World Journal of Advanced Research and Reviews
eISSN: 2581-9615 CODEN (USA): WJARAI
Cross Ref DOI: 10.30574/wjarr
Journal homepage: https://wjarr.com/

(CASE REPORT)

Radiotherapy for Iliopsoas Muscle Metastasis from Undifferentiated Nasopharyngeal Carcinoma in a Young Patient: A Rare Case Report

Nisrine El Hayel [1, 2, *], Wissal Hassani [1, 2], Samia Khalfi [1, 2], Kaoutar Soussy [1, 2], Fatima Zahra Farhane [1, 2], Zenab Alami [1, 2] and Touria Bouhafa [1, 2]

[1] *Department of Radiotherapy, Oncology Hospital, Hassan II University Hospital, Fez, Morocco.*
[2] *Faculty of Medicine and Pharmacy, Sidi Mohammed Ben-Abdellah University, Fez, Morocco.*

World Journal of Advanced Research and Reviews, 2026, 29(02), 1476-1483

Publication history: Received on 16 January 2026; revised on 21 February 2026; accepted on 24 February 2026

Article DOI: https://doi.org/10.30574/wjarr.2026.29.2.0448

Abstract

Nasopharyngeal carcinoma (NPC) typically metastasizes to bone, lung, liver, and distant lymph nodes, whereas skeletal muscle involvement is exceptionally rare and often diagnostically challenging. We report a 15-year-old patient with locally advanced undifferentiated nasopharyngeal carcinoma (UCNT) who achieved locoregional control after induction chemotherapy followed by definitive concurrent chemoradiotherapy, but developed early distant relapse manifesting as a symptomatic iliopsoas muscle metastasis with associated iliac bone destruction. Imaging findings were suggestive but not specific, and histopathologic confirmation was required to establish the diagnosis. Palliative radiotherapy delivered to the iliopsoas lesion (30 Gy in 10 fractions) resulted in marked pain relief, functional improvement, and sustained local stabilization, despite subsequent systemic progression. This case underscores the aggressive potential of UCNT, highlights skeletal muscle as a rare site of dissemination, and reinforces the pivotal role of radiotherapy in achieving durable local control and meaningful symptomatic benefit in this uncommon metastatic presentation.

Keywords: Nasopharyngeal carcinoma; Undifferentiated nasopharyngeal carcinoma; Skeletal muscle metastasis; Iliopsoas metastasis; Palliative radiotherapy

1. Introduction

Nasopharyngeal carcinoma (NPC) is a biologically distinct epithelial malignancy characterized by a strong association with Epstein–Barr virus infection and marked geographic variability [1]. The undifferentiated non-keratinizing subtype (UCNT) represents the predominant histological variant and demonstrates high sensitivity to chemotherapy and radiotherapy [1]. For locally advanced disease, concurrent chemoradiotherapy delivered using intensity-modulated radiotherapy (IMRT) remains the standard of care, achieving excellent locoregional control in contemporary series [2].

Despite improvements in radiation delivery and systemic therapy, distant metastasis remains the leading cause of mortality in advanced-stage NPC [3]. Bone, liver, lung, and distant lymph nodes represent the most common metastatic sites [3]. In contrast, skeletal muscle metastasis is exceedingly rare. Large imaging-based analyses report a prevalence well below 1% across solid tumors [4]. The relative resistance of skeletal muscle to metastatic implantation has been attributed to mechanical, metabolic, and immune-mediated factors [8].

Metastasis to the iliopsoas muscle is particularly uncommon and may mimic inflammatory or primary soft tissue conditions on cross-sectional imaging. Reports describing skeletal muscle metastasis arising from NPC remain limited to isolated case descriptions [5]. Given the paucity of available data, optimal local management strategies are not clearly

* Corresponding author: Nisrine El Hayel

defined. While radiotherapy is well established in the palliation of bone metastases [6,7], its specific role in skeletal muscle metastasis remains largely derived from case-based evidence.

The present report describes a young patient with locally advanced UCNT who developed early iliopsoas muscle metastasis following definitive chemoradiotherapy, highlighting diagnostic challenges and the role of palliative radiotherapy in local disease control.

