International Journal of Emerging Trends in Health Sciences

Volume 8, Issue 2, (2024) 46-51

www.ij-hs.eu

A rare case of lumbar intramedullary spinal cord metastasis from papillary thyroid carcinoma

Ercan Kaya [a*] **,** Mardin Training and Research Hospital, Mardin, Turkey.

Suggested Citation:

Kaya, E. (2024). A rare case of lumbar intramedullary spinal cord metastasis from papillary thyroid carcinoma. *International Journal of Emerging Trends in Health Sciences*. *8*(2), 46-51. https://doi.org/10.18844/ijeths.v8i2.9620

Received March 2, 2024; revised from August 5, 2024; accepted from December 1, 2024.
Selection and peer review under the responsibility of Prof. Dr. Nilgun Sarp, Uskudar University, İstanbul.

Abstract

Intramedullary spinal cord metastasis (ISCM) from papillary thyroid carcinoma (PTC) is an extremely rare and poorly documented condition. This report presents the case of a 55-year-old woman with persistent back pain, in whom an intramedullary mass at the L1 level was identified. Despite no prior history of thyroid disease, pathology revealed the mass to be a metastasis from PTC, which was subsequently confirmed by thyroid ultrasound and biopsy. The patient underwent thyroid surgery and radioiodine treatment, leading to improvement in back pain, although sensory deficits persisted. This case underscores the rarity of spinal metastases as a presentation of PTC and highlights the importance of a multidisciplinary approach, with surgical intervention playing a key role in optimizing outcomes.

Keywords: Intramedullary spinal cord metastasis, papillary thyroid carcinoma, spinal metastases, surgical intervention.

* ADDRESS FOR CORRESPONDENCE: Ercan Kaya , Mardin Training and Research Hospital, Mardin, Turkey.
E-mail address: drercankaya@gmail.com

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1. INTRODUCTION

Intramedullary spinal cord metastases (ISCMs) occur in only 0.1-0.4% of all cancer patients (Kalayci, Cağavi, Gül, Yenidünya & Açikgöz, 2004). These metastases most commonly arise from primary malignancies such as lung cancer, breast cancer, melanoma, and renal cell carcinoma (Yoel, Joshua, Shoukrun, Dyomin, Levin, Sufaro, & Fraenkel, 2019). However, ISCCs from papillary thyroid carcinoma (PTC) are extremely rare, and only a few cases have been documented in the literature. PTC typically follows an indolent course with a good prognosis and a low incidence of distant metastasis. When distant metastasis occurs, the lungs and bones are the most commonly affected sites, and metastasis to the spinal cord is almost unheard of (Tripathy, Deo, Mishra, Dhir, Nath & Satapathy, 2016).

Differentiated thyroid carcinomas (DTC), including papillary and follicular subtypes, are generally associated with excellent long-term survival rates. The 10-year survival rate for PTC exceeds 90% (Verburg, Mäder, Tanase, Thies, Diessl, Buck, Luster & Reiners, 2013). Although metastases to the central nervous system have been reported in 1-3% of patients with metastatic DTC, intramedullary spinal cord involvement remains an infrequent phenomenon (Sampson, Brierley, Le, Rotstein & Tsang, 2007). Most cases of ISCM from PTC are found incidentally during autopsy or as part of widespread metastatic disease. Symptoms of ISCM can include progressive motor weakness, sensory deficits, and sphincter dysfunction, which can mimic other more common spinal pathologies, leading to diagnostic difficulties and delayed treatment (O'Neill, Phung & Lai, 2018).

This case report presents a unique example of recurrent intramedullary spinal cord metastasis in a patient previously operated for a thoracic intramedullary lipoma. The patient underwent reoperation for tumor recurrence, and pathological findings showed metastatic PTC. To our knowledge, this case is one of the few reported cases of PTC presenting as ISCM. This case highlights that clinician should maintain a high index of suspicion for metastatic disease in patients with a history of PTC presenting with new neurological symptoms, even if the spinal pathology appears benign.

2. METHOD AND MATERIALS

This study employed a case report methodology to investigate a rare instance of recurrent intramedullary spinal cord metastasis (ISCM) originating from papillary thyroid carcinoma (PTC). The patient, a female with a history of thoracic intramedullary lipoma, presented with new neurological symptoms, prompting further investigation. Initial imaging revealed the recurrence of a spinal tumor, and the patient underwent reoperation. Pathological examination of the tumor sample confirmed metastatic PTC. The methodology included detailed clinical assessments, including neurological evaluations and advanced imaging techniques such as MRI, to monitor and identify changes in spinal pathology. A comprehensive review of the patient's medical history, including previous thyroid cancer diagnosis, was conducted to assess potential risk factors for metastasis. The study aimed to emphasize the importance of maintaining a high index of suspicion for metastatic disease, particularly in patients with known PTC who present with new or unexplained neurological symptoms, even when spinal pathologies appear benign.

