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INTRADURAL EXTRA MEDULLARY SPINAL METASTASIS FROM BREAST CARCINOMA: A RARE OCCURRENCE

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ABSTRACT

Intradural extra medullary (IDEM) metastases are uncommon spinal lesions, accounting for less than 5% of all spinal metastases (1). Breast carcinoma is among the most frequently reported primaries. Because of their rarity and nonspecific imaging features, the diagnosis remains challenging due to imaging overlap with benign intradural tumors. Management is mainly palliative, combining surgical decompression and or radiotherapy, with systemic therapy as indicated. Prognosis remains poor, but prompt recognition can improve quality of life and functional outcomes.
We report the case of a woman with a history of breast carcinoma under oncologic follow-up who developed neurological symptoms. Spinal MRI revealed an intradural extra medullary lesion. Surgical resection was performed for decompression and histopathological analysis confirmed metastatic breast carcinoma.

KEYWORDS

Breast cancer, intradural extra medullary metastasis, spinal metastasis.

MAIN ARTICLE

INTRODUCTION:

Breast cancer is the most common malignancy in women and frequently metastasizes to the bone, lung, liver, and brain. Central nervous system involvement most often presents as parenchymal brain metastases or leptomeningeal disease, whereas spinal intradural extra medullary (IDEM) metastases are exceedingly rare, accounting for fewer than 5% of all spinal metastases (1,2). Because their imaging features often overlap with benign intradural tumors such as meningiomas or schwannomas, diagnosis can be challenging. MRI remains the modality of choice, demonstrating well-defined enhancing intradural lesions that may mimic primary neoplasms. Recognition of this entity is important, as IDEM, metastases typically indicate advanced systemic disease and carry a poor prognosis. We report a rare case of IDEM spinal metastasis from breast carcinoma, highlighting the imaging findings and reviewing the relevant literature.

CASE REPORT:

A 52-year-old woman with a history of breast carcinoma, under follow-up for known osseous and pulmonary metastases, presented with progressive heaviness of the left lower limb. Neurological examination revealed decreased muscle strength in the left lower limb (Medical Research Council grade 4/5 proximally and distally), with mild spasticity. Deep tendon reflexes were brisk on the left side compared to the right, and a Babinski sign was present. Sensory testing showed no significant abnormality. Sphincter function was preserved.

Spinal MRI demonstrated an intradural extra medullary lesion at the L1 level. The mass appeared isointense to intermediate on T2-weighted sequences and exhibited heterogeneous contrast enhancement following gadolinium administration. A central non-enhancing area consistent with necrosis was noted. In addition, there was epidural thickening and abnormal enhancement at the same level, compatible with epiduritis. The spinal cord was compressed but not invaded.

In addition, multiple vertebral lesions were observed, extending from L5 to S5. These appeared hypo intense on T1-weighted images, hyper intense on T2-weighted images and showed contrast enhancement after gadolinium injection, consistent with vertebral metastases.

The patient underwent surgical decompression with subtotal resection of the lesion. Postoperatively, there was mild neurological improvement.

Histopathological examination confirmed metastatic carcinoma consistent with breast primary, showing malignant epithelial cells arranged in nests and cords, positive for estrogen receptor and cytokeratin immunostains.

Following surgery, the patient received adjuvant radiotherapy to the lumbar spine. Systemic therapy was adjusted according to oncologic evaluation.

DISCUSSION:

Intradural extra medullary (IDEM) metastases are rare entities, representing less than 5% of all spinal metastases(1). Among primary tumors, breast and lung carcinomas are the most frequently reported(3). Compared with the common osseous and cerebral metastases observed in breast cancer, intradural extra medullary spinal involvement remains exceptional. This rarity underlines the importance of recognizing and reporting such cases, as their clinical and imaging features may mimic benign intradural lesions and delay appropriate management.

The exact mechanism of intradural extra medullary metastasis remains uncertain, but several hypotheses have been proposed. Hematogenous dissemination through the arterial or venous system is considered a potential route, particularly in vascular tumors. Another proposed mechanism is dissemination through the cerebrospinal fluid, leading to so-called “drop metastases,” in which tumor cells seed along the leptomeninges and accumulate in dependent areas of the spinal canal. Finally, direct extension from adjacent disease has been described, either from pachymeningeal carcinomatosis or from contiguous epidural metastases. In our patient, the associated epidural thickening and enhancement strongly suggest that epidural spread played a role in the intradural involvement(4).

MRI is the modality of choice for evaluating intradural extra medullary (IDEM) lesions. Metastatic IDEM tumors typically appear iso- to hypo intense relative to the spinal cord on T1-weighted sequences, hyper intense on T2-weighted images, and usually demonstrate contrast enhancement after gadolinium administration, which may be homogeneous in small nodules but becomes heterogeneous in larger or more aggressive lesions. In addition, leptomeningeal enhancement or associated epidural disease, as seen in our case, may further suggest a metastatic etiology(3,5).

