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Abstract

BACKGROUND
Metastatic spinal cord compression (MSCC) is a well-recognized complication of underlying malignancies, however, MSCC is rarely described in acute leukemia.

CASE
We report a 24-year-old female presenting with low backache, right lower limb radicular pain, right foot drop, and loss of bladder sensation, suggestive of a cauda-costa syndrome. Magnetic resonance image revealed an enhancing pre-/paravertebral lesion extending from L5-S3 level with destruction of vertebral bodies and intraspinal infiltration. Peripheral blood smear revealed atypical cells, which was confirmed on bone marrow analysis as vacuolated myeloblasts. Accordingly, she was diagnosed with acute myeloid leukemia (AML) type M4 with spinal myeloid sarcoma leading to cord compression. She was started on a cytarabine-adriamycin-based chemotherapy regimen. Following 2 cycles, her symptoms improved, however, she succumbed to febrile neutropenia following 4 cycles of treatment.

CONCLUSION
MSCC, although rare, can be a presenting complaint of AML resulting from cord compression by spinal myeloid sarcoma.

Keywords: Acute Leukemia; AML; Metastatic spinal cord compression; Myeloid sarcoma

INTRODUCTION
Metastatic spinal cord compression (MSCC) is a common complication of solid malignancies and with the exception of multiple myeloma, is rarely encountered in hematological neoplasias. Herein, we report a 24-year-old female with undiagnosed acute myeloid leukemia who presented with cauda-costa syndrome secondary to a spinal myeloid sarcoma.
CASE REPORT
A 24-year-old female developed presented with sudden onset low backache for the past 5 days. It was severe in intensity and was aggravated on changing posture, bending forward, and coughing/sneezing, thereby affecting her daily activities. She also complained of an electric shock-like sensation occasionally radiating down the right lower limb. She had also noticed that she was unable to appreciate hot or cold sensations on the lateral aspect of her right feet while bathing. Besides, she was finding it difficult to clear her right foot from the ground while walking. She also complained of bladder and bowel incontinence for the past 3 days. Other than a history of menorrhagia for the last 2 months, her past history was not significant. Physical examination revealed tachycardia, pallor, and sternal tenderness. There were no visible spinal deformities. She had right foot drop and loss of touch/temperature sensations over the lateral aspect of the right leg and foot. Right ankle and plantar reflexes could not be elicited. She had saddle anesthesia and loss of anal reflex.

Magnetic resonance (MR) imaging of the lumbosacral spine revealed an enhancing pre- and paravertebral lesion extending from L5-S3 level with the destruction of vertebral bodies and intraspinal infiltration (figure a, b). Other than hyperuricemia (uric acid 8.4 mg/dl), the biochemical panel was unremarkable. However, a complete blood count revealed anemia (hemoglobin 6.2 gm/dl), leukocytosis (25,000/μl), and thrombocytopenia (52,000/μl). Peripheral blood smear showed atypical cells suggestive of blasts. Subsequently, bone marrow analysis revealed abnormal promyelocytes and vacuolated blast cells (figure c), confirmed on immunocytochemistry as myeloblasts. She was diagnosed as having acute myeloid leukemia (AML) type 4. In the clinical setting of AML and radiological features of paravertebral mass infiltrating the spinal cord, a diagnosis of myeloid sarcoma-related cauda-cola syndrome was made. Biopsy from the paravertebral mass was not performed. Biopsy from the paravertebral lesion was not performed, as the patient was not willing for the same.

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She was started on a cytarabine-adriamycin-based chemotherapy regimen along with parenteral dexamethasone for relieving cord compression. Other supportive measures included packed red cell transfusion, allopurinol (to prevent tumor lysis syndrome), antiviral, anti-fungal, and *P. carini* chemoprophylaxis. In addition, she was offered external beam radiotherapy over the lower lumbar and sacral spine (30 Gy over 10 fractions). Corticosteroids were continued for 2 weeks and then stopped. Following 2 cycles of chemotherapy, her backache, foot drop and bladder/bowel incontinence improved. However, following 4th cycle, she developed febrile neutropenia with multidrug-resistant *E. coli* and succumbed to her illness.

