

Spastic Paraplegia Secondary to Spinal Metastasis in a Patient with Advanced-Stage Breast Cancer: A Case Report

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ABSTRACT

Introduction: Spinal metastasis in breast cancer patients can lead to severe pain, neurological deficits, and significant morbidity, impacting quality of life and chances of survival in breast cancer patients. **Case:** A 48-year-old woman was referred to a neurologist because of lower extremity weakness. Due to spinal cord compression, she had paraplegia with chronic progressive mixed-type lower back pain, with radiating to the pelvis, accompanied by numbness, tingling, and burning from both feet to the subumbilical region, and impairment of defecation and urination. She had a history of breast cancer with chemotherapy and radiotherapy. Her numeric rating scale score was 7, ID pain score was 4, Karnofsky score was 40; neurological examination revealed spastic paraplegia, segmental hypoesthesia at and below the 11th spinal cord level, and urinary and bowel retention. Radiologic examination showed kyphosis with osteolytic and osteosclerotic thoracic vertebrae. Bone survey showed bone metastases in thoracic vertebral bodies 5–12, the right ilium, and the right proximal femur. **Discussion:** The patient was diagnosed with spinal metastasis based on physical examination and supporting investigations, but further follow-up was limited. Early recognition of the clinical condition is expected to help prevent further deterioration of neurological deficits. **Conclusion:** The patient was diagnosed with spinal metastasis from breast cancer and received analgesic and corticosteroid therapy. The prognosis was poor.

Keywords: Breast cancer, case report, palliative treatment, paraplegia, spinal cord compression, spinal metastasis.



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<https://doi.org/10.55175/cdk.v53i10.2014>

e-ISSN: 2503-2720

INTRODUCTION

Breast cancer is the most common cancer among women, followed by lung, cervical, colorectal, and liver cancers.^{1,2} In 2020, 2,261,419 new cases of breast cancer were reported, representing 11.7% of all cancers worldwide.³ Approximately 65,000 new cases were reported in 2020, representing 16.6% of all malignancies in Indonesia.⁴ Breast cancer is one of the most common malignancies affecting women worldwide, with a significant risk of metastasis to various organs, including the spine. Breast cancer most commonly metastasizes to the bone and has a particular affinity for the spine, accounting for 2/3 of osseous metastases discovered.⁵ The clinical incidence of spinal metastases is 15.67%; two-thirds are metastases from breast-, prostate-, or lung cancer.⁶

Spinal metastases in breast cancer patients can result in excruciating pain, neurological deficits, and significant morbidity, affecting

the quality of life and chances of survival.⁷ Breast cancer metastases constitute the most common cause of symptomatic spine metastases, 9%–40% of clinical series of spinal epidural metastases documented in the literature.⁸ It is estimated that around 90% of breast cancer deaths are caused by metastasis, with bone tissue being the system with the highest incidence (65%–75%).⁹

Spinal metastasis, commonly referred to as metastatic spinal cord compression (MSCC), is a condition frequently encountered in clinical practice but is often overlooked during early detection. Back pain may not always be recognized as an early sign of spinal metastasis at primary healthcare facilities, potentially delaying the needed referral to a neurologist. Limited diagnostic facilities or the patient's clinical condition may further prevent additional investigations.

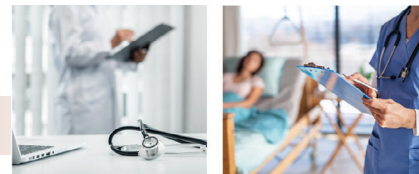
Definitive diagnosis of MSCC requires

magnetic resonance imaging (MRI); however, some hospitals may not have access to this modality. Furthermore, MRI examination can be time-consuming and may be contraindicated in certain conditions, such as in patients with incompatible metallic foreign bodies or implants. These limitations present a significant challenge in managing patients who require prompt treatment despite the inability to undergo MRI.

CASE

A 48-year-old woman was referred to the Neurology Department by the Obstetrics and Gynecology Department because of progressive lower-extremity weakness. She was diagnosed with breast cancer approximately eight months earlier. Initial evaluation at a district hospital revealed a nodular lesion in the right breast that was suspicious for malignancy and classified as BI-RADS 4 on ultrasonography. Histopathological examination demonstrated

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grade 2 invasive ductal carcinoma. Immunohistochemical evaluation of estrogen receptor (ER), progesterone receptor (PR), human epidermal growth factor receptor 2 (HER2), and Ki-67 was not available in the medical records and could not be retrieved for this case. Abdominal ultrasonography showed no evidence of metastatic lesions in the liver, spleen, pancreas, kidneys, urinary bladder, or uterus. She subsequently received chemotherapy with anthracyclines and taxanes, and radiotherapy was planned.

