



SCIREA Journal of Clinical Medicine

ISSN: 2706-8870

<http://www.scirea.org/journal/CM>

May 2, 2022

Volume 7, Issue 3, June 2022

<https://doi.org/10.54647/cm32809>

Lumbar Epidural Metastasis of Breast Cancer Resembling Lumbar Disc Herniation: a case report

Takanori Fukunaga^{1,*}, Masao Umegaki², Yohei Bamba³, Yasuaki Tsuchida⁴, Koshi Ninomiya¹, Katsumi Matsumoto¹, Haruhiko Kishima⁵, Manabu Sasaki^{5, 6}

¹ Department of Neurosurgery, Iseikai Hospital, Osaka, Japan

² Department of Neurosurgery, Suita Municipal Hospital, Suita, Japan

³ Department of Neurosurgery, Osaka Rosai Hospital, Sakai, Japan

⁴ Department of Surgical Pathology, Iseikai Hospital, Osaka, Japan

⁵ Department of Neurosurgery, Osaka University Graduate School of Medicine, Suita, Japan

⁶ Department of Neurosurgery, Hanwa Memorial Hospital, Osaka, Japan

*Corresponding Author: Takanori Fukunaga

Department of Neurosurgery, Iseikai Hospital, 6-2-25 Sugawara, HigashiYodogawa-ku, Osaka-shi, Osaka 533-0022, Japan

Phone: +816-6326-1121 Email: tfukunaga_nsu@aol.com

Abstract

Background: As the prognosis of cancer patient has improved following advance in multimodal treatment, the incidence of metastases to distant organs commonly occur. Spinal metastatic tumor usually spread in spinal bone and sometimes induce paralysis through spinal cord compression.

However, metastasis to the epidural space is rare. In this study, we report the metastasis of breast cancer to epidural space including intervertebral disc which seemed lumbar disc herniation at preoperative setting.

Case presentation: A 49-year-old woman who had breast cancer suffered from left leg pain. Initial MRI indicated lumbar disc herniation compressing S1 nerve root. The pain was uncontrollable with conservative treatments and she underwent surgical decompression. Intraoperative findings showed that left S1 nerve root was compressed by soft and gray tumor locating ventrally. We resected the nerve root surroundings and intervertebral disc protrusion, S1 nerve root was finally adequately decompressed. Pathological examination demonstrated adenocarcinoma as same as original breast cancer.

Conclusions: Intraoperative findings showed that bone tissue around the tumor was intact, it is thought to be metastasized to the epidural space hematogenously. Although lumbar disc herniation is much more popular than epidural metastasis, we should constantly consider differential diagnosis as metastatic lesion in case of malignancy.

Keywords: breast cancer, epidural metastases, lumbar disc herniation

Background

As the prognosis of cancer patient has improved following advance in multimodal treatment, the incidence of metastases to distant organs commonly occur. In breast cancer patients, metastases most frequently occur in the skeleton.¹⁾ Although metastasis to vertebral bone is common and it induces neurological deficits, metastasis to epidural space is rare. In this report, we demonstrate a rare case of metastases to the lumbar epidural space including intervertebral disc originated from breast cancer which initially seemed to be lumbar disc herniation.

Case presentation

A 49-year-old woman complaining left toe pain and dysesthesia came to our outpatient clinic. She had had breast cancer (Stage IV, ER+, PgR+, HER2-), bone metastases including sacrum 2