The differential diagnosis of IDEM lesions on MRI is challenging. Meningiomas, which represent the most common intradural extra medullary tumors, classically appear as well-circumscribed, homogeneously enhancing masses, often with a broad dural base and the characteristic “dural tail” sign. They are typically isointense on both T1- and T2-weighted sequences and rarely show central necrosis. Schwannomas, in contrast, frequently demonstrate a fusiform shape along a nerve root, may extend into the neural foramen producing the so-called “dumbbell” configuration, and can show heterogeneous signal with cystic or hemorrhagic changes. Other rare intradural tumors, such as paragangliomas, solitary fibrous tumors, or metastases from melanoma, may also mimic these imaging features, although their frequency is very low (6–8).

In the oncologic setting, certain radiological clues should raise suspicion for metastasis rather than a benign intradural tumor. These include multiplicity of lesions, association with leptomeningeal or epidural thickening, heterogeneous or ring-like enhancement with necrosis, and coexistence of systemic metastatic disease(9). In our patient, the combination of a heterogeneously enhancing IDEM lesion with a necrotic center, concomitant epidural thickening, and multiple vertebral metastases was strongly suggestive of a metastatic process. This highlights the importance of integrating clinical history and whole-spine imaging to avoid misdiagnosis and to guide appropriate management.

Histopathological examination remains essential to establish the diagnosis and to exclude a primary intradural extra medullary tumor. In our patient, immunohistochemistry confirmed the mammary origin of the lesion, showing positivity for estrogen receptor (ER) and cytokeratin (CK), consistent with metastatic breast carcinoma(4).

The treatment of intradural extra medullary (IDEM) metastases is essentially palliative. Surgical intervention is usually performed for decompression and to obtain tissue for histopathological confirmation. Postoperative radiotherapy can provide local control, while systemic therapy should be tailored according to the primary malignancy and overall oncologic status. The primary goal of treatment is to improve quality of life and preserve neurological function rather than achieve cure(4,10).

Conclusion :

Intradural extra medullary spinal metastases from breast carcinoma are exceptionally rare and may mimic benign intradural tumors on MRI. In patients with a known history of systemic

malignancy, this diagnosis should always be considered when new neurological symptoms arise. Our case illustrates the key role of MRI in lesion detection, the necessity of histopathological confirmation, and the importance of integrating clinical history to avoid misdiagnosis. Although the overall prognosis remains poor, timely surgical decompression and adjuvant therapies can provide meaningful neurological improvement and preserve quality of life

FIGURES:

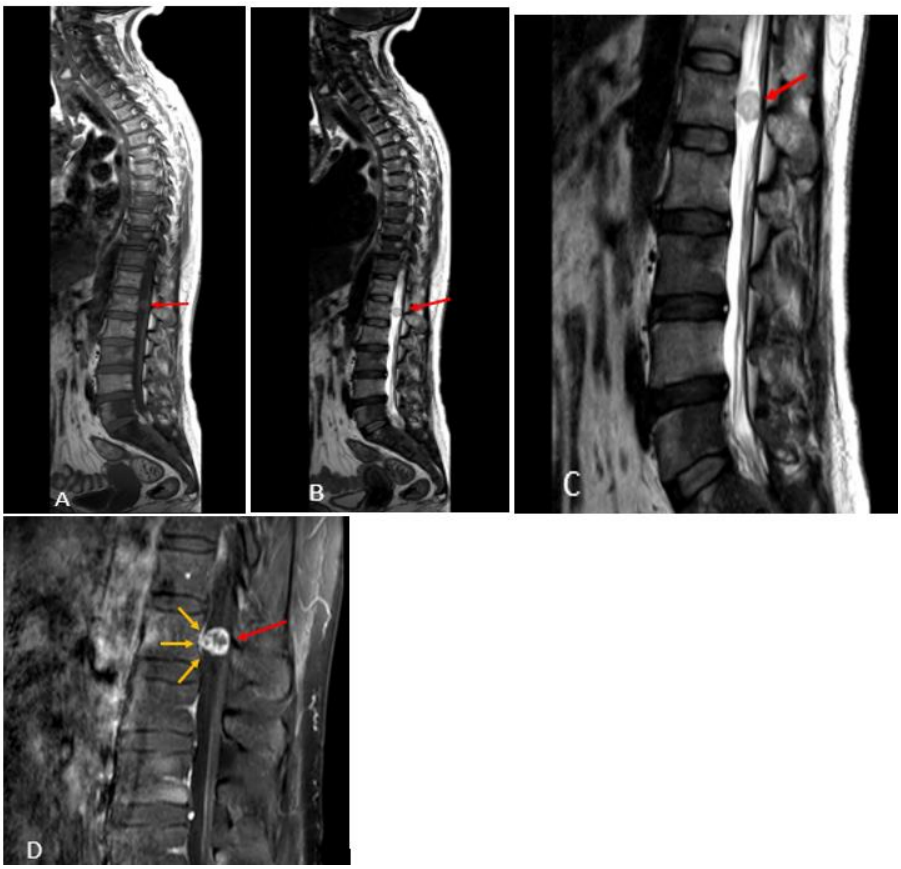

Figure 1: Sagittal MRI of the lumbar spine. (A) T1-weighted image shows an isointense intradural extra medullary lesion at the L1 level (red arrow). (B) T2-weighted image demonstrates intermediate to hyper intense signal. (C) Magnified sagittal T2 view highlights the lesion with central heterogeneity. (D) Post-contrast T1 sagittal image reveals heterogeneous enhancement with a non-enhancing central necrotic area, associated with epidural thickening and enhancement consistent with epiduritis (orange arrow).

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