Approximately one month after the initial breast cancer diagnosis, the patient developed low back pain, predominantly on the right side. The pain was described as a pulling sensation accompanied by stiffness when changing position from sitting to standing. It was intermittent, mild, and more prominent at night. Physical activity aggravated the pain, and rest relieved it. At that time, it was not exacerbated by coughing, sneezing, or straining. She denied radicular pain, lower-extremity weakness, tingling, numbness, electric shock-like sensations, or bowel and bladder dysfunction. She remained able to perform her usual daily activities. She sought treatment at a private clinic and was prescribed medication, but the pain did not improve. However, she did not seek further evaluation and continued her cancer treatment.

Approximately six months after the initial breast cancer diagnosis, the low back pain progressively worsened. The pain changed to a burning sensation that radiated from the lower back to the right pelvis and was accompanied by tingling and numbness in both feet, which gradually progressed proximally to both thighs. The pain increased to moderate intensity, was aggravated by movement, and was exacerbated by coughing, sneezing, and straining. It was particularly severe at night. The patient also developed difficulty walking but remained able to ambulate with assistance. At this stage, she developed bowel and bladder dysfunction. She was admitted to the district hospital and required urinary catheterization. A vertebral mass was suspected, and spinal radiography was performed, although the results were not known to the patient at that time. She received medication and

physiotherapy and subsequently continued her planned radiotherapy before being discharged.

Approximately two weeks before admission to the referral hospital, about 7.5 months after the initial breast cancer diagnosis, her symptoms deteriorated further. The low back pain increased to moderate-to-severe intensity, and the burning sensation persisted. The tingling and numbness progressed proximally to below the umbilicus. Her lower-extremity weakness worsened, resulting in an inability to walk independently, and she required assistance to maintain a sitting position. She was admitted to the district hospital with suspected spinal metastasis. She was treated with intravenous tramadol 100 mg every 12 hours, intravenous methylprednisolone 62.5 mg every 12 hours, and intravenous mecobalamin 500 µg every 12 hours. However, her symptoms persisted. She was subsequently referred to the referral hospital for further oncological management, and a neurology consultation was requested because of chronic progressive lower-extremity weakness.

There was no history of sinusitis, dental infection, ear discharge, fever, chronic cough, prolonged cough treatment, night sweats, weight loss, subfebrile fever, or hemoptysis. On admission, the patient was alert, and her vital signs were normal. Her pain intensity was 7/10 on the numeric rating scale (NRS), and her ID Pain score was 4. Neurological examination revealed spastic paraplegia with

segmental protopathic and proprioceptive hypoesthesia below the T11 spinal cord level. Urinary and fecal retention were present. Her Karnofsky Performance Status was 40.

Review of the spinal radiograph obtained at the district hospital approximately two months before admission to the referral hospital revealed thoracic kyphosis and mixed osteolytic and osteosclerotic lesions involving the T6–T11 vertebral bodies (**Figure 1**). A subsequent bone survey demonstrated metastatic lesions involving the T5–T12 vertebral bodies, right ilium, and proximal



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Figure 1. Radiologic examination of thoracic vertebrae. (A) Anteroposterior view shows osteolytic, osteosclerotic lesion of thoracic vertebrae corpus 6–11 (circle) suggestive of bone metastasis. (B) Lateral view shows kyphosis of thoracic vertebrae.

