wesolowski DP, Fischgrund JS, Herkowitz HN. Computed tomography-guided biopsy of the spine. A review of 103 patients. *Spine (Phila Pa 1976)* 1998;23:81-5.
- Metzger CS, Johnson DW, Donaldson WF 3<sup>rd</sup>. Percutaneous biopsy in the anterior thoracic spine. *Spine (Phila Pa 1976)* 1993;18:374-8.
- Murphy WA, Destouet JM, Gilula LA. Percutaneous skeletal biopsy 1981: A procedure for radiologists-results, review, and recommendations. *Radiology* 1981;139:545-9.
- Nijenhuis RJ, Sluzewski M, van Rooij WJ. Iatrogenic lumbar pseudoaneurysm causing dural sac compression after spine surgery. *J Neurosurg Spine* 2009;10:585-6.
- Ortiz AO, Zoarski GH. Image-guided percutaneous spine biopsy. In: Mathis JM, editor. *Image-Guided Spine Interventions*. New York: Springer; 2004. p. 69-93.
- Santillan A, Patsalides A, Gobin YP. Endovascular embolization of iatrogenic lumbar artery pseudoaneurysm following extreme lateral interbody fusion (XLIF). *Vasc Endovascular Surg* 2010;44:601-3.
- Stringham DR, Hadjipavlou A, Dzioba RB, Lander P. Percutaneous transpedicular biopsy of the spine. *Spine (Phila Pa 1976)* 1994;19:1985-91.
- Szolar DH, Preidler KW, Steiner H, Riepl T, Flaschka G, Stiskal M, *et al.* Vascular complications in lumbar disk surgery: Report of four cases. *Neuroradiology* 1996;38:521-5

**How to cite this article:** Patel P, Mehendiratta D, Bhambhu V, Dalvie S, Kulkarni A, Popat B. Psoas hematoma due to segmental vessel injury leads to paresis following CT-guided biopsy of lumbar vertebrae: A case report. *Surg Neurol Int* 2020;11:457.