



Case Report

Prostate adenocarcinoma dural metastasis mimicking a subacute subdural hematoma

Christian I. Rios-Vicil, Orlando De Jesus

Department of Surgery, Section of Neurosurgery, University of Puerto Rico, San Juan, Puerto Rico.

E-mail: Christian I Rios-Vicil - christian.rios3@upr.edu; *Orlando De Jesus - drodejesus@aol.com



*Corresponding author:

Orlando De Jesus,
Department of Surgery, Section
of Neurosurgery, University of
Puerto Rico, San Juan, Puerto
Rico.

drodejesus@aol.com

Received: 13 December 2024

Accepted: 30 January 2025

Published: 21 February 2025

DOI

10.25259/SNI_1077_2024

Quick Response Code:



ABSTRACT

Background: Patients with malignancies that have a propensity to develop dural metastasis can present a dural infiltration mimicking a subdural hematoma. Dural metastases originating from prostate cancer mimicking a subdural hematoma are rare.

Case Description: The authors describe the case of a 66-year-old man with a history of prostate adenocarcinoma with vertebral metastases who complained of headaches, weakness, anorexia, and dizziness for 1 month. A head computed tomography scan without contrast demonstrated a right pan-hemispheric subdural collection, which was reported to be a subacute subdural hematoma. Due to the patient's history of prostate carcinoma, brain magnetic resonance imaging (MRI) with and without gadolinium was requested before the surgery, which showed substantial enhancement of the subdural collection, suggesting a tumoral collection. Based on the MRI findings, an open biopsy was performed, revealing extensive bone infiltration and a thickened dura with a large subdural tumoral component suggestive of disseminated pachymeningeal carcinomatosis. No hematoma was identified.

Conclusion: This case report demonstrated how metastatic lesions can mimic subdural hematomas. This disease carries a poor prognosis. Diagnosing and managing this rare entity warrants high suspicion to guide the patient and the family members in decision-making.

Keywords: Dural metastasis, Leptomeningeal carcinomatosis, Pachymeningeal carcinomatosis, Prostate adenocarcinoma, Subdural hematoma

INTRODUCTION

Patients with malignancies that tend to develop dural metastasis could present pachymeningeal carcinomatosis. The most frequent primary cancers associated with intracranial dural metastasis are breast, prostate, and lung.^[10,11] When the dural infiltration forms a thick mass, it could resemble a chronic or subacute subdural hematoma. Dural metastases originating from prostate cancer mimicking a subdural hematoma are rare.^[2] In this report, we presented a case of dural metastasis in a patient with prostate carcinoma in which the head computed tomography (CT) scan resembled a subdural hematoma; however, at surgery, a large en-plaque subdural tumor was identified not associated with a blood collection. Most chronic and subacute subdural hematomas undergo burr hole as the principal treatment modality; however, in most cases, the management of dural metastatic infiltration requires a different approach.

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, transform, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

©2025 Published by Scientific Scholar on behalf of Surgical Neurology International

CASE PRESENTATION

A 66-year-old man with a history of prostate adenocarcinoma diagnosed 13 years before and vertebral metastases 1 year ago complained of headaches, weakness, anorexia, and dizziness for 1 month. The patient and family members denied any recent trauma. On examination, he was alert and oriented in person and place. He had no motor or sensory deficits. The head CT scan without contrast showed a slight hyperdense right pan-hemispheric subdural collection, causing an 8 mm shift of midline structures [Figures 1a-c]. The bone window view did not show lytic lesions or bone erosion. Given the history of prostate cancer, a brain magnetic resonance imaging (MRI) with gadolinium was ordered, which showed substantial enhancement of the subdural collection, suggestive of a tumoral collection [Figures 1d-f].