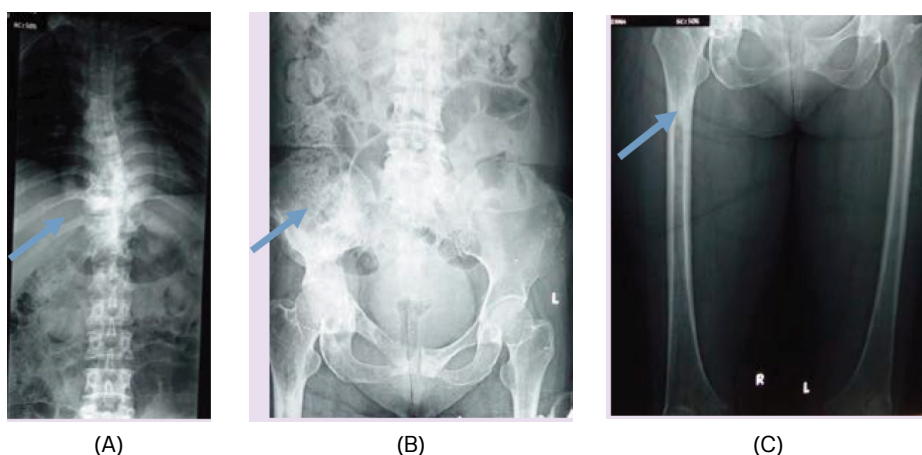


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Figure 2. Bone survey examination. (A) Bone metastasis in Thoracic vertebral corpus 5–12, (B) Bone metastasis in right ilium (arrow) showing osteolytic lesion, (C) Bone metastasis in proximal right femur (arrow) showing lytic sclerotic lesion.



right femur. These findings were consistent with extensive osseous involvement in the setting of her breast cancer (**Figure 2**).

The management consisted of education for the patient and family, TLSO (thoraco-lumbo-sacral orthosis) braces, physiotherapy and a decubitus mattress, and pharmacological: intravenous dexamethasone 10 mg, continued by 5 mg/6 hours, intravenous mecobalamin 500 mcg/12 hours, intravenous ketorolac 30 mg/8 hours, intravenous ranitidine 50 mg/12 hours, intravenous tramadol 50 mg/8 hours, oral gabapentin 100 mg/12 hours. Following treatment with analgesics and dexamethasone, the low back pain showed partial improvement, with the NRS decreasing from 7/10 to 4/10. However, the lower-extremity weakness persisted, and no significant improvement in ambulation was observed. TLSO was used during mobilization. Bladder and bowel dysfunction persisted during the documented follow-up period.

DISCUSSION

This patient shows symptoms most likely caused by suppression or compression of the spinal cord in the thoracolumbar segment. Radiological findings include kyphosis and osteolytic and osteosclerotic changes in thoracic vertebral bodies 6–11. Bone survey revealed bone metastatic lesions involving the T5–T12 vertebral bodies, right ilium, and proximal right femur. MRI was not performed due to the patient's deteriorating condition and inability to be transported. Consequently, the precise degree and extent of spinal canal compromise and spinal cord compression could not be objectively assessed. There is no way to track whether this patient underwent a spine CT as a substitute for an MRI. Thus, the lack of advanced spinal imaging in this case is an important diagnostic limitation, although the clinical and radiographic findings strongly suggested spinal involvement.

This syndrome may be caused by: 1) Spine and spinal cord secondary tumors, 2) Spine and spinal cord primary tumors. This condition is related to grade 2 breast cancer, indicating a moderate growth rate.¹⁰ Neoplastic diseases of the spine often manifest pain difficult to distinguish from non-neoplastic (benign) causes. Primary spine tumors are extremely

rare, with an incidence of less than 5 percent of the total bone tumor. Metastatic cancers of the spine are fairly common.^{11,12} Nerve tissue, meningeal tissue, bone, and cartilage can undergo neoplastic change. These structures can develop malignant tumors that spread via lymphatic or hematogenous routes. Some studies state that spinal cord compression is usually caused by the collapse of the vertebral body or metastatic compression, occasionally caused by direct tumor expansion into the vertebral column.^{11,13}

Approximately 70% of symptomatic lesions are found in the thoracic region, 20% in the lumbar region, and 10% in the lumbar and cervical region. More than 50% of patients with spinal metastases have bone disorders with multiple levels. Spinal metastases can originate from lung malignancy (31%), breast (24%), gastrointestinal (9%), prostate (8%), lymphoma (6%), melanoma (4%), unknown (2%), other lesions including multiple myeloma (13%), and kidney (1%).¹³

Breast cancer spinal metastases (BCSM) frequently result in severe skeletal-related events (SRE), including vertebral fractures and paralysis.¹⁴ Other studies indicate that 9.6% of patients with spinal metastases experience metastatic epidural spinal cord compression, while 1 in 8 (12.6%) of those with spinal metastases encounter pathologic vertebral compression fractures.⁴ Another limitation was the absence of immunohistochemical data for the breast carcinoma (ER, PR, HER2, Ki-67). These biomarkers provide important information regarding the biological characteristics of breast cancer and may influence systemic treatment selection. Therefore, the tumor's biological subtype could not be determined in this patient.