2. Case presentation

A 15-year-old male with no significant past medical or surgical history was diagnosed with locally advanced Nasopharyngeal carcinoma, histologically confirmed as Undifferentiated carcinoma of nasopharyngeal type, staged T4N3M0. The disease was characterized by a locally extensive rhino pharyngeal tumor associated with bulky bilateral cervical lymphadenopathy.

The patient received induction chemotherapy with cisplatin and doxorubicin (three cycles), followed by definitive concurrent chemoradiotherapy.

2.1. Primary Radiotherapy:

Definitive radiotherapy was delivered using intensity-modulated radiotherapy (IMRT). A total dose of 70 Gy was prescribed to the primary tumor and involved nodal volumes, with standard fractionation, delivered concomitantly with chemotherapy.

Treatment was completed without major interruption. Post-treatment imaging demonstrated near-complete regression of the nasopharyngeal mass, with significant reduction of cervical lymphadenopathy, consistent with good locoregional response.

2.2. Metastatic Relapse:

Three months after completion of chemoradiotherapy, the patient developed progressively worsening right-sided pelvic pain, initially rated 8/10 on the visual analog scale (VAS), associated with limping and reduced mobility. On clinical examination, a soft, painful, palpable mass was identified in the right iliac fossa.

Computed tomography (CT) demonstrated:

- A large soft tissue mass centered on the right iliopsoas muscle, extending to the ipsilateral iliac bone
- Osteolytic destruction with cortical breach and periosteal reaction
- Associated mediastinal and internal mammary lymphadenopathy

