DOI: https://doi.org/10.5281/zenodo.20776172

ISR Journal of Medical Case Reports (ISRJMCR)

Homepage: https://isrpublisher.com/isrjmcr/

Volume 02, Issue 03, March 2026 ISSN: 3107-5576 (Online)

Hemoptysis as an Unusual Herald of Penetrating Aortic Ulcer in a Patient with Prior Mediastinal Irradiation: A Case Report

M. Aabid[1]*, N. Ebbadi[1], S. Belhend[1], S. Belasri[1], R. Roukhsi[1], B. Slioui[1], A. Mouhsine[1]

[1]Department of Radiology, Avicenna Military Hospital, Marrakech, Morocco

***Corresponding author:** M. Aabid
Department of Radiology, Avicenna Military Hospital, Marrakech, Morocco

Article History

Received: 23-12-2025

Accepted: 26-02-2026

Published: 01-03-2026

Abstract: **Case Report**

Penetrating aortic ulcer (PAU) is a critical component of acute aortic syndromes, typically occurring when an atherosclerotic plaque breaches the internal elastic lamina. While traditionally seen in elderly patients with chronic hypertension, there is a growing recognition of its occurrence as a late complication of thoracic radiotherapy. We present the case of a 51-year-old male, previously treated for Hodgkin lymphoma, who presented with hemoptysis. Multidetector computed tomography (CT) revealed a localized alveolar hemorrhage in the left upper lobe, immediately adjacent to a 12 mm penetrating ulcer of the descending thoracic aorta. This case underscores the atypical clinical presentation of PAU and the need for a high index of suspicion when evaluating thoracic symptoms in patients with a history of mediastinal irradiation.

Keywords: Penetrating Aortic Ulcer, Hemoptysis, Radiotherapy Complications, Hodgkin Lymphoma, CT Angiography, Acute Aortic Syndrome.

INTRODUCTION

Within the spectrum of acute aortic syndromes, the penetrating aortic ulcer (PAU) remains a challenging diagnosis due to its variable clinical behavior. Unlike classic aortic dissection, PAU originates from the focal ulceration of an atherosclerotic plaque that burrows into the aortic media [1]. While age and systemic atherosclerosis are the primary drivers [2], thoracic radiotherapy is a potent but often overlooked risk factor for accelerated vascular injury [3]. In long-term survivors of mediastinal malignancies, such as Hodgkin lymphoma, radiation-induced vasculopathy can lead to premature arterial degeneration. We describe an unusual case where hemoptysis served as the primary clinical sign of an aortic ulcer in a middle-aged man with a history of oncological treatment.

Case Presentation

A 51-year-old male with a significant history of tobacco use sought medical attention for a sudden onset of hemoptysis. His past medical history was significant for axillary Hodgkin lymphoma, treated years earlier with a combination of chemotherapy and mediastinal radiotherapy.

Given the respiratory symptoms, a chest CT angiography was performed to exclude pulmonary embolism or primary bronchopulmonary pathology. The imaging revealed focal ground-glass opacities in the apico-dorsal segment of the left upper lobe **(Figure 1)**. These findings, associated with localized parenchymal collapse, were highly suggestive of alveolar hemorrhage.

Of particular concern was the vascular finding located just millimeters from the lung

abnormality: a focal outpouching of the descending thoracic aorta. This lesion, measuring 12 mm in width and 6 mm in depth, was identified approximately 3 cm distal to the origin of the left subclavian artery, confirming the diagnosis of a penetrating aortic ulcer **(Figure 2)**. The thoracic aorta was mildly ectatic (43 mm). Interestingly, the CT also showed a moderate pericardial effusion (13 mm) and chronic left pleural thickening with fatty remodeling, likely sequelae of the prior radiotherapy. No evidence of malignant recurrence was found.

Figure 1: Axial chest CT angiography demonstrating localized ground-glass opacities in the left upper lobe, consistent with alveolar hemorrhage, located immediately adjacent to a penetrating aortic ulcer (arrow)

