

Intradural Extramedullary Non-infiltrated Solitary Metastatic Tumor

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Spinal intradural extramedullary non-infiltrated solitary metastasis is very rare. We report a case of intradural extramedullary carcinoma to the T9 nerve root, which mimicking a nerve sheath tumor. Pathology reveals metastatic adenocarcinoma. We discuss the feature of mechanism and pathogenesis and management strategy follows.

KEY WORDS : Intradural extramedullary · Nerve root · Metastasis.

Introduction

Nerve sheath tumors are the most common primary intradural extramedullary spinal cord tumor⁶⁾. On the other hand, spinal intradural extramedullary metastasis is very rare^{4,8,9,15)}. But, in most cases the solitary intradural extramedullary metastasis is located on a nerve root, which makes differentiation from a nerve sheath tumor difficult⁵⁾.

We report a case of intradural metastatic carcinoma to the T9 nerve root mimicking a nerve sheath tumor. The clinical presentation, radiology, differential diagnosis, and operative management are presented. A discussion of the pathogenesis and management strategy follows.

Case Report

A 57-year-old man presented with a ten-day history of both leg paresthesia and motor weakness. He had undergone a right lower lobectomy and right upper lobe posterior segmental wedge resection in 1998 for the treatment of lung cancer. Lung biopsy showed adenocarcinoma.

The patient was in some distress because decreased both leg raising strength and sensory change. The muscle strength of left leg was grade 3. Sensation of light touch, vibration and pinprick were diminished below left T9 dermatome.

Thoracic magnetic resonance imaging(MRI) indicated

intradural extramedullary mass that compress spinal cord, it measured 2.0cm craniocaudally by 2.0cm anteroposteriorly and centered at the level of the T9 vertebra. T1-weighted MRI showed a mass that was a hypointense area and it was well enhanced after administration of Gadolinium. The T2-weighted MRI indicated a slightly high intensely mass(Fig. 1).

The patient underwent a T8 partial and T9 total laminectomy. When the dura is opened, the tumor is found to be located entirely in the intradural space. It is located central to left. There is a firm, yellowish circumferential soft tissue around the T9 root and it compressed spinal cord. The mass had relatively well demarcated margin to the cord and moderately adhered to the dura. We cut proximal 9th nerve root and we debulked tumor mass totally.

The pathology showed metastatic adenocarcinoma(Fig. 2). The cerebrospinal fluid showed class 4, which suggestive of metastatic adenocarcinoma.

After removal of the tumor mass, the patient was noticed a significant relief of paresthesia and improving muscle strength. He received postoperative whole spine radiotherapy (3000cGy). Repeated metastatic work-up remained negative during 10months.

Discussion

Nerve sheath tumors are the most common primary intradural extramedullary spinal cord tumor⁶⁾. In contrast, metastatic spinal tumor is very rare^{2,4,15)}. Based on Bryne's paper¹³⁾, among 200patients treated with symptomatic spinal metastasis, spinal cord or cauda equina compression was due to extradural spinal metastasis in 189cases. An intramedullary spinal metastasis was confirmed at surgery in one patient. Localized intradural extramedullary tumors were discovered

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Fig. 1. Preoperative sagittal T1-weighted magnetic resonance image reveals about a 2cm-sized low intense round mass at the level of the T9 vertebra (arrow). In T2-weighted image, there is a slightly high intense mass (hollow arrow). The mass is well enhanced after administration of gadolinium (arrow head).

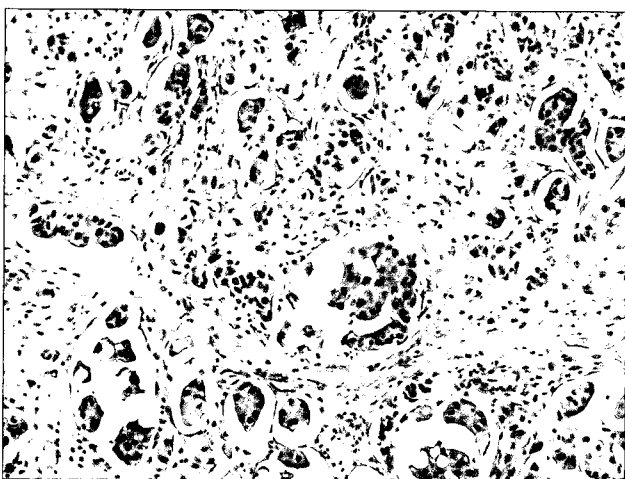


Fig. 2. Photomicrograph shows typical features of adenocarcinoma. This is composed of well-differentiated tumors with obvious glandular element. (H & E, $\times 400$).

in 10 cases. And, in most cases, the solitary intradural extramedullary metastasis is located on a nerve root, which makes differentiation from a nerve sheath tumor difficult⁵.