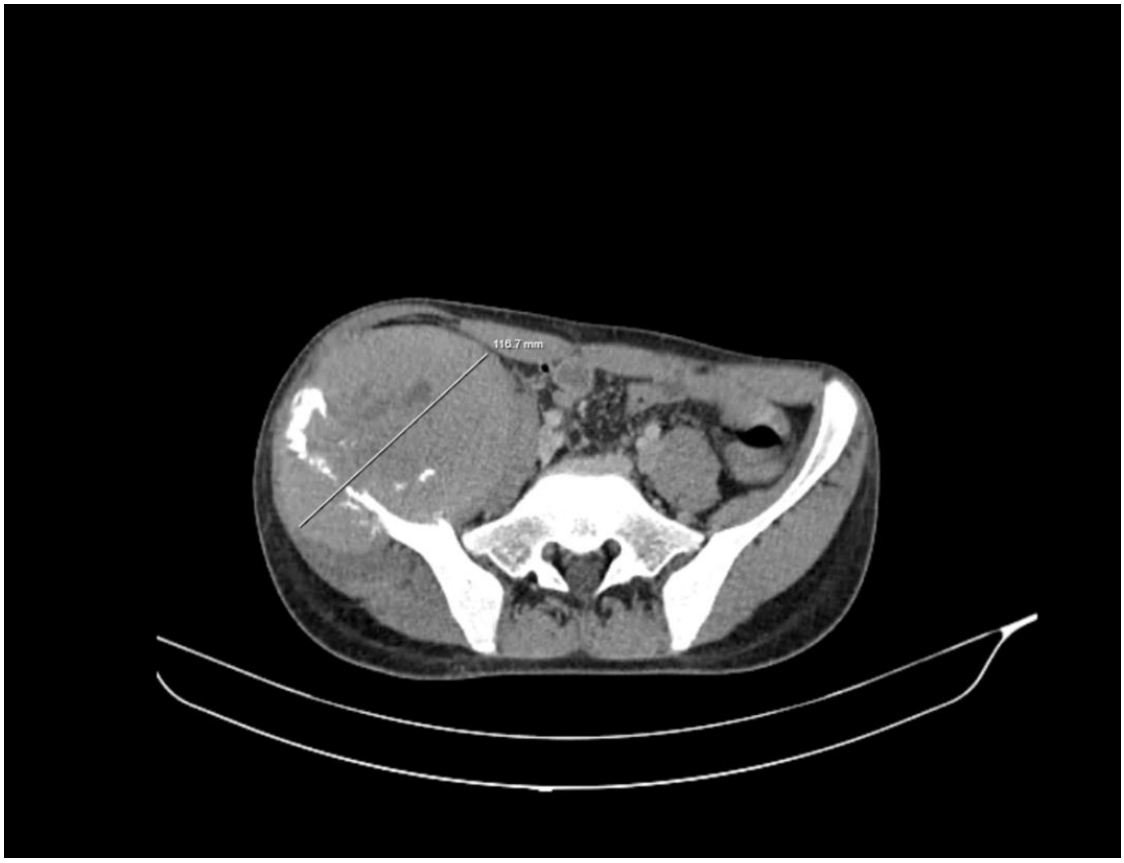

Figure 1 Axial contrast-enhanced CT scan demonstrating a large soft tissue mass centered on the right iliopsoas muscle with extension to the ipsilateral iliac bone and associated osteolytic changes

Bone scintigraphy revealed intense uptake in the right iliac wing. Image-guided biopsy of the iliopsoas mass confirmed metastatic undifferentiated carcinoma consistent with nasopharyngeal origin (CK5/6 positive), establishing the diagnosis of skeletal muscle metastasis.

2.3. Palliative Radiotherapy to the Iliopsoas Metastasis:

Given the symptomatic painful lesion with bone involvement, palliative radiotherapy was indicated for pain control and local disease stabilization.

Radiotherapy was delivered using three-dimensional conformal radiotherapy (3D-CRT) to the right iliopsoas mass at a total dose of 30 Gy in 10 fractions (3 Gy per fraction). Treatment planning was based on CT simulation, with appropriate margins added to the gross tumor volume to generate the planning target volume while respecting surrounding organs at risk.

