SEVERE HYPERCALCEMIA - A RARE AND UNUSUAL PRESENTATION OF ACUTE LYMPHOBLASTIC LEUKEMIA

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CASE SUMMARY

- 4 yrs female child
- Intermittent fever for 2 months
- Excruciating pain both lower limbs and refusal to stand for 15 days
- Weight loss x 10 days
PAST HISTORY

- Evaluated and treated with multiple antibiotics, analgesics and a short course of dexamethasone elsewhere. Blood investigations and USG done outside.
FIRST LOOK

- Febrile
- Pale
- Distressed in pain, Not allowing to even touch the limbs.
- Vitals stable
- Liver just palpable
- No significant lymphadenopathy or splenomegaly
- No obvious joint swelling.
IMPRESSION

- HEMATOLOGICAL MALIGNANCY
- INFECTION
## Initial Investigations

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>Test</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hb</td>
<td>6.8</td>
<td>Sodium</td>
<td>140</td>
</tr>
<tr>
<td>TC</td>
<td>6900</td>
<td>Potassium</td>
<td>3.5</td>
</tr>
<tr>
<td>DC</td>
<td>P45 L38.6 M 6.4 E9.6 B0.2</td>
<td>Chloride</td>
<td>101</td>
</tr>
<tr>
<td>Platelets</td>
<td>2.7</td>
<td>Bicarbonate</td>
<td>29</td>
</tr>
<tr>
<td>Urea/Creat</td>
<td>12/0.7</td>
<td>Calcium</td>
<td>13.3</td>
</tr>
<tr>
<td>Total/Direct bilirubin</td>
<td>0.35/0.12</td>
<td>Repeat calcium</td>
<td>14.6</td>
</tr>
<tr>
<td>SG PT/SG OT</td>
<td>21/13</td>
<td>Phosphorous</td>
<td>5.7</td>
</tr>
<tr>
<td>Albumin</td>
<td>4</td>
<td>LDH</td>
<td>195</td>
</tr>
<tr>
<td>ALP</td>
<td>248</td>
<td>Uric acid</td>
<td>6.4</td>
</tr>
</tbody>
</table>
PERIPHERAL SMEAR

- No abnormal cells
OSTEOLYSIS
## Endocrine Evaluation

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parathormone</td>
<td>4.7 (1-6)</td>
</tr>
<tr>
<td>25 OH Vitamin D</td>
<td>normal</td>
</tr>
<tr>
<td>Urine Ca/creat ratio</td>
<td>0.86</td>
</tr>
<tr>
<td>Thyroid profile</td>
<td>normal</td>
</tr>
</tbody>
</table>
CT THORAX

whole abdomen - with contrast. ct / paed C/O PVE
CT ABDOMEN
Hypercalcemia with extraosseous MDP uptake in a bone scan as initial presentation in case of cutaneous T-cell lymphoma. Shanmuga Sundaram Palaniswamy, S Padma, Vijay Harish, Jay Kumar Rai.
BO NE MARROW ASPIRATE

- Reactive marrow
- no abnormal cells
BONE MARROW FLOWCYTOMETRY

- 18% Lymphoblasts
- B cell Acute Lymphoblastic leukemia
BONE BIOPSY

- Leukemic Infiltrate
IMMUNOHISTOCHEMISTRY

- CD 45, CD10 CD 19 positive,
FINAL DIAGNOSIS

- B CELL LYMPHOBLASTIC LEUKEMIA
- SEVERE HYPERCALCEMIA
MANAGEMENT

HYPERCALCEMIA

- HYDRATION
- FRUSEMIDE
- PAMIDROATE
- CALCITONIN

ANEMIA

- PACKED RED BLOOD CELLS

LEUKEMIA

- ANTITUMORLYSIS
- CHEMOTHERAPY

OSTEOLYSIS

- ORAL CALCIUM
- NON WEIGHT BEARING
TRENDS OF CALCIUM
CURRENTLY

- Ambulant
- Disease in remission
- On oral calcium maintenance. Serum calcium levels normal.
- On chemotherapy
HYPERCALCEMIA

