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Extensive Medullo-Cervicothoracic Lesion in Acute Lymphoblastic Leukemia

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Dear Editor,

The etiology of longitudinal spinal cord lesions includes inflammation, vascular causes, and malignancy. Acute leukemia in the spinal cord has been reported previously, but it usually only presents with constitutional symptoms and peripheral evidence of the disease. We report a case of leukemia presenting initially as spinal cord disease with imaging revealing a longitudinally extensive medullo-cervicothoracic lesion.

A 73-year-old female presented with subacute progressive weakness in her arms and legs, numbness in her hands, and sphincteric disturbance over several weeks, which occurred during a lockdown period due to the coronavirus crisis in early 2020. She reported no bulbar symptoms or pain. She was systemically well with no history of fevers, weight loss, night sweats, recurrent infections, or bruising. Her breathing was unaffected. Her past medical history consisted of type 2 diabetes mellitus, hypothyroidism, squamous cell carcinoma, and lumbar spinal fusion.

Salient findings in a neurological examination were asymmetric quadriparesis (left>right), spasticity, and hyperreflexia. There were no abnormal cranial nerve signs. A systemic examination produced unremarkable findings.

Magnetic resonance imaging (MRI) of the neuraxis revealed a longitudinally extensive lesion that began at the level of the lower medulla and terminated at T3 (Fig. 1). The lesion exhibited heterogeneous enhancement after administering a contrast agent. The spinal cord appeared swollen, particularly in the cervical region. The differential diagnosis included an inflammatory etiology, malignancy, and a high-level (intracranial/cervicomedullary) arteriovenous fistula, which was less likely but still thought worthy of consideration. The findings of head MRI with contrast agent were normal.

Screening blood tests demonstrated only a slightly elevated white blood cell count (13.4×10^9/L), with no anemia and normal inflammatory markers. Screening revealed negativity for autoantibodies (including anti-aquaporin-4 and anti-myelin oligodendrocyte glycoprotein antibodies). A cerebrospinal fluid (CSF) examination identified a white blood cell count of 3/mL, elevated protein at 0.94 g/L, normal glucose, and matched oligoclonal bands with isoelectric focussing. The CSF and serum IgG index was 1.53. The presence of lymphoblasts in the CSF was suggestive of acute leukemia, most probably of B-lymphoid lineage, supported by demonstration of $CD45^-CD34^+CD19^+CD10^-$ blasts in CSF flow cytometry. Fluorodeoxyglucose positron-emission tomography did not demonstrate abnormal uptake in the bone marrow (BM). BM aspirate showed normal lymphocyte numbers and morphology, and the absence of lymphoblasts. Flow cytometry revealed a small population of phenotypically abnormal B cells, with $CD45^+CD34^+CD38^{lo}CD19^+CD10^+sIg^+$ (lambda restricted) that accounted for 0.21% BM cellularity. The abnormal cells in CSF were $CD45^-$, indicative of a precursor status. This was distinguished from primary CNS lymphoma by the presence of lymphoblast cells, and by the absence of clonal immunoglobulin heavy-chain and kappa

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light-chain gene rearrangements, MYD88 L265P mutation, and light-chain restriction. Furthermore, target fluorescence in-situ hybridization showed a normal signal pattern, and a BM trephine biopsy revealed that <1% cells were positive for terminal deoxynucleotidyl transferase. The patient was treated acutely with intrathecal methotrexate.

Spinal cord infiltration can occur in acute leukemia, but extramedullary compression is more common.[1,2] Intramedullary spinal cord involvement as the presenting feature is atypical, especially in the absence of systemic features and