**DISCUSSION**

Metastatic spinal cord compression (MSCC) is a well-recognized complication of cancer and usually tends to present as an oncological emergency. MSCC usually results from collapse or compression of a vertebral body destroyed by metastatic disease but can also be caused by direct tumor extension into the spinal cord. An estimated 15% of all patients with advanced cancer develop MSCC. It is more commonly encountered in patients with solid malignancies like breast, prostate, and lung cancers (1). Amongst hematological malignancies, multiple myeloma is most commonly associated with MSCC and seldom seen in patients with leukemia (2).

Although occasional reports of spinal cord compression by myeloid sarcoma have been described in the literature (3–6), the entity is extremely rare. Also known as granulocytic sarcoma, it is a tumor formed by myeloid precursors at an extra-medullary site. The prevalence of myeloid sarcoma in the spine is estimated to be <1% among all patients with acute and chronic myeloid leukemia (7). In a study that involved 32 patients with AML and spinal myeloid sarcoma, nine patients had the spinal lesion as the initial manifestation of leukemia as in the index case. The lumbosacral and thoracic regions of the spine were most commonly involved. Twenty-seven patients had multiple or contiguous multilevel spinal involvements. Spinal granulocytic sarcomas were classified as epidural in the central spinal canal, epidural along the nerve course, thickening of the nerve root itself or pre-vertebral (7). The index case had pre-vertebral involvement with intra-spinal extension, probably along with...
the nerve roots. In addition, there was evidence of destruction of the vertebral body by the myeloid sarcoma.

The diagnosis of myeloid sarcoma is often challenging, especially in a patient presenting for the first time. The differential diagnosis of spinal myeloid sarcoma includes lymphoma, metastasis, extramedullary hematopoiesis, and neurogenic tumor with extramedullary imaging features. The imaging finding of a multiple or contiguous multilevel extramedullary mass of the spine with diffuse abnormal bone marrow signal intensity helps in the initial diagnosis of spinal myeloid sarcoma in association with leukemia. When a solitary dumbbell-shaped mass in the intervertebral foramen with diffuse bone marrow infiltration is visualized on MR images, the presence of spinal myeloid sarcoma can be considered. Unless evidence of diffuse bone marrow infiltration is seen on an MR image, the signal intensity of myeloid sarcoma can be used to differentiate a myeloid sarcoma from a neurogenic tumor. In this circumstance of mimicking a neurogenic tumor, the intermediate signal intensity (less high signal intensity) of myeloid sarcoma on T2-weighted images is a helpful finding. Intermediate signal intensity on T2-weighted images and isointensity on T1-weighted images is seen in myeloid sarcomas (7). Post-gadolinium contrast, they show homogenous enhancement.

Tissue diagnosis with immunocytochemistry is confirmatory. The diagnosis is, however, straightforward in those already diagnosed with AML. Systemic therapy directed against the underlying AML is the treatment of choice; as many as 28% and 38% of the patients respond to initial chemotherapy by a complete and partial reduction in tumor volume, respectively (7). Although lumbosacral spine imaging was not repeated in the index case, one can assume that they had been at least a partial reduction in the tumor volume, leading to improved symptoms. Adjuvant corticosteroid therapy during the acute stages can help reduce cord edema.

CONCLUSIONS

Spinal myeloid sarcoma can be a rare cause of metastatic spinal cord compression. It should always be kept as a first differential diagnosis in AML patients presenting with symptoms of cord compression.
REFERENCES

FIGURE LEGENDS
**Figure a.** Magnetic resonance image of the lumbosacral spine (T1-weighted, sagittal section) showing a pre-vertebral soft tissue mass in the L5-S1 region (marked in yellow arrow) extending into the lower spinal cord (marked in red arrow).

**Figure b.** Magnetic resonance image of the lumbosacral spine (T1-weighted, axial section) showing destruction of the vertebral body (L5).
Figure c. Photomicrograph of bone marrow aspirate showing well-defined vacuolated myeloblasts (100x, Wright-Giemsa Stain).