REF: AAFP: 2015
APPROACH TO HYPERCALCEMIA
HYPERCALCEMIA IN MALIGNANCY

- Rare paraneoplastic syndrome of pediatric malignancy
- First association between hypercalcemia and malignancy was demonstrated by Myers IN 1956
- In a large retrospective study of more than 6,000 paediatric cancer patients from St. Jude’s children’s cancer hospital over a 29-year period, only 0.4% had hypercalcaemia during the course of malignancy.
- In a subgroup of patients with acute leukemia/lymphoma (2186) the incidence is 0.3%


McKay C and Furman WL (1993) Hypercalcemia complicating childhood malignancies Cancer 72
PEDIATRIC MALIGNANCIES ASSOCIATED WITH HYPERCALCEMIA

- Rhabdomyosarcoma
- Hepatoblastoma
- Brain tumours,
- Lymphoma
- Neuroblastoma
- Angiosarcoma
- less commonly in ALL and AML.

Severe Hypercalcemia: rare initial presentation of Acute Lymphoblastic Leukemia.

International journal of hematology-oncology and stem cell research. Jan 2014
DISTINCT PROFILE of ALL with ↑Ca

- Older children
- Low or normal counts
- Absent blast in peripheral smear
- Associated with t(17,19)
- More common in pre B cell type
- Poor prognosis


MECHANISM

- PTHrP mediated hypercalcemia
- Osteolytic metastases mediated hypercalcemia
- Hypercalcemia secondary to overproduction of 1,25 vitamin D
- PTH mediated hypercalcemia (parathyroid carcinoma and ectopic production)
Hypercalcaemia with disseminated osteolytic lesions: a rare presentation of childhood acute lymphoblastic leukaemia

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Abstract

Acute lymphoblastic leukaemia (ALL) presenting with hypercalcaemia and lytic bone lesions is a rare event in children unlike adults. We report a 15-year-old boy with acute lymphoblastic leukaemia and hypercalcaemia. He had normal peripheral blood count and the peripheral smear did not show blast. The bone marrow examination revealed Pre B ALL phenotype with aberrant expression of CD13. The skeletal survey showed osteolytic lesions. Hypercalcaemia was treated with zoledronic acid. He attained remission only after three lines of intensive chemotherapy protocols. He was planned for stem cell transplant. Meanwhile, he relapsed and died. A review of the literature also highlights characteristics similar to our case.

Keywords: acute lymphoblastic leukaemia, hypercalcaemia, osteolytic bone lesions
Severe Hypercalcemia: A Rare and Unusual Presentation of Childhood Acute Lymphoblastic Leukemia

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ABSTRACT
Hypercalcemia in children is a medical emergency and often manifests as nonspecific symptoms such as nausea, vomiting, weight loss, and anorexia. Severe hypercalcemia is a rare complication of malignancy in children, while it can be seen in various types of malignant tumors. It is usually associated with significant morbidity and may be severe enough to threaten life. Incidence of hypercalcemia in hematopoietic malignancies including acute lymphoblastic leukemia (ALL) is very rare and unusual, especially as the initial manifestation of the disease. In this paper a 5-year-old boy who had severe hypercalcemia and gastrointestinal symptoms before the onset of common and usual manifestations of ALL is introduced.

KEY WORDS: Acute lymphoblastic leukemia, Hypercalcemia, Children
CASE REPORT

Case Report: Pulmonary Alveolar Calcification as a Result of Severe Hypercalcemia due to Acute Lymphoblastic Leukemia. [v1; ref status: indexed, http://f1000r.es/5aj]

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Abstract
Severe hypercalcemia is a rare metabolic disorder in pediatric medicine. This report describes a rare case of severe hypercalcemia and its clinical manifestations in a 2-year-old toddler. The radiological findings caused by hypercalcemia and osteolysis were emblematic of the osteolytic lesions. Hypercalcemia led to massive pulmonary alveolar calcification. The hypercalcemia was successfully treated with pamidronate, a bisphosphonate drug class. Further investigation resulted in a diagnosis of acute lymphoblastic leukemia (ALL). The patient is currently on chemotherapy and has a favorable prognosis. Although severe hypercalcemia alone is an unusual finding as the first sign for ALL, this should be considered, not to mention the radiological images resulted from calcium deposits.
TAKE HOME MESSAGE

- Pain/Osteolytic lesions with hypercalcemia - initial presentation of malignancy

- Even if the counts and smear study are normal, bone marrow aspirate is mandatory to rule out malignancy
Thank you!