We assessed that the collection probably represented pachymeningeal carcinomatosis; therefore, a craniotomy with tumor biopsy was recommended. Due to severe thrombocytopenia of 36,000 per microliter of blood, a transfusion of platelets was given before the operation, increasing the platelet count to 96,000. A frontotemporal craniotomy was performed. The craniotomy bone was

grossly infiltrated with tumoral cells and was discarded [Figure 2]. When the dura was opened, no hematoma or infectious collection was visualized. The thickened dura showed extensive subdural infiltration that appeared to be metastatic cancer. The frozen section of the mass was reported as metastatic carcinoma. The exposed dura was cut circumferentially with the tumoral component and sent for permanent pathological examination. Given that the patient had extensive metastatic disease and marginal platelet count level, it was decided not to proceed with additional resection of the subdural tumor and only achieve a decompression with the bone removal. Five days later, the patient developed a significant worsening of his neurological condition, being stuporous and with left hemiplegia. Emergency head CT scan showed a complete acute ischemic stroke in the distribution of the right middle cerebral artery (MCA) [Figure 3]. Because of his poor prognosis and disseminated cancer, the family opted for supportive and palliative management. The patient expired 6 days later. The final pathologic diagnosis was metastatic high-grade prostate adenocarcinoma without brain or pial invasion. Immunohistochemistry staining for prostate-specific antigen was strongly positive in all cells.

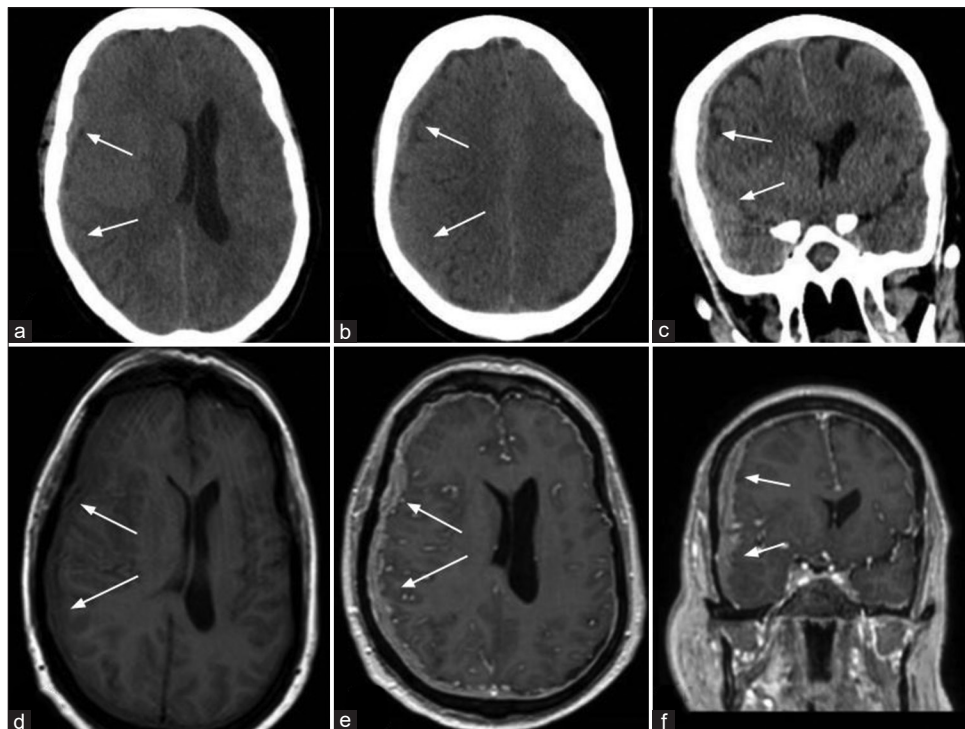


Figure 1: Head computed tomography (a and b) without contrast axial images and (c) coronal image show the slight hyperdense pan-hemispheric subdural collection on the right side (white arrows), causing an 8-mm shift of midline structures. Brain magnetic resonance imaging (MRI) (d) axial T1 image without gadolinium shows a slight hypointense subdural collection (white arrows); (e) brain MRI axial T1 image and (f) coronal T1 image with gadolinium show substantial enhancement of the subdural collection (white arrows) and the shift of midline structures.

