associated diarrhea [6]. The safety profile of probiotic preparations are generally considered satisfactory but caution must be exercised when prescribing them to patients with suspected compromise of the immune status. If underlying immunodeficiency is missed or overlooked, this seemingly harmless medication may have devastating consequences.

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Life-threatening Hypercalcemia as the First Manifestation of Acute Lymphoblastic Leukemia

Hypercalcemia of malignancy, usually reported in adults in advanced stages, is rare in children. A 4-year-old boy presented with intermittent episodes of severe hypercalcemia, which improved with intravenous hydration therapy, furosemide and bisphosphonates as the initial manifestation of occult acute lymphoblastic leukemia. Pediatricians should rule out hematological malignancy in patients with severe hypercalcemia.

Keywords: *Constipation, Diabetes insipidus*.

Severe hypercalcemia (>14 mg/dL) is rare in children but can result in coma, arrhythmias and death. In adults, the most common cause of severe hypercalcemia is malignancy (advanced stages), which portends a poor prognosis. Hypercalcemia of malignancy has been rarely reported in children [1]. We present a boy with life-threatening hypercalcemia who was diagnosed with occult acute lymphoblastic leukemia (ALL).

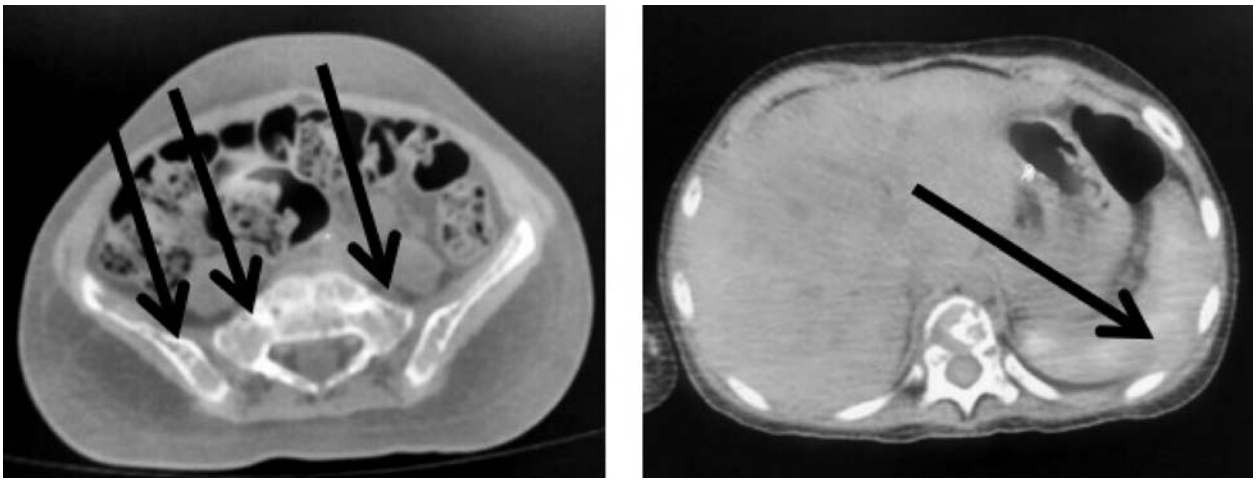
A 4-year-old boy presented with recurrent vomiting, polyuria, polydipsia, extreme irritability, irrelevant talk, constipation and right leg immobility with the history of low back pain for two months. The child was in severe dehydration with altered sensorium, high blood pressure (>99th centile) without any neurological deficit, hepatosplenomegaly or lymphadenopathy. On laboratory investigations, serum calcium was 19.2 mg/dL (ionized 8.2 mg/dL), phosphate 3.7 mg/dL, albumin 3.7 g/dL, alkaline phosphatase 389 IU/L, high urinary calcium: creatinine ratio, 25(OH)D 40 nmol/L (normal 50-250), increased 1,25$(OH)_2$D 271 pmol/L (normal 52-117); and normal venous blood gas, renal function and serum magnesium. He was managed with hydration with double maintenance fluid and intravenous furosemide. Pamidronate (1 mg/kg) was administered over 4 hours by intravenous infusion. The serum calcium improved to 9.2 mg/dL and subsequently fell to 6.8 mg/dL over the next 3 days requiring oral calcium supplementation. A diagnosis of primary hyperparathyroidism was considered based on serum PTH level of 106 pg/ml (15-68.3) and doubtful PTH gland adenoma on ultrasound of neck. Sestamibi scan, 4D CT neck and 4D MRI neck did not identify any parathyroid gland abnormality. A repeat serum PTH was reported low at 1.3 pg/mL with normal calcitonin (<2 pg/mL, normal 0-18.2). Work up for PTH-independent causes of hypercalcemia including granulomatous disease (tuberculosis and angiotensin-converting enzyme levels for sarcoidosis) was normal.