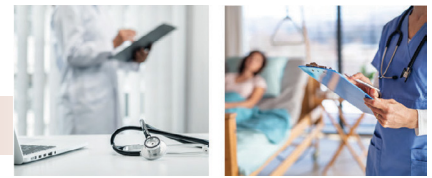
Palliative treatment focuses on portability, reducing tumor burden, and relieving symptoms. Options include symptomatic treatment, radiation, surgery, and chemotherapy. Symptomatic treatment includes treatments for pain in an unstable spine, uncomfortable conditions, and mental and social distress. Corticosteroids serve as adjuvants for both neuropathic and inflammatory pain; nonsteroidal anti-inflammatory drugs can help patients with bone pain who cannot utilize corticosteroids.

Dexamethasone reduces prostaglandin E2 (PGE2) and vascular endothelial growth factor (VEGF) production, thereby reducing ischemic edema.¹⁵ The appropriate initial dosage would be a 10 mg intravenous bolus, followed by a maintenance dose of 4 mg every six hours, gradually reduced over two weeks as the clinical situation permits.¹⁶

Radiotherapy is indicated for radiosensitive tumors (lymphoma, multiple myeloma, small-cell lung carcinoma, seminoma of the testicles, neuroblastoma, and Ewing sarcoma), survival rate less than 3 or 4 months; total neurological deficit below the level of compression for more than 24 to 48 hours; multiple spinal involvement; and patients who cannot undergo surgery due to advanced age, poor clinical symptoms, tumor position, or refusal of surgery.¹⁷ Nonpharmacological treatment such as TLSO braces, physiotherapy, decubitus bed. Multidisciplinary treatment is recommended to maintain quality of life and minimize complications.¹⁵

The Karnofsky score assesses the ability of patients with chronic diseases such as cancer. In this patient, a score of 40 indicates that due to disabilities, she could only manage limited self-care and was restricted to a bed or chair for over 50% of her waking hours. Patients require special care and assistance, and their prognosis is generally poor, with a median survival of around 3 months in advanced cancer.^{18,19}

Managing MSCC requires timely, coordinated multidisciplinary team (MDT) involvement. In this patient, collaboration among medical oncology, neurology, radiation oncology, neurosurgery or orthopedic spine specialists, and physical medicine and rehabilitation is important, with radiology and pathology support as appropriate. Neurology contributes by identifying the neurological level and monitoring progression of spinal cord dysfunction through neurological examinations. Medical oncology evaluates the overall oncological status and determines appropriate systemic treatment based on tumor characteristics and disease extent. Radiation oncology plays an important role in determining the indication, modality, and timing of radiotherapy for spinal metastatic



disease. Neurosurgical or orthopedic spine consultation is important when there is concern regarding neural compression that may require decompression and stabilization. Physical medicine and rehabilitation contributes to preserving mobility and functional independence, managing spasticity and pain, preventing complications related to immobility, and providing appropriate orthotic support such as a TLSO. In the present case, the progressive neurological deterioration, extensive vertebral involvement, paraplegia, and sphincter dysfunction underscore the importance of early MDT assessment.

CONCLUSION

This case might have had spinal metastases from breast cancer. Early detection of neurological symptoms and back pain in breast cancer is needed to detect possible metastases and to provide early management

of spinal cord compression emergencies. A multidisciplinary palliative management approach may enhance the patient's quality of life.

DECLARATIONS

Consent for Publication

The radiological images and supporting examinations presented in this manuscript were obtained during routine clinical care at the hospital where the author practice

Funding

This research was entirely self-funded by the author. The patient's clinical care was covered by the Indonesian National health Insurance.

Author Contributions

Fery Luvita Sari is the first author and corresponding authors. Fery contributed to the conception, data curation, investigating, writing original and final draft, review and editing. Agus

Taufiqurrohman contributed to the literature review, reference management and verification the reference. All authors reviewed and approved the final manuscript.

Conflict of Interest

Authors declare no conflicts of interest, whether financial or non-financial.

Declaration on the Use of Artificial Intelligence (AI)

The authors declare that AI assistance was utilized during the preparation of this manuscript for language editing. The authors used ChatGPT and Gemini AI to assist with grammar correction. The authors reviewed the edited text and take full responsibility for the manuscript's content.

Acknowledgments

The authors thank the hospital where the case was managed for its support and the patient for allowing publication of this case.

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