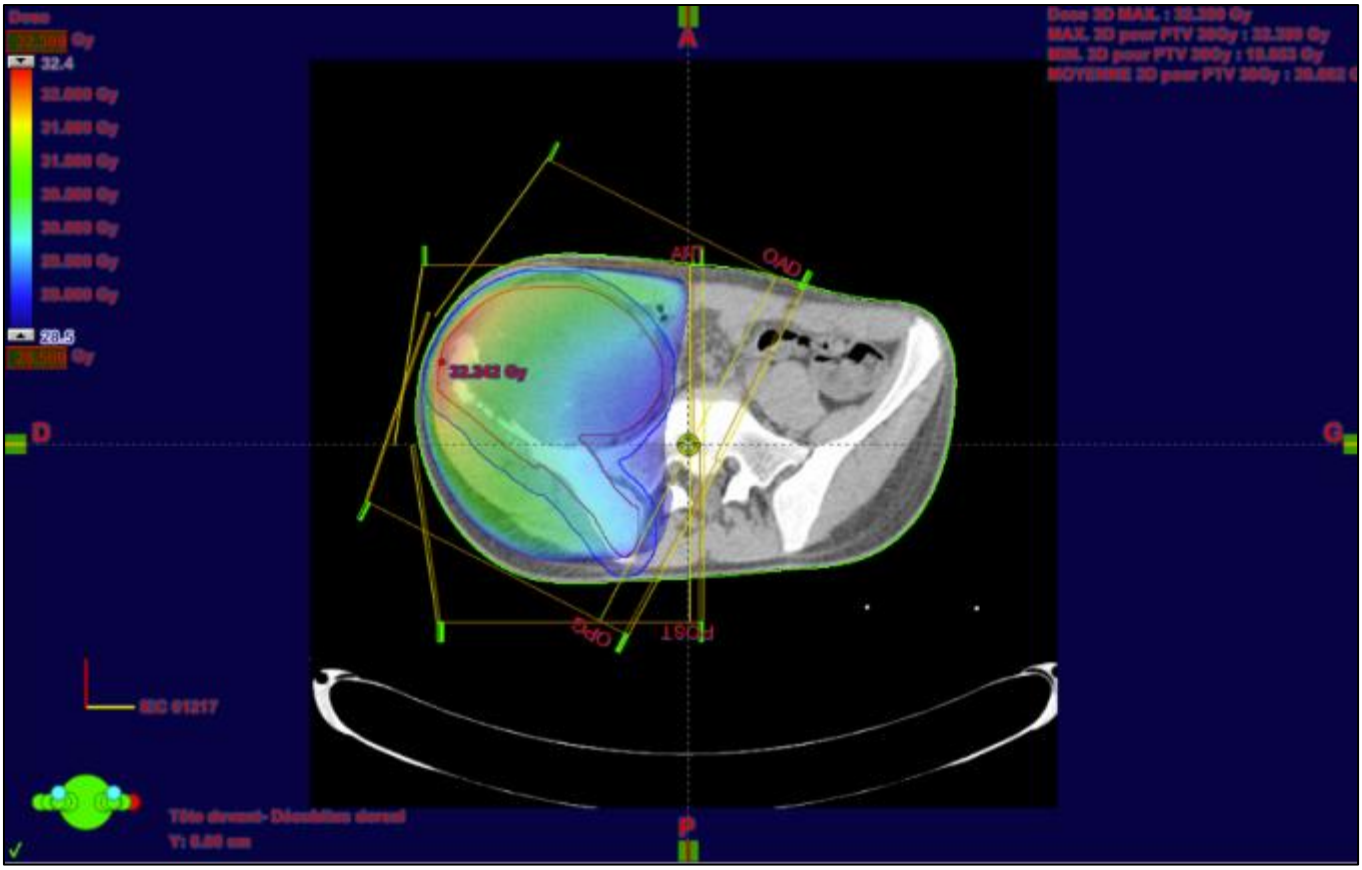

Figure 2 Axial CT simulation image demonstrating three-dimensional conformal radiotherapy (3D-CRT) planning for the right iliopsoas metastasis. The isodose distribution illustrates adequate coverage of the planning target volume (PTV) with a prescribed dose of 30 Gy

Treatment was well tolerated. Clinically, the patient reported significant improvement in pelvic pain, with the VAS score decreasing from 8/10 prior to radiotherapy to 3/10 following treatment. Mobility improved, and performance status remained stable.