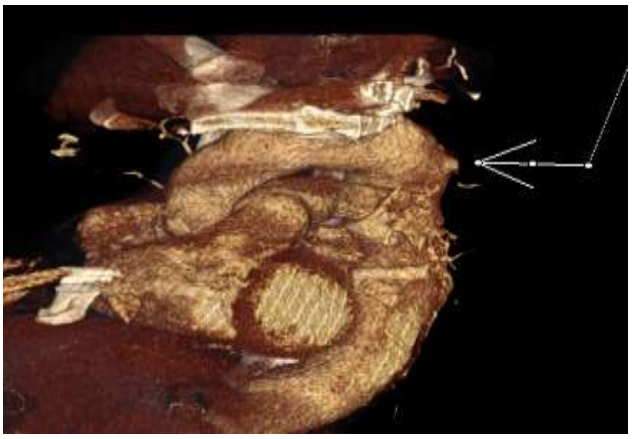

Figure 2: Three-dimensional CT reconstruction showing the anatomical location and morphology of the penetrating ulcer in the descending thoracic aorta, distal to the left subclavian artery

DISCUSSION

A penetrating aortic ulcer represents a focal "crater" in the aortic wall that can lead to serious complications such as intramural hematoma, pseudoaneurysm, or frank rupture [4]. While PAU is most common in the eighth decade of life, our patient presented at age 51, highlighting the role of external factors in vascular aging.

The Radiation Link

Mediastinal irradiation induces a progressive state of endarteritis obliterans and medial fibrosis. These changes not only accelerate atherosclerosis but also weaken the structural integrity of the large vessels [5, 6]. In Hodgkin lymphoma survivors, the risk of late vascular events remains elevated decades after the initial treatment [7]. In this case, the PAU occurred in a segment likely included in the prior radiation field.

Atypical Symptomatology: The Hemoptysis

Hemoptysis is an exceedingly rare presenting symptom for a PAU. While chest or back pain is the hallmark of acute aortic syndromes [8, 9], the proximity of the descending aorta to the left lung parenchyma can lead to localized pulmonary complications. The alveolar hemorrhage observed in our patient suggests an inflammatory process or an impending rupture of the ulcer irritating the adjacent lung tissue. Recognizing this association is vital, as hemoptysis might be the only warning sign before a catastrophic aortic rupture.

The Role of CT Imaging

CT angiography is the diagnostic gold standard, offering the spatial resolution required to identify the focal disruption of the aortic intima [4]. The use of 3D volume-rendering techniques (Figure 2) was essential here to precisely map the ulcer's relation to the left subclavian artery, a critical detail for potential endovascular stenting (TEVAR) [10].

CONCLUSION

This case highlights the importance of maintaining a high index of clinical suspicion for aortic pathology in patients with a history of thoracic radiotherapy, even when symptoms appear primarily respiratory. Hemoptysis in these patients should prompt a meticulous assessment of the thoracic aorta. Early detection of a PAU allows for timely intervention, potentially preventing a fatal outcome.

REFERENCES

1. Coady, M. A, *et al*., (1998). Penetrating ulcer of the thoracic aorta. *Ann Thorac Surg*, *67*, 1005-1009.
2. Evangelista, A., Isselbacher, E. M., Bossone, E., Gleason, T. G., Eusanio, M. D., Sechtem, U., ... & Eagle, K. A. (2018). Insights from the international registry of acute aortic dissection: a 20-year experience of collaborative clinical research. *Circulation*, *137*(17), 1846-1860.
3. Gansera, B, *et al*., (2015). Penetrating atherosclerotic ulcer of the thoracic aorta. *Eur J Cardiothorac Surg*, *48*, 546-552.
4. Macura, K. J, *et al*., (2003). Pathogenesis in acute aortic syndromes: imaging findings. *Radiographics*, *23*, 791-804.
5. Stewart, J. R., & Fajardo, L. F. (1971). Radiation-induced heart disease: clinical and experimental aspects. *Radiologic Clinics of North America*, *9*(3), 511-531.
6. Jaworski, C., Mariani, J. A., Wheeler, G., & Kaye, D. M. (2013). Cardiac complications of thoracic irradiation. *Journal of the American College of Cardiology*, *61*(23), 2319-2328.
7. Heidenreich, P. A., Hancock, S. L., Lee, B. K., Mariscal, C. S., & Schnittger, I. (2003). Asymptomatic cardiac disease following mediastinal irradiation. *Journal of the American College of Cardiology*, *42*(4), 743-749.
8. Nienaber, C. A., & Clough, R. E. (2015). Management of acute aortic syndrome. *Lancet*, *385*, 800-811.
9. Vilacosta, I., & Román, J. A. S. (2001). Acute aortic syndrome. *Heart*, *85*(4), 365-368.
10. Eggebrecht, H, *et al*., (2006). Endovascular treatment of penetrating aortic ulcer. *J Endovasc Ther*, *13*, 694-700.