years before seeing us. Biopsy and chemo/hormone therapy were performed for the breast cancer and radiation therapy for the sacrum metastasis. Her activities of daily livings were maintained all by herself until before left toe pain had emerged. She suffered from severe pain and exhibited left motor weakness of gastrocnemius, flexor hallucis longus muscles (grade 4/5). Preoperative lumbar magnetic resonance imaging (MRI) showed that intervertebral disc protruded continuously which looked like a L5-S1 disc herniation compressing left S1 nerve root firstly. Although vertebral cancellous bone was broken in part due to previous sacrum metastasis, its cortical continuity was retained at spinal canal on computed tomography (CT). (Fig. 1). Additionally, preoperative Positron Emission Tomography-CT (PET-CT) indicated that there are F-fluorodeoxyglucose (FDG) accumulation in left sided ischium and pubis, however, in neither L5-S1 vertebral body, intervertebral disc, nor medial sacrum (Fig. 2). Left S1 nerve root block anesthesia temporarily alleviated her pain. Preoperative diagnosis was lumbar disc herniation causing left S1 radiculopathy. Her pain was refractory to conservative treatment; therefore, we underwent posterior decompressive surgery. Intraoperative findings made us surprised that epidural severely tight tissue, not herniated nucleus pulposus (HNP), adhered around S1 nerve root. The lesion discolored in dark red and extended into foraminal space along S1 nerve root. Careful detachment and dissection of the lesion as much as possible from the nerve root was performed. Moreover, we further made an incision in the L5-S1 disc protrusion, resected its HNP. Finally, we confirmed that left S1 nerve root was absolutely decompressed (Fig. 3).

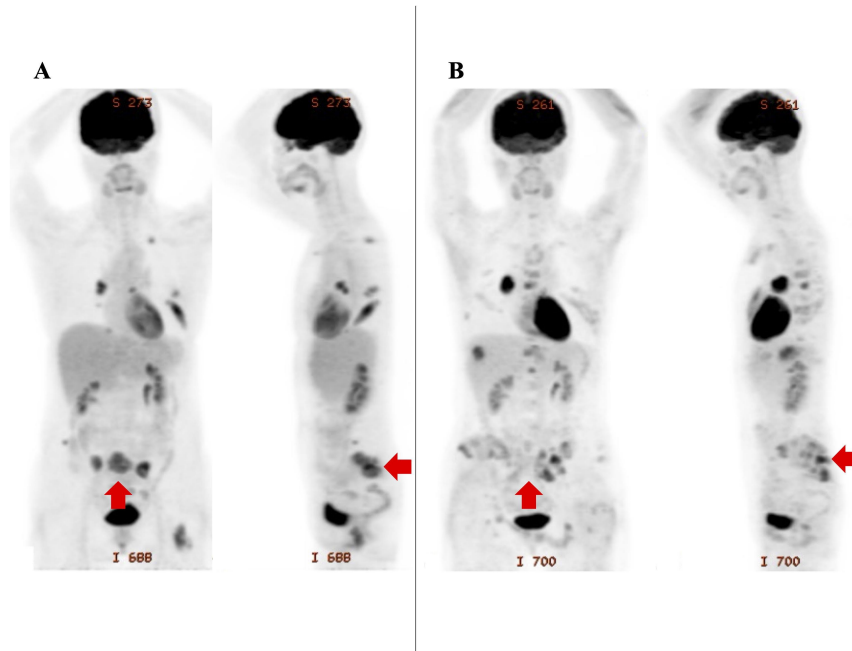


Fig. 1 Preoperative imaging studies at L5-S1 level.

(a) Left S1 nerve root was compressed (arrow) in axial T2-weighted MRI.

(b) Axial bone window CT at S1 lateral recess level where S1 nerve root pass through seemed intact.

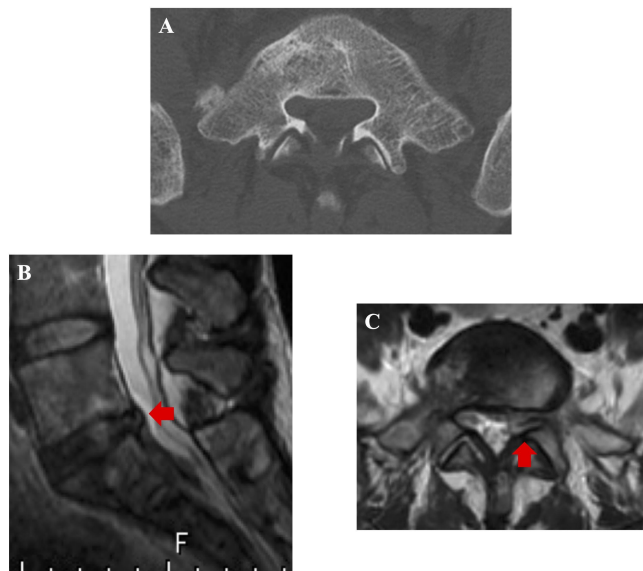


Fig. 2 Preoperative systemic PET-CT investigation.