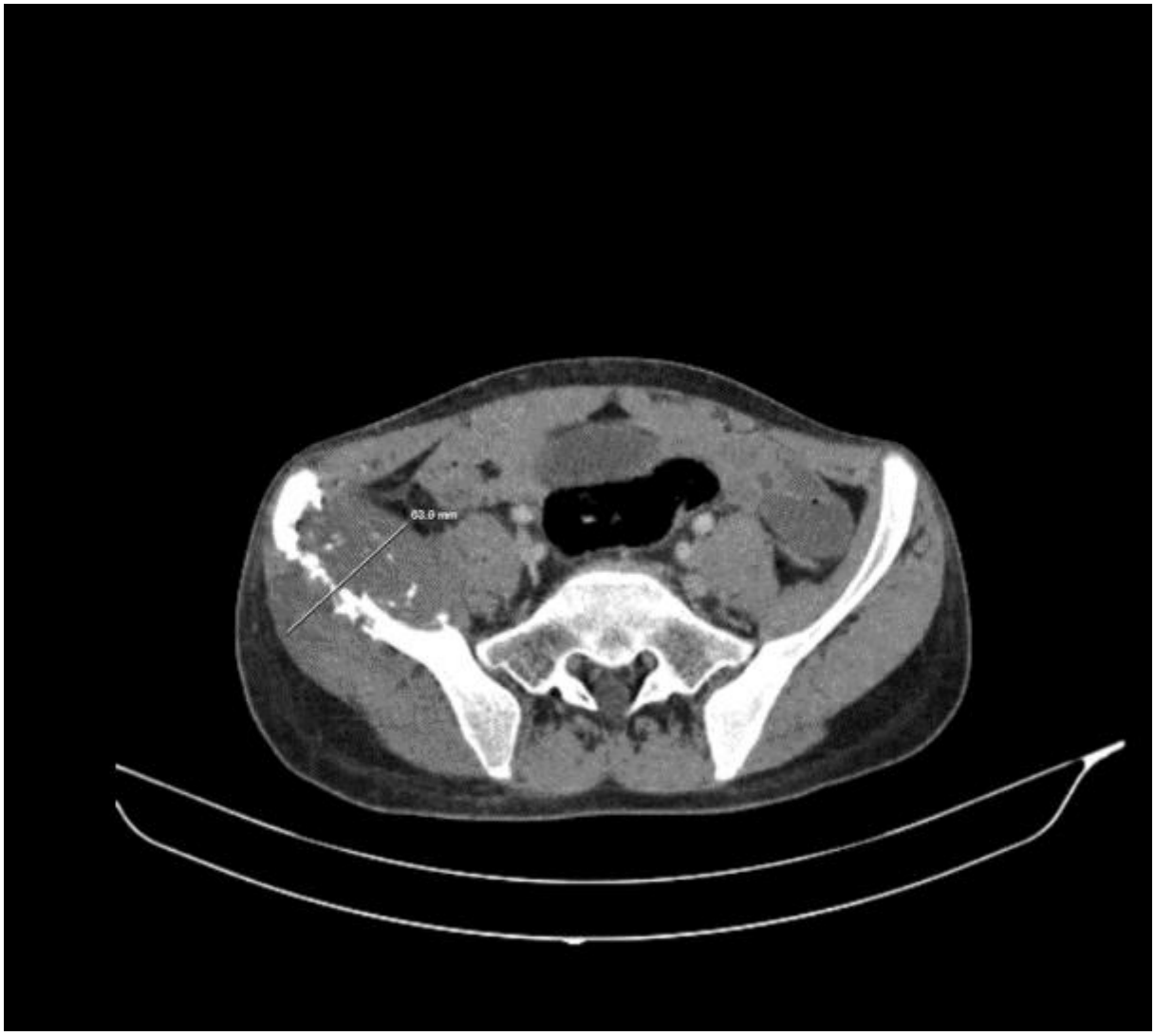

Figure 3 Follow-up axial CT scan three months after completion of radiotherapy showing marked reduction in the size of the right iliopsoas mass and partial reossification of the iliac bone

2.4. Subsequent Systemic Management and Evolution:

The patient received first-line metastatic chemotherapy with carboplatin and gemcitabine in combination with zoledronic acid. Follow-up imaging demonstrated partial regression of nodal and bone metastases, as well as further reduction of the irradiated iliopsoas lesion.

Despite subsequent systemic progression at hepatic and nodal levels after second-line chemotherapy, the irradiated pelvic lesion remained radiologically stable, suggesting sustained local control following palliative radiotherapy.