According to Okamoto's paper¹¹, among 157 metastatic spinal tumor cases, the primary tumors were the lung carcinoma (51%), breast cancer (15.3%), malignant melanoma (7.6%), lymphoma (5.1%), and unknown origin (3.8%). A similar study by Edelson⁷ reached the same conclusion. In our case, the primary focus was the lung carcinoma.

Pain is the initial and most common symptom associated with the intradural extramedullary lesions⁵. It may be radicular or localized to the spine, which is worse at night or with recumbency, and is characteristically described as a "severe cramping" and episodic "shock-like" discomfort. Motor weakness is a complaint noted in approximately one the third of patients⁵. Sensory symptoms or sphincter dysfunction are each described by about 25% of patients at diagnosis⁵. Patterns of sensory abnormalities include a

segmental loss consistent with radicular involvement, patchy areas of decreased sensation of frank sensory levels corresponding to the level of tumor involvement⁵. Impotence occurs in about 5%⁵. Motor weakness, gait difficulties, hyperreflexia, and extensor plantar responses are the most common abnormalities detected⁵. Bowel and bladder dysfunction is recorded preoperatively¹³. Atypically, the patient in this case had no pain complaint.

He had just sensory change and motor weakness. Tumor may metastasize to the spine by several principle means. First, they may spread by hematogenous dissemination. Tumor that travels through the anterior spinal artery, segmental arteries, or radiculomedullary arteries may lead to metastasis of the vertebral body or the spinal cord itself⁷. The second method of spinal metastasis is through the paravertebral plexus of veins originally described by Batson². A third possible mechanism by which tumors may invade the spine is direct invasion of the bone¹¹.

The fourth mechanism of tumor spread to the spine is by dissemination through cerebrospinal fluid pathway². Other pathogenesis include spread by extension along perineural lymphatic ducts or spinal nerve roots or tracking along nerve roots^{1,3,14}.

Nerve root metastases can mimic a benign nerve sheath tumor radiologically. Nerve sheath tumors are the most common intradural extramedullary spinal cord tumor, producing bone findings on plain films, such as enlargement of the neural foramen, osseous change, and pedicle erosion¹⁹. Paraspinal soft tissue masses are common with "dumbbell" and extradural lesions¹². Myelographic findings in nerve root metastasis, including multiple nodular appearance, striated appearance related to thickening of the roots, failed visualization of nerve root sheath, and filling defects of varying regularity are not entirely specific. Gadolinium-enhanced MRI has become the modality of choice for evaluating spinal cord tumors. It specifies not only the extent and margin of tumor invasion, but also the exact anatomic localization for operative planning. But MRI is less specific in the detection of intradural metastases¹⁸. But in spite of this advantage, the proper diagnosis may be possible only at surgery¹⁹.

Clinical deterioration occurs more rapidly and surgical decompression is much less effective in case with intradural extramedullary spinal metastasis¹³. The overall median

survival after surgery is 30 months, with 18% surviving 5 years or more¹².

Based on Livingston's study¹⁰, among 100 patients, 29 of these patients are living with an average postoperative survival of 2.3 years; 71 patients had died with an average survival of 8.8 months. Surgical decompression produced effective pain relief in 70 of these, 40 patients are walking and continent of urine 6 months following surgery. And the results of treatment by radiotherapy alone are retrospectively compared with those of surgical decompression (with or without radiotherapy). There is no significant difference between these results for immediate response to treatment or for long-term outcome¹⁶.

The best predictor of outcome is the site of primary tumor. Several results are reported. Survival varied by tumor type, with the best prognosis noted in patients with breast or kidney cancer^{16,17}. Surgical treatment is considered preferable in cases in which the diagnosis of cancer is not proven, and when there is a possibility of neural compression.

Treatments of these lesions are predicated on the status of the systemic cancer, the specific symptoms, and the degree of the intradural dissemination. For the solitary lesion in a patient without a prior diagnosis of malignancy, a preoperative diagnosis may be impossible. Alternatively, the patient with known metastatic cancer who has multiple lesions, positive CSF cytology, and a neurologic deficit referable to these lesions may be best treated with radiation with or without systemic or intrathecal chemotherapy⁵.

The choice of treatment will depend upon the particular requirements of each individual patient¹⁶.

Conclusion

Intradural extramedullary spinal metastasis is very rare. In most cases the solitary intradural extramedullary metastasis is located on nerve root, which makes different-

iation from a nerve sheath tumor difficult. We report a case of this pattern of metastasis with related articles.

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