Drop Metastasis Seeding the Intramedullary Conus Medullaris in a Patient with Breast Cancer and Brain Metastasis

Jung-Ying Chiang¹ and Der-cherng Chen¹ ²*

¹Department of Neurosurgery, China Medical University Hospital, Taichung, Taiwan, R.O.C
²China Medical University, Taichung, Taiwan, R.O.C

Abstract

Breast cancer metastasis to the conus medullaris is very rare. We report a case of intra-axial conus medullaris metastasis from breast adenocarcinoma in a 39-year-old woman. Two years after the diagnosis of brain metastasis was biopsy-proven, she developed progressive lower limb weakness with urinary incontinence for one month. MRI revealed a contrast-enhancing intramedullary lesion at the conus medullaris. Laminectomy and removal of the tumor were performed for decompression and for preserving function. Postoperative histopathological examinations confirmed the metastatic nature of the lesion. We discuss the possibility of drop metastasis traveling from the brain to the conus medullaris via cerebrospinal fluid (CSF) in the central canal. Since intramedullary spinal cord metastasis can lead to rapid progressive neurological deficits and poor outcome, early diagnosis and decompression could preserve the quality of life. We suggest that CSF cytology could be helpful for the diagnosis of intraspinal metastasis in patients with brain metastasis.

Keywords: Intramedullary; Spinal cord; Metastasis; Breast cancer

Introduction

Intramedullary spinal cord metastasis (ISCM) is rare (representing approximately 0.1–0.4% of all spinal cord neoplasms [1]), and nearly 50% of ISCMs arise from primary lung cancer. Other primary sources include primary breast and colorectal cancers [2]. Spinal magnetic resonance imaging (MRI) is routinely used to diagnose ISCM [3]. Surgical excision aims at decompression of functional neural tissue and at histological confirmation of the diagnosis [4]. We present a case of intramedullary conus medullaris metastasis from primary breast adenocarcinoma.

Case Report

A 39-year-old premenopausal woman presented with T2N0M0 left breast cancer treated in 1997 with surgery followed by anthracycline-based chemotherapy and tamoxifen. The tumor was Her-2/neu (3+) and estrogen/progesterone receptor negative. She achieved a complete response and was then followed up on a regular basis. Metastasis to the lung developed in 2009 and then progressed to the liver and brain, and was treated with herceptin, avastin, and cisplatin. Brain biopsy was performed to pathologically confirm the diagnosis of brain metastasis, which was treated with whole brain radiation. However, weakness, paresthesia, and numbness in the lower extremities had progressed two years after the brain biopsy leaving the patient unable to walk and urinary incontinent. The MRI of the lumbar spine disclosed a 3.9 × 1.4 cm mass within the medullary conus at spinal level T12 to L1. T1- and T2-weighted sequences showed significant enhancement of the heterogeneous hyperintense lesion after gadolinium injection, no bony destruction, and no epidural tumors (Figure 1). Muscle strength decreased from 5 to 2, and urinary incontinence persisted. Laminectomy of T12 and L1 and durotomy were performed, and a medullary conus tumor was found. During partial resection of the medullary conus tumor, the lumen of the central canal was seen to be patent and to have a smooth surface. The nerve roots of the cauda equina were released using microsurgical techniques. The patient had no notable complications; her lower limb weakness and numbness improved immediately after the operation, but she was still unable to walk and remained dependent on a Foley catheter. Postoperatively, she underwent spinal local radiotherapy (30 Gy/12 Fr) and further rehabilitation.

Histological and genetic findings: Microscopic examination showed metastatic adenocarcinoma composed of polygonal tumor cells with pleomorphic and hyperchromatic nuclei arranged in vague glandular structures or nests (Figure 2). Immunohistochemical study showed an immunophenotype consistent with breast cancer, i.e., CK7 (+), CK20 (−), TTF-1 (+), ER (−), PR (−), and Her-2/Neu (weakly positive, score 2+).

Discussion

The treatment of ISCM could be steroids, radiation, chemotherapy, and surgical excision to preserve function. In this case, the patient had no notable complications and regained her lower limb function. CSF cytology could be helpful for the diagnosis of intraspinal metastasis in patients with brain metastasis.

*Corresponding author: Der-cherng Chen, Assistant Professor of Medicine, Department of Medicine, China Medical University; Department of Neurosurgery, China Medical University Hospital, No. 2 Yu-Der Road, Taichung 404, Taiwan, R.O.C, Tel: +886-42-2052121x5034; Fax: +886-42-2052121x5035; E-mail: vincenchen1966@gmail.com

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CSF cytology could be routinely performed when intramedullary metastasis is suspected. CSF cytology could also be helpful for detection of metastasis before symptoms become apparent in those patients with prior brain metastasis. But the value of CSF sampling needs to be confirmed in more studies.

Conclusion

To our knowledge, we report here the first case of successful surgical treatment of intramedullary spinal cord metastasis to the conus medullaris from a breast adenocarcinoma in a patient with brain metastasis. Treatment could be surgery, conservative, palliative measures, corticosteroids, chemotherapy, or radiotherapy. CSF cytology could help make the diagnosis without the need to obtain a surgical specimen for pathology and may detect the intramedullary spinal metastasis before the symptoms become apparent in those patients with prior brain metastasis.

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