Although it suspected vertebral bone metastases including left sided ischium and pubis, there seemed to be FDG accumulation in neither lower lumbar spine nor medial sacrum.

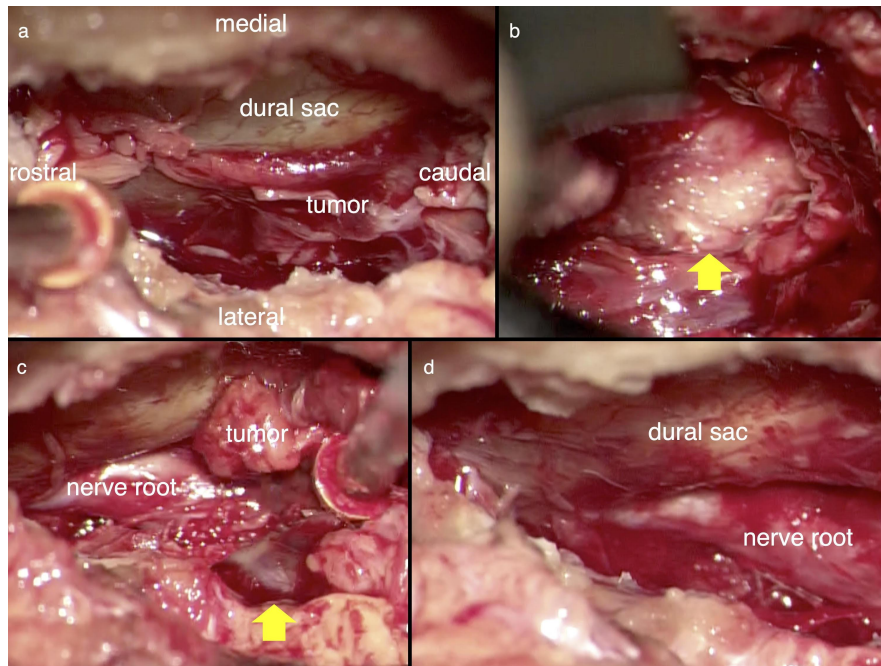


Fig. 3 Intraoperative microscopic viewings

(a) Epidural lesion compressed left S1 nerve root. (b) The lesion was not developed from S1 vertebral body (arrow). (c) Left facet joint membrane discolored in dark red and was hypertrophic. (d) Left S1 nerve root was adequately decompressed.