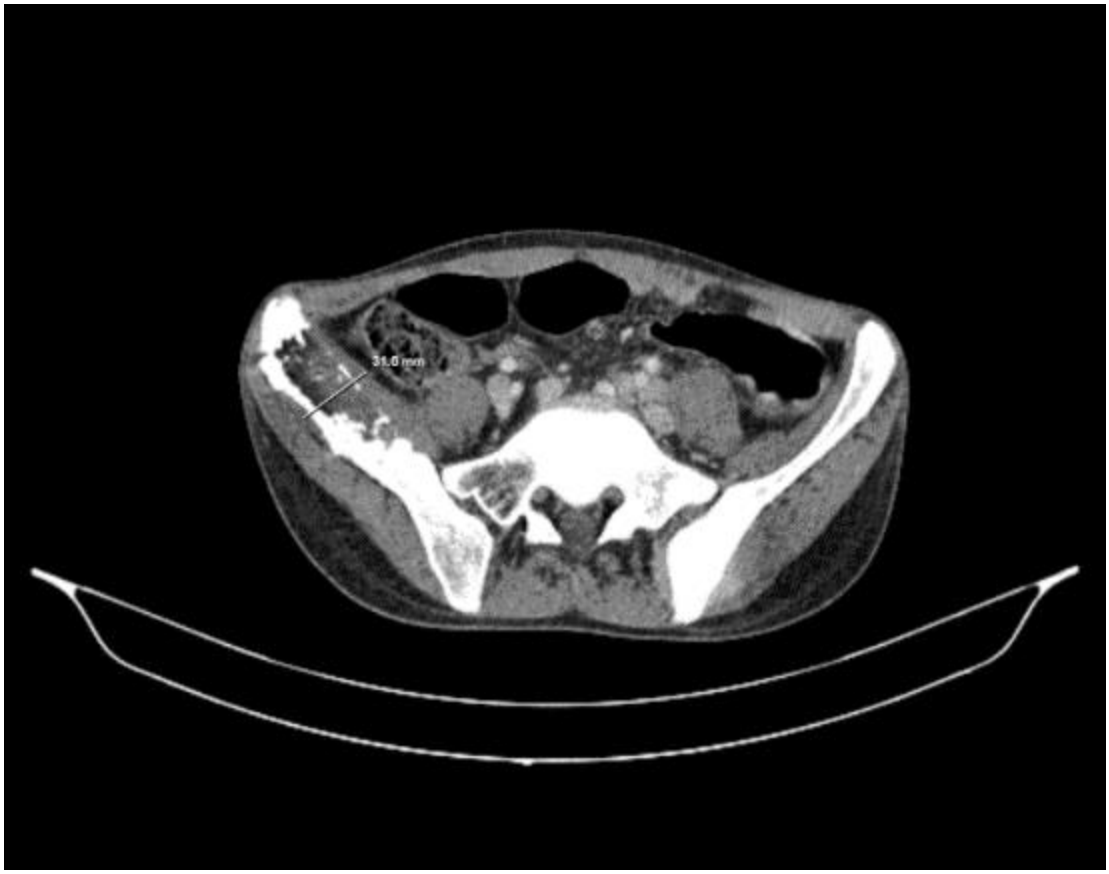

Figure 4 Axial CT scan performed one year after radiotherapy demonstrating sustained local control of the right iliopsoas metastasis without evidence of progression at the irradiated site

3. Discussion

The adoption of IMRT has significantly improved locoregional control in NPC while reducing toxicity [2]. However, distant dissemination remains the predominant pattern of failure, particularly in patients with advanced T and N stage disease [3]. Contemporary data confirm that systemic relapse continues to limit survival despite optimal primary treatment [3].

Skeletal muscle metastasis is an uncommon manifestation of systemic spread. Imaging-based studies report a prevalence ranging between 0.03% and 0.8% across solid malignancies, with lung and gastrointestinal primaries most frequently implicated [4]. Head and neck cancers account for only a minority of cases. The rarity of muscle involvement has been explained by several protective mechanisms inherent to skeletal muscle tissue, including constant contractility, variable perfusion, high interstitial pressure, and metabolic factors [8].

Radiologically, skeletal muscle metastases typically present as intramuscular masses with heterogeneous enhancement and possible central necrosis [4]. Iliopsoas involvement poses specific diagnostic challenges, as abscess, hematoma, and primary sarcoma must be considered. PET imaging may demonstrate hypermetabolic uptake but lacks specificity, making histopathologic confirmation mandatory [5].

Therapeutic decision-making is individualized and guided by symptom burden and systemic disease status. Radiotherapy remains a cornerstone in the palliation of symptomatic metastatic lesions, particularly when bone destruction coexists. Updated ASTRO guidelines support external beam radiotherapy as an effective modality for painful metastatic disease, with commonly used fractionation schedules including 8 Gy in a single fraction, 20 Gy in five fractions, and 30 Gy in ten fractions depending on clinical context and expected durability [6,7].

Although prospective data specifically addressing skeletal muscle metastasis are lacking, available reports suggest that radiotherapy provides meaningful symptom relief and local stabilization [4]. In cases involving both muscle and adjacent bone, radiation therapy may reduce pain, mitigate inflammatory edema, and prevent further skeletal-related

complications. Importantly, local control at irradiated sites may be maintained even in the setting of systemic progression, supporting the role of focal treatment within a multidisciplinary framework.