3. RESULTS

3.1. Case presentation

A 55-year-old woman with no other known disease presented with severe pain in the thoracolumbar region, unresponsive to medical treatment. MRI revealed a contrast-enhancing, well-circumscribed, intramedullary mass at the L1 level compressing the spinal cord. The operation was planned to remove the mass.

Intraoperatively, the tumor was adherent to the spinal cord, and total resection was not possible. To prevent neurological deficit in the patient, we had to leave a small part of the mass stimulated by the neuromonitor when touched. The frozen result came back as carcinoma metastasis. In the postoperative period, the patient stated that her back pain was relieved, but she had numbness in her right leg.

Figure 1.

Pre-operation Magnetic Resonance Imaging (sagittal and axial planes of contrast-enhanced sequence)

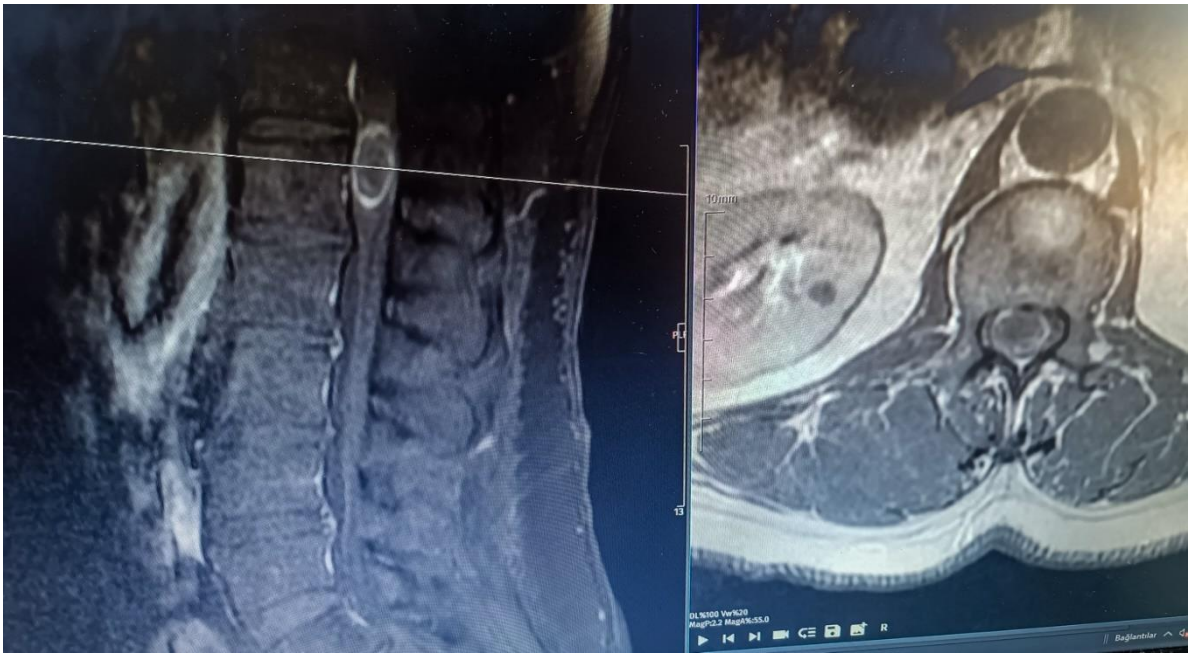
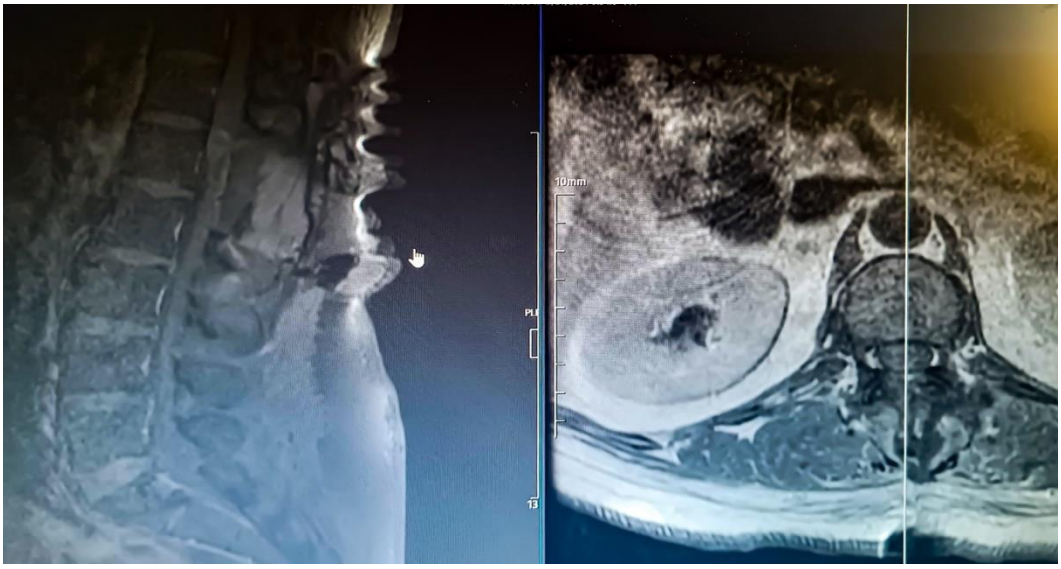


Figure 2.