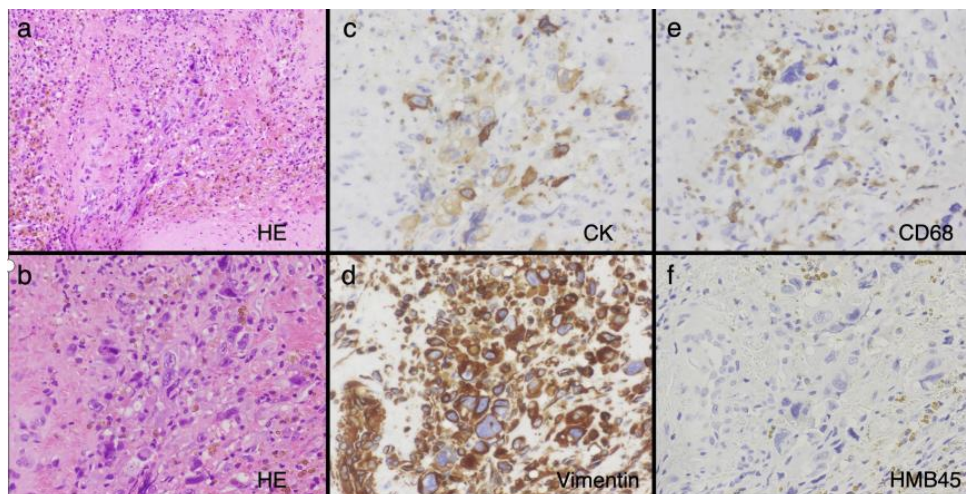


Fig. 4 Pathological investigation with formalin fixed paraffin embedded tissue

(a) On HE staining, atypical and pleomorphic nuclear in low-power field. (b) large nucleus and cytoplasm and nucleoli were observed in high-power field. In immunohistochemical survey, (c) cytokeratin AE1+AE3 (CK), (d) Vimentin were positive, (e) CD68 as a marker of histiocytes, (f) HMB 45 as a marker of melanoma were negative.

Pathological findings of all the things surgically removed such as epidural nerve root surroundings, intervertebral disc contained adenocarcinoma consisted of proliferative atypical cells and pleomorphic nuclear on hematoxylin and eosin (HE) stain. In high-power field, nucleoli in the cells were clearly observed. Undifferentiated pleomorphic sarcoma or malignant melanoma were denied because CD68 and HMB45 immunohistochemical tests were negative (Fig. 4). We definitely determined the lesion was metastases of breast cancer to epidural space around nerve root invading to lumbar disc.

After the surgery, her pain in the toes relieved to some extent and improved muscle strength (grade 5/5), MRI showed left S1 nerve root was completely decompressed. She received local radiation therapy to nerve root surroundings.

Discussion and Conclusions

In cancer patients, vertebral metastases are typically associated with back pain firstly. Subsequently, metastatic vertebral bone lesion expands to spinal canal, metastatic epidural spinal cord compression (MESCC) occurs in 2.5-10% of cancer patients in the last year of life.²⁻⁴⁾ In our case, the patient did not complain back pain but only pain in the toes. MRI also appeared that lumbar HNP seemed to put pressure on left S1 nerve root, not seemed to be occurred from sacrum. Additionally, preoperative PET-CT indicated that there is no FDG accumulation in lower lumbar spine nor medial sacrum, this assumed that the epidural lesion did not develop from sacrum at least in the preoperative setting. Therefore, we at first diagnosed lumbar disc herniation; However, the pathological examination identified that what we had removed including surroundings around nerve root and HNP comprised adenocarcinoma. There is possibility that epidural and HNP metastases were too small to be detected in preoperative PET-CT. Hence, we have concluded that primary breast cancer metastasized hematogenously to the lumbar intervertebral disc, and the epidural space in this case. Previous studies reported that spinal epidural metastases are diagnosed during life in only 1% to 5% of patients with systemic cancer.⁵⁾
⁶⁾ To our knowledge, there is no previous report that breast cancer directly metastasizes to epidural space around nerve root including lumbar intervertebral disc, our case is the first report so far. It is reported that only ten cases of solid cancers metastases to spinal nerve root ganglia.⁷⁾

A previous randomized trial showed that surgery followed by radiotherapy provides better

outcomes than radiotherapy alone for the treatment of symptomatic metastatic epidural spinal cord compression.⁸⁾ Surgeons should consider operation when patients complaining neurologic dysfunction in the setting of quite spinal cord compression. As in this case, even if we diagnosed metastatic lesion preoperatively, the patient had neurologic dysfunction like pain and motor weakness, it is suitable that we consequently performed surgery after all.

In conclusion, the metastasis to lumbar epidural space including intervertebral disc is rarely reported. Even if a lesion seems to be lumbar disc herniation, in the setting of known malignancy, we should keep in mind the possibility of metastasis to epidural space.

Declarations

Ethical approval and consent to participate

This study was performed in accordance with the ethical standards of the Ethics committee of Iseikai hospital. Written informed consent was obtained from the patient in our study.

Availability of data and materials

All data generated or analysed during this study are included in this published article.

Author's contributions

TF designed and conducted the study; MS and YB and YT and KN analyzed the data; KM and HK and MS revised the manuscript. All authors approved the final version of the manuscript and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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