DISCUSSION

Case reports have documented subdural hematomas containing prostate tumor nodules within the subdural space.^[14,16] However, prostate pachymeningeal carcinomatosis without an associated subdural hematoma is exceedingly uncommon and may lead to an incorrect diagnosis of a chronic, subacute, or acute subdural hematoma. We searched the English literature to identify reports of prostate dural metastases mimicking subdural hematomas. In addition to our case, we identified 13 case reports of prostate carcinoma dural metastases mimicking subdural hematomas without

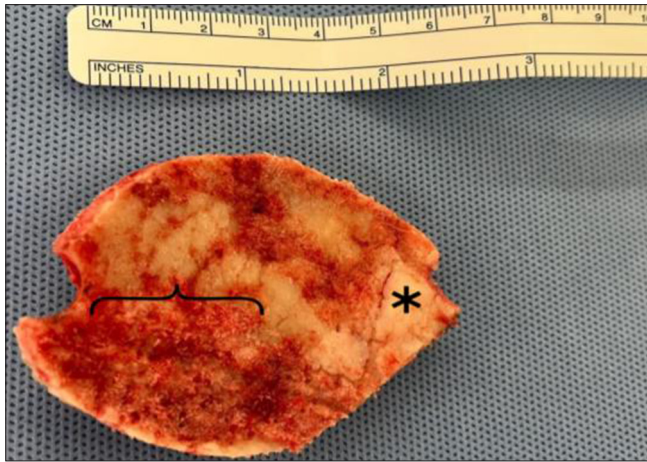


Figure 2: Gross specimen of the craniotomy bone showing extensive tumor infiltration (black bracket) compared to the bone edge with a more normal bony region (black asterisk).

evidence of hemorrhage [Table 1].^[1,3-6,8,9,12,13,15-18] The median age of the patients was 65 years (range 45–77). The median time between the prostate carcinoma diagnosis and the dural metastasis was 3 years (range 1–13). The characteristics of the collection on the noncontrast CT scan images could be isodense, mixed-density, hyperdense, and rarely hypodense.^[16] In most cases, the initial noncontrast head CT scan resembled a subacute subdural hematoma. In two cases, the collection was mistaken for an acute subdural hematoma. In two cases, the CT scan image finding was assessed as a tumor, although it resembled a subdural hematoma. In patients with a history of cancer and no history of recent trauma, further contrast-enhanced studies should be done before surgical treatment. Five patients had a preoperative brain MRI with gadolinium performed, while six had it postoperatively. In two patients, the dural metastasis was the first manifestation of prostate carcinoma.^[1,4] The treatment of pachymeningeal carcinomatosis has not been standardized and may include biopsy, subtotal resection, and supportive measures. One patient did not receive surgical treatment as the collection was identified initially as tumoral, receiving only palliative care.^[18] In half of the patients, the bone had tumor invasion. More than two-thirds of the patients presented with systemic metastases. The mechanism of dural invasion in patients with skull metastases is thought to be a direct extension of the neoplastic process.^[6,11,18] Most patients had a poor prognosis, with a median survival time of 3 months (range 11 days to >25 months).

A brain MRI with gadolinium can identify pachymeningeal carcinomatosis substantially better, allowing finer delineation

Table 1: Reported cases of prostate dural metastasis mimicking a subdural hematoma without a documented hematoma.

Author	Age	History of prostate CA	Time after CA diagnosis	Type of hematoma by CT scan	Bone involved	MRI performed	Systemic metastases	Survival
Alcalá-Cerra <i>et al.</i> ^[11]	77	No	-	SA	Yes	No	No	Palliative
Barrett <i>et al.</i> ^[3]	59	Yes	NR	SA	No	Pre	Yes	NR
Beraldo <i>et al.</i> ^[4]	68	No	-	SA	No	Pre	NR	1 month
Bourdillon <i>et al.</i> ^[5]	76	Yes	3 year	SA	NR	Post	No	1 month
Cheng <i>et al.</i> ^[6]	72	Yes	NR	SA	No	Post	Yes	4 months
Houssem <i>et al.</i> ^[8]	52	Yes	NR	C	Yes	No	Yes	5 months
Kokot <i>et al.</i> ^[9]	65	Yes	NR	SA	No	No	Yes	1 month
Nunno <i>et al.</i> ^[12]	64	Yes	NR	A	No	Pre	No	Palliative
Nzokou <i>et al.</i> ^[13]	65	Yes	3 year	A	Yes	Post	Yes	5 months
Patil <i>et al.</i> ^[15]	71	Yes	1 year	SA	No	Post	No	>25 months
Sukumaran <i>et al.</i> ^[16]	45	Yes	3 year	SA	Yes	Post	Yes	Palliative
Tomlin and Alleyn ^[17]	61	Yes	1 year	SA	Yes	Post	Yes	3 months
Yu <i>et al.</i> ^[18]	62	Yes	3 year	SA	Yes	Pre	Yes	Palliative
Present Case	66	Yes	13 year	SA	Yes	Pre	Yes	11 days