Post-operation Magnetic Resonance Imaging (sagittal and axial planes of contrast-enhanced sequence)



The pathology report of the surgery revealed that the mass was a metastasis of papillary thyroid carcinoma (PTC). The patient had no known history of thyroid disease, and physical examination revealed no thyroid enlargement. The patient was then referred to the general surgery department, and the diagnosis of papillary thyroid carcinoma was confirmed by ultrasound and biopsy. Surgery was then performed, and radioiodine treatment and appropriate systemic therapy were initiated.

This case illustrates the unusual presentation of papillary thyroid carcinoma as intramedullary spinal cord metastasis without a primary diagnosis. Early diagnosis and multidisciplinary management are critical in addressing this rare but crucial metastatic pattern.

4. DISCUSSION

The reviewed literature reported that distant organ metastases occur in approximately 20% of patients with well-differentiated thyroid carcinoma (TC) (3% spinal metastases) and are recognized as the most common cause of mortality in TC (Quan, Pointillart, Palussière & Bonichon, 2012; Georgy 2008). Intramedullary spinal cord metastasis (ISCM) from papillary thyroid carcinoma (PTC) is an infrequent condition that presents significant diagnostic and therapeutic challenges.

The preoperative MR image suggested that the lesion might be malignant without known primary pathology. The fact that the patient presented with severe thoracolumbar pain and subsequently developed sensory deficits postoperatively illustrates the spectrum of symptoms associated with ISCM. Spinal metastases typically present with neurological symptoms such as motor weakness, sensory changes, and pain, which were also present in this patient. The difficulty of achieving a complete resection due to the adherence of the tumor to the spinal cord reflects the complexity of surgical intervention in ISCM cases. However, partial resection provided symptomatic relief, particularly in terms of pain reduction, although the patient experienced postoperative sensory changes.

From a management perspective, a multidisciplinary approach is essential to improve patient outcomes. In this case, surgical intervention followed by thyroidectomy, radioiodine therapy, and oncological management was crucial. Studies reveal that PTC can respond well to radioiodine therapy, especially when metastatic, but spinal metastases often show a more aggressive clinical course than other metastatic sites such as the lungs or bones. In addition, hypervascularity in thyroid metastases requires careful surgical planning and sometimes requires preoperative embolization to minimize intraoperative blood loss.

The rarity of ISCM arising from PTC is evident in the literature, with few cases reported, most of which occurred long after the primary diagnosis of thyroid cancer. This case is even more unique because of the absence of known thyroid disease before detecting spinal metastasis. Routine diagnostic evaluations such as thyroid ultrasound and biopsy are crucial in identifying the primary malignancy when patients present with atypical metastatic patterns. Given that the patient was ultimately diagnosed with PTC after detection of spinal metastasis, this case highlights the importance of comprehensive diagnostic work-up in patients with unusual metastatic presentations.

The prognosis of ISCM is generally poor, depending primarily on the type of primary tumor and the degree of neurological impairment at the time of diagnosis (O'Neill, Phung & Lai, 2018). However, in cases where ISCM arises from well-differentiated thyroid carcinomas such as PTC, outcomes may be more favorable, primarily if the metastasis responds to radioiodine therapy. Early diagnosis and intervention, as seen in this case, may stabilize or improve neurological symptoms and prevent further deterioration. Still, the long-term prognosis remains guarded due to the aggressiveness of the spinal metastasis.

The American Thyroid Association guidelines recommend that surgical resection of the mass and radiotherapy should be the mainstay of treatment following detection of ISCM, and radioactive iodine therapy may also be considered (Haugen, Alexander, Bible, Doherty, Mandel, Nikiforov, Pacini, Randolph, Sawka, Schlumberger, Schuff, Sherman, Sosa, Steward, Tuttle & Wartofsky, 2016).

5. CONCLUSIONS

In conclusion, this case of intramedullary spinal cord metastasis from papillary thyroid carcinoma illustrates the complex nature of the diagnosis and management of rare metastatic presentations of otherwise incurable cancers. Despite the rarity of ISCM from PTC, this case demonstrates the need to consider metastatic disease in patients with spinal tumors, particularly those with a history or suspicion of thyroid malignancy. Surgical intervention followed by adjuvant treatments such as radioiodine therapy may provide symptom relief and improve quality of life, but prognosis depends on early intervention and neurological status at diagnosis.

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