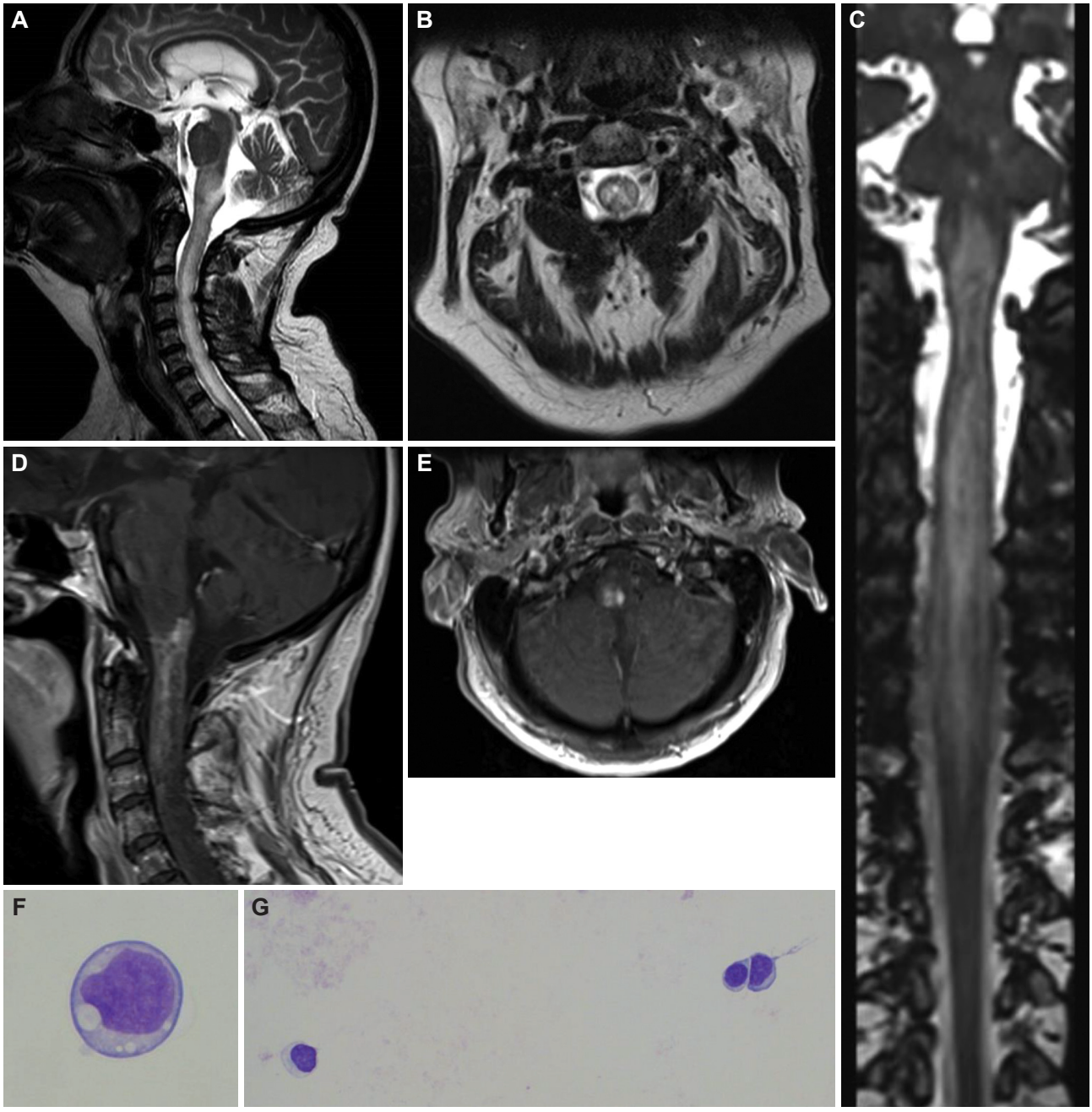

Fig. 1. MRI of the head and cervical cord in acute lymphoblastic anemia. A: Sagittal T2-weighted MRI of the brainstem and cervical cord demonstrating a longitudinally extensive lesion, predominantly with a posteromedial distribution. B: Axial T2-weighted MRI of the cervical spine demonstrating the same lesion. C: Coronal T2-weighted MRI of the brainstem and cervical and thoracic spine demonstrating the same lesion. Swelling and expansion of the brainstem and spinal cord are evident. D: Sagittal T1-weighted MRI with gadolinium contrast agent, where the lesion exhibited patchy enhancement following the administration of gadolinium from distal to the inferior cerebellar peduncle of the medulla to the superior C4 level, which was most marked on the right side of medulla initially and then predominantly involved the left spinal cord. E: Axial T1-weighted MRI of the cervical spine with gadolinium contrast agent demonstrating patchy enhancement. F: CSF cytology with mononuclear cells. G: As F, showing an immature cell. CSF, cerebrospinal fluid; MRI, magnetic resonance imaging.

an unremarkable full blood count.[3] Leukemia accounted for only 1 case (0.2%) in 51 patients with longitudinally extensive spinal cord lesions.[4] Moreover, such striking longitudinally extensive infiltrative changes of the neuraxis extending from the lower brainstem to the upper thoracic cord is unusual in the absence of abnormal CSF findings. This led to diagnostic uncertainty and provoked debate amongst our neuroradiology colleagues in the present case, before a second CSF study demonstrated the presence of lymphoblasts, thus securing the diagnosis.

The present case illustrates the importance of keeping an open mind about unusual spinal cord lesions and always considering the possibility of malignancy in the appropriate clinical context. This case also underscores the value of multidisciplinary input, which helped in stratifying the list of differential diagnoses and informed our investigative approach.

Ethics Statement

The patient provided written informed consent for her information and medical images to be published as a case report in a medical journal.

Availability of Data and Material

Data sharing not applicable to this article as no datasets were generated or analyzed during the study.

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Conflicts of Interest

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