A: Acute, C: Chronic, CA: Carcinoma, NR: Not reported, Pre: Preoperative, Post: Postoperative, SA: Subacute

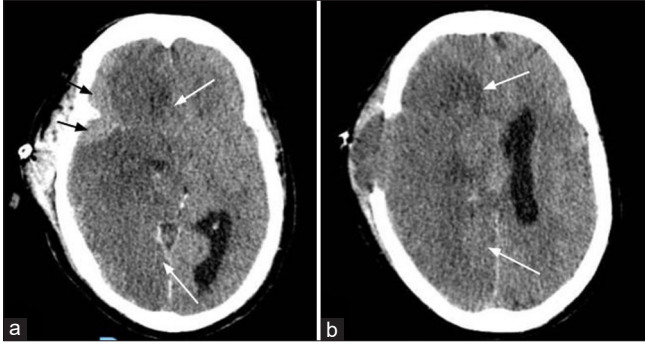


Figure 3: Head computed tomography (a and b) without contrast axial images 5 days postoperative showing a complete acute ischemic stroke in the distribution of the right middle cerebral artery (white arrows). Black arrows indicate the subdural tumor collection at the sphenoid wing/Sylvian fissure region.

of the enhancing extra-axial collection.^[1,4-6,8,15,16,18] The MRI represents the preferred study; however, a head CT scan with contrast can be used for patients who cannot undergo a brain MRI.^[4,9,16,17] An accurate radiological diagnosis is crucial to managing the patient adequately and having shared decision-making with the patient and the family members. The prognosis of prostate dural metastases is poor.^[2,4,6,9,10,13,17] In our case, the patient developed an acute stroke in the distribution of the right MCA 5 days after the surgery. Nunno *et al.* also reported an MCA stroke, which was identified in the initial MRI study of their patient.^[12] In patients with dural metastases, the stroke could be attributed to compression of the MCA by the tumor, blockage of the venous return, or the hypercoagulability and hyperviscosity predisposition secondary to cancer.^[7,12] This case highlights the importance of the clinical history. In patients with a history of malignancy, the possibility of dural metastasis should be considered even if the initial radiological imaging suggests a subdural hematoma. Images should be carefully evaluated for atypical findings. A thin collection with a significant mass effect or shift of midline structures may point to a different diagnosis. A contrast brain MRI or head CT scan is required if a dural metastasis is suspected. It is essential to recognize that a patient with a history of prostate carcinoma can present a dural metastasis that can mimic a subdural hematoma to select the most appropriate management.

CONCLUSION

Metastatic subdural collections can mimic a subdural hematoma. The management of the patient should not be based only on imaging studies. Patients with metastatic dural infiltration and pachymeningeal carcinomatosis carry a poor prognosis due to their advanced primary disease and the infiltration of the brain and pachymeninges. These metastatic collections warrant high diagnostic suspicion to

guide patients and their family members in clinical decision-making.

Ethical approval: Institutional Review Board approval is not required.

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.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation: The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript, and no images were manipulated using AI.