Radiographs showed extensive generalized bony lytic lesions of skull (salt and pepper appearance), phalanges

and spine with vertebral collapse. Bone-scan showed metastatic calcification of stomach and bilateral lung secondary to hypercalcemia. In the background of extensive bony lytic lesions and suppressed PTH, malignancy-induced hypercalcemia was considered. Complete blood count, peripheral smear, lactate dehydrogenase (LDH), uric acid and alpha-fetoprotein (AFP) were normal. Bone marrow aspiration and biopsy were normal. Parathyroid related peptide (PTHrP) was also normal <0.8 pmol/L (<1.3). CECT abdomen, chest and neck revealed diffuse geographic lytic lesions with diffuse osteopenia (brown tumor) but no solid tumor was identified. Fluorodeoxyglucose (FDG) PET scan showed extensive lytic changes involving the entire visualized skeleton with diffusely increased FDG uptake in the spleen suggestive of a lymphoproliferative disorder (***Fig.* 1a, 1b**). A repeat bone marrow aspiration and biopsy revealed inconclusive small round cell tumor. Subsequently, a CT-guided bone marrow biopsy was done from iliac crest lesions, which showed 54% malignant cells consistent with round cell tumor. Immuno-histochemistry was positive for PAX5 (B cell marker), T'dt (precursor of lymphocytes), MIC-2, and CD20 (focal) markers and negative for CD3 (T cell marker), CD 56, Chromogranin (neuroendocrine marker), which confirmed the diagnosis of B-cell ALL. He was started on standard-risk induction chemotherapy for ALL (vincristine, L-asparaginase, prednisolone and intra-thecal methotrexate) with which remission was achieved.

In summary, our case presented with severe hypercalcemia, high PTH and parathyroid adenoma on USG neck, pointing towards a diagnosis of primary hyperparathyroidism (PHPT). Occurrence of bony pains and the characteristic salt and pepper appearance of skull in our patient were also consistent with PHPT. However, multiple extensive bony lytic lesions are very rare in PHPT [2]. Serum PTH was found to be suppressed on repeat testing pointing to the possibility of malignancy in the absence of other clinical, haematological or biochemical evidence. Our case report highlights the importance of repeating hormone assays (PTH) when the clinical picture is inconsistent and the limitations of a single rephine biopsy in detecting occult lymphoblastic malignancies.

Hypercalcemia of malignancy is very rare in children and usually seen in ALL, rhabdomyosarcoma and less often in lymphoma, hepatoblastoma, and neuroblastoma [3]. Hypercalcemia in solid tumor presents late in the disease course and is more resistant to treatment, unlike ALL where it may present early without other clinical manifestations [4]. There are several mechanisms of malignancy-induced hypercalcemia, such as PTHrP by malignant solid tumours and osteolytic metastasis with local release of cytokines including osteoclast activating factor or unregulated extrarenal production of $1,25(OH)_2D$ (in lymphoma and granulomatous diseases) [5]. In one study of 22 ALL patients with hypercalcemia, half had elevated PTHrP thought to be released from blast cells [6]. In our case, the PTHrP was normal and hypercalcemia probably resulted from the extensive osteolytic lesions due to local pro-duction of cytokines and possibly high $1,25(OH)_2D$ levels.



(a) *(b)*

FIG. 1 *Fluorodeoxyglucose (FDG) PET scan showing extensive lytic changes in skeleton (a) with diffusely increased FDG uptake in spleen (b).*

We conclude that severe hypercalcemia, extensive generalized bony lytic lesions and suppressed PTH levels may point to an underlying malignancy even in the absence of occult features which should be ruled out by appropriate investigations.

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Cytosorb for Management of Acute Kidney Injury due to Rhabdomyolysis in a Child

A 6-year-old girl presented with rhabdomyolysis following a febrile illness. Polymerase chain reaction (PCR) for Influenza B and enterovirus was positive. Her serum creatine kinase (CK) and myoglobin levels were very high. She developed myoglobinuria with oliguria leading to acute kidney injury. Continuous renal replacement therapy along with Cytosorb filter resulted in good outcome.

Keywords: *Cytokine adsorber, Myoglobinuria Treatment*.

Rhabdomyolysis is a potentially life-threatening condition that can result into complications such as hypovolemia, hyperkalemia, metabolic acidosis, acute kidney injury (AKI) and disseminated intravascular coagulation (DIC) [1]. Viral myositis is the most frequent cause of rhabdomyolysis in children [2]. Management of rhabdomyolysis includes aggressive fluid resuscitation and hydration in order to maintain adequate urine output and prevent AKI, and early correction of potentially lethal electrolyte disturbances [3]. For children with ongoing AKI in spite of conservative management, renal replacement therapy is warranted.

A 6-year-old, previously healthy girl presented to us with a febrile illness and profound pain in lower extremities. There was no history of trauma, excessive exercise or insect bite. Investigations showed elevated creatine kinase (CK) level (5169 U/L) and negative dengue serology (NS-1 antigen, IgM and IgG). Child was started on intravenous hydration and oral paracetamol. Her serum creatinine was 0.41 mg/dL. The next day, patient had asystolic cardiac arrest that reverted with cardiopulmonary resuscitation for two minutes. She was put on mechanical ventilation. Child also had coagulopathy that was treated with fresh frozen plasma and platelet transfusions. She was noted to have severe metabolic acidosis, elevated hepatic transaminases (SGOT 10,786 U/L, SGPT 3131 U/L) as well as reduced ejection fraction (35%) on Two-dimension echocardiography (2D-Echo) examination. Her serum creatinine was 0.58 mg/dL. Subsequent laboratory investigations revealed hyperkalemia (serum K^+ 5.9 mEq/L), hypoalbuminemia and further rise in CK level (23586 U/L). Urine microscopic examination revealed ocassional red blood cells and positive urine myoglobin. Sodium bicarbonate infusion was added for alkalization of her urine. Considering very high CK levels, positive fluid balance (3 liters) and dark colored urine, acute renal tubular injury was considered. The child was started on intermittent hemodialysis (HD) with high flux dialyzer (Fx 60). Due to hemodynamic instability, patient was shifted to continuous renal replacement therapy (CRRT) next day in Continuous Veno-Venous Hemofiltration (CVVH) mode. Cytosorb filter was added to remove myoglobin (molecular weight 17kDal) and CK (molecular weight 81kDal). After three days of Cytosorb and five days of continuous CRRT, patient was shifted to intermittent hemodialysis with F×60, as she was