In young patients, management priorities shift toward preservation of function and quality of life. Pediatric and adolescent NPC is typically approached with curative intent at diagnosis [9], but relapse requires symptom-directed strategies. Modern radiotherapy techniques offer precise dose delivery with acceptable toxicity, making them suitable for focal palliation in this context.

Skeletal muscle metastasis from NPC remains an exceptional clinical entity. Increased awareness of this metastatic pattern is essential to avoid diagnostic delay. Radiotherapy represents a rational and effective option for local symptom control and stabilization, particularly when bone involvement is present.

4. Conclusion

Skeletal muscle metastasis from nasopharyngeal carcinoma is an exceptionally rare manifestation that may mimic benign or inflammatory conditions, necessitating histologic confirmation.

In symptomatic cases with associated bone involvement, radiotherapy represents an effective and well-tolerated modality for pain control and durable local stabilization, even in the setting of systemic progression. Early recognition of this uncommon metastatic pattern is essential to ensure timely diagnosis and appropriate multidisciplinary management.

Compliance with ethical standards

Acknowledgments

The authors received no financial support for the research, authorship, or publication of this article.

Disclosure of conflict of interest

All authors declare that there are no conflicts of interest regarding the publication of this manuscript. The authors declare no competing financial or non-financial interests.

Statement of ethical approval

This case report was conducted in accordance with the ethical standards of the institutional and national research committee and with the principles of the Declaration of Helsinki. According to institutional policy, ethical committee approval was not required for a single case report. Written informed consent was obtained from the patient for publication of the clinical data and accompanying images. All identifying information has been anonymized to ensure patient confidentiality.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

References

[1] Chen YP, Chan ATC, Le QT, Blanchard P, Sun Y, Ma J. Nasopharyngeal carcinoma. Lancet. 2019;394(10192):64-80. doi:10.1016/S0140-6736(19)30956-0

[2] Lee N, Harris J, Garden AS, Straube W, Glisson B, Xia P, et al. Intensity-modulated radiation therapy with or without chemotherapy for nasopharyngeal carcinoma: radiation therapy oncology group phase II trial 0225. J Clin Oncol. 2009;27(22):3684-3690. doi:10.1200/JCO.2008.19.9109

[3] Li AC, Xiao WW, Shen GZ, Wang L, Xu AA, Cao YQ, et al. Distant metastasis risk and patterns in nasopharyngeal carcinoma in the intensity-modulated radiotherapy era. Oncotarget. 2015;6(27):24511-24521. doi:10.18632/oncotarget.4312

[4] Surov A, Hainz M, Holzhausen HJ, Arnold D, Katzer M, Schmidt J, et al. Skeletal muscle metastases: primary tumours, prevalence and radiological features. Eur Radiol. 2010;20(3):649-658. doi:10.1007/s00330-009-1577-1

[5] Amir GJ, Juweid ME. Nasopharyngeal squamous cell carcinoma metastatic to psoas muscle. Clin Nucl Med. 2010;35(7):545-546. doi:10.1097/RLU.0b013e3181e05daa

[6] Lutz S, Balboni T, Jones J, Lo S, Petit J, Rich SE, et al. Palliative radiation therapy for bone metastases: update of an ASTRO evidence-based guideline. Pract Radiat Oncol. 2017;7(1):4-12. doi:10.1016/j.prro.2016.08.001

[7] Alcorn S, Rich SE, et al. External beam radiation therapy for palliation of symptomatic bone metastases: ASTRO clinical practice guideline. Pract Radiat Oncol. 2024;14(1):e1-e18. doi:10.1016/j.prro.2024.04.018

[8] Seely S. Possible reasons for the high resistance of muscle to cancer. Med Hypotheses. 1980;6(2):133-137. doi:10.1016/0306-9877(80)90079-1

[9] Ben-Ami T, Barel O, Levi I, et al. Nasopharyngeal carcinoma in children: current treatment and outcomes. J Pediatr Hematol Oncol. 2024;46(3):117-124. doi:10.1097/MPH.0000000000002848