REFERENCES

- Alcalá-Cerra G, Gutiérrez-Paternina JJ, Niño-Hernández LM, Sabogal-Barrios R, Moscote-Salazar LR, Suárez-Jaramillo K. Metástasis dural como manifestación inicial de cáncer de próstata [Dural metastasis as the first manifestation of prostate cancer]. *An Sist Sanit Navar* 2011;34:513-7.
- Aleksić V, Joković M, Ilić R, Bogosavljević V, Đurović B. Dural metastasis of prostate carcinoma misdiagnosed as a bilateral subdural hematoma: A case report. *Neurocirugia (Astur: Engl Ed)* 2020;2020:S1130-1473(20)30108-1.
- Barrett C, Rodrigues D, Bradey N, Strachan R. Intracranial metastasis masquerading as acute subdural haematoma. *Br J Neurosurg* 2008;22:444-6.
- Beraldo RE, Gatto LA, Golff IF, Alchieri TG, Pereira MC, Demartini Z Jr. Dural metastasis of prostate cancer mimicking chronic subdural hematoma. *Neurol India* 2024;72:209-10.
- Bourdillon P, Apra C, Cornu P, Chauvet D. An unexpected subdural collection: Story of a prostatic metastasis. *Clin Genitourin Cancer* 2016;14:e405-7.
- Cheng YK, Wang TC, Yang JT, Lee MH, Su CH. Dural metastasis from prostatic adenocarcinoma mimicking chronic subdural hematoma. *J Clin Neurosci* 2009;16:1084-6.
- Dearborn JL, Urrutia VC, Zeiler SR. Stroke and cancer- A complicated relationship. *J Neurol Transl Neurosci* 2014;2:1039.
- Houssem A, Helene C, Francois P, Salvatore C. "The subdural collection" a great simulator: Case report and literature review. *Asian J Neurosurg* 2018;13:851-3.
- Kokot K, Dzierżanowski J, Krakowiak M, Fercho J, Yuser R, Kosel L, *et al.* Dural metastasis of prostate carcinoma mimicking intracranial hematoma: A case report and literature review. *J Surg Case Rep* 2024;2024:rjae014.
- Laigle-Donadey F, Taillibert S, Mokhtari K, Hildebrand J, Delattre JY. Dural metastases. *J Neurooncol* 2005;75:57-61.
- Nayak L, Abrey LE, Iwamoto FM. Intracranial dural metastases. *Cancer* 2009;115:1947-53.
- Nunno A, Johnson MD, Wu G, Li YM. Metastatic prostate cancer mimicking a subdural hematoma: A case report and literature review. *J Clin Neurosci* 2018;55:109-12.
- Nzokou A, Magro E, Guilbert F, Fournier JY, Bojanowski MW. Subdural metastasis of prostate cancer. *J Neurol Surg Rep* 2015;76:e123-7.
- O'Meara C, Mahasneh T, Wilson P, l'Ons B, Alkhwaja D.

- Dural prostate metastasis resembling a chronic subdural haematoma. *J Surg Case Rep* 2012;2012:7.
15. Patil S, Veron A, Hosseini P, Bates R, Brown B, Guthikonda B, *et al.* Metastatic prostate cancer mimicking chronic subdural hematoma: A case report and review of the literature. *J La State Med Soc* 2010;162:203-5.
 16. Sukumaran M, Mao Q, Cantrell DR, Jahromi BS, Potts MB. Holohemispheric prostate carcinoma dural metastasis mimicking subdural hematoma: Case report and review of the literature. *J Neurol Surg Rep* 2022;83:e23-8.
 17. Tomlin JM, Alleyne CH. Transdural metastasis from adenocarcinoma of the prostate mimicking subdural hematoma: Case report. *Surg Neurol* 2002;58:329-31; discussion 331.
 18. Yu WL, Sitt CM, Cheung TC. Dural metastases from prostate cancer mimicking acute sub-dural hematoma. *Emerg Radiol* 2012;19:549-52.

How to cite this article: Rios-Vicil CI, De Jesus O. Prostate adenocarcinoma dural metastasis mimicking a subacute subdural hematoma. *Surg Neurol Int.* 2025;16:60. doi: 10.25259/SNI_1077_2024

Disclaimer

The views and opinions expressed in this article are those of the authors and do not necessarily reflect the official policy or position of the Journal or its management. The information contained in this article should not be considered to be medical advice; patients should consult their own physicians for advice as to their specific medical needs.