Back pain: An unusual manifestation of acute lymphoblastic leukemia – A case report and review of literature

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Abstract

Acute lymphoblastic leukemia (ALL) presented with bone pain and leukopenia is a well-recognized complex. Bone and joint pain are seen as presenting symptoms in 25% of patients with acute leukemia, but generalized osteopenia and vertebral complications are less common. Back pain due to vertebral changes as an early feature has been infrequently reported. We report a case of a 9-year-old female child who presented with back pain for 3 weeks. Blood counts and peripheral smear were normal. X-ray of the spine showed wedge-shaped deformity in L3–L5 vertebrae. Magnetic resonance imaging of the spine confirmed the lytic lesions of L3–L5 vertebrae. Infective etiological evaluation was normal. Bone marrow aspiration revealed pre-B-cell lymphoblastic leukemia. She was started on ALL protocol and pain subsided within a week, and remodeling of the bony lesions could be seen 2 months later. This case highlights that spinal involvement may be a presenting feature despite normal peripheral blood counts.

Keywords: Acute lymphoblastic leukemia, back pain, children

Introduction

Although back pain is fairly common in healthy children, when it is of disproportionate intensity and causes limitation of activities, it has to be thoroughly evaluated to identify the underlying pathology and not dismissed as a psychosocial or somatic cause. The younger the patient, the higher is the probability of establishing rare morphologic causes, such as benign or malignant tumors, congenital malformations, and infections. In children younger than 5 years old, the likelihood is more than 50%.

leukemia (ALL), the presence of the complaints with a normal peripheral blood counts, with no organ involvement or lymphadenopathy normally, diverts the attention from ruling out a bone marrow pathology. Intense and progressive pain restraining daily normal activities and causing difficulty in ambulation should be a red flag sign to lower the threshold for a quick in-depth analysis of the problem and include malignancy as the etiology after evaluating for the more common causes. We report this case with the intention of promoting greater awareness that ALL can cause significant back pain in children without other systemic symptoms.

Case Report

A 9-year-old female child presented to the orthopedic outpatient clinic with complaints of lower back pain for 3 weeks. The pain

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had been severe to restrict her daily activities and was progressive, 
excruciating, disturbing her sleep, and she was nonambulant for 
the last 10 days. She was being managed by local applicants and 
algesics with no relief. There was no history of any trauma 
preceding the symptoms.

On examination, she was lying down in the supine position 
and not able to sit or walk. She was afebrile; no signs of pallor, 
petechiae, ecchymosis, lymphadenopathy, or organomegaly 
were found. Examination of the musculoskeletal system 
revealed tenderness over lumbosacral region and restriction of 
movements of the lower spine. No obvious deformities of the 
spine could be seen.

Power and reflexes of the both lower limbs were normal. There 
was no bowel or bladder dysfunction. Investigations revealed 
hemoglobin of 10.4 g/dl, total count of 3890 cells/cumm, with 
a differential count of polymorphs 42.4%, lymphocytes 56.6%, 
platelets 1.50 lakhs/cumm, lactate dehydrogenase (LDH) 183 mg/
dl, uric acid 5.4 mg/dl. Peripheral smear showed no abnormal cells. 
X ray spine showed reduced height of L5 vertebrae [Figure 1]. 
Magnetic resonance imaging of the spine revealed anterior wedge 
configuration of dorsal vertebral bodies in L3–L5 [Figure 2]. She 
was evaluated for tuberculosis (TB) spine and found to be negative. 
With the pain worsening and not being relieved by any degree 
of analgesics and antibiotics, bone marrow aspiration was done 
which revealed pre-B-cell lymphoblastic leukemia. Karyotyping 
and cytogenetics were normal. She was started on children 
oncology ALL protocol. The back pain subsided in 1 week and 
she was ambulant after 2 weeks of chemotherapy. Radiological 
evaluation of the spine after 2 months of chemotherapy showed 
remodeling of the lesion. She is currently on maintenance phase 
of chemotherapy, 18 months from diagnosis and in remission.

Discussion

Acute leukemia, the most common malignancy in children 
usually presents with fever, pallor, petechiae, ecchymosis, 
hepatosplenomegaly, lymphadenopathy, and bone pains. Bone 
and joint pain are seen as presenting symptoms in 25% of 
patients with acute leukemia.[3] The less commonly reported 
manifestations are arthritis, bony lesions, generalized osteopenia, 
and vertebral complications.[4] When these symptoms precede 
over leukemia, the diagnostic delays complicate the management. 
When children or adolescents seek medical care for back pain, it 
is highly likely that there is an underlying pathology.

Vertebral body collapse and back pain are an unusual 
presentation for childhood leukemia that can cause significant 
back pain in children without other systemic symptoms. The presence of anemia, low or high white cell counts with 
lymphocytosis, and thrombocytopenia gives a clear picture 
of bone marrow involvement and the diagnosis is simpler; 
however, the absence of classic features with unusual features 
as initial manifestations has always led to delay in diagnosis 
as illustrated in literature.[3] In children, acute leukemia at 
presentation can mimic several orthopedic pathologies so that a 
variable delay of the correct diagnosis is often reported.[8] When 
the predominant symptoms are osteoarticular complaints, 
they lead the diagnosis toward nonmalignant conditions that 
are most common cause of such symptoms in children, such 
as injuries, nonspecific reactive arthritis, or inflammatory 
connective tissue diseases.[2]

The common acquired pathological causes of vertebral collapse 
in children are Langerhans cell histiocytosis, chronic recurrent 
multifocal osteomyelitis, TB, pyogenic osteomyelitis, osteogenesis 
imperfecta, neoplastic lesions either primary, metastatic, or of 
hematological origin.[7]

Vertebral collapse presenting as initial manifestation of 
acute leukemia has been suggested as a biologically unique 
subset of ALL. Characteristic findings of this rare primary 
manifestation of leukemia are lack of significant organomegaly 
or lymphadenopathy, normal or low white blood cell count
with predominance of lymphocytes and rarely circulating lymphoblasts, normal platelet count, uric acid, and LDH values.[8]

The musculoskeletal manifestations of leukemia include symmetric or migratory polyarthritis or arthralgias, bone pain and tenderness, and back pain mimicking a radiculopathy.[9] Compressed vertebral bone fracture has been reported variously up to 31.25% in different articles, and antileukemic treatment usually results in rapid symptomatic relief as well as radiographic evidence of bony remodeling. In addition, bone involvement has no worse prognosis in comparison to cases without bone involvement.[10]

Although vertebral fractures and lytic lesions of the spine at multiple levels had been the initial presenting features of ALL, despite the extensive vertebral body collapse, neurological compromise has been hardly reported in ALL unlike in other solid tumors involving the spine.[11]

**Conclusion**

As bony lesions may precede clinical findings, knowledge of radiographic and orthopedic appearances of leukemia is important in order to initiate earlier treatment to avoid the progressive damage and improve their survival rates.

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**Conflicts of interest**

There are no conflicts of interest.

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