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Case Report

AN INCIDENTIAL FINDING OF HYPERCALCEMIA IN A PATIENT WITH ACUTE MYLOID LEUKAEMIA.

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Abstract

Hypercalcemia complicating leukemia is a rare, but well-recognized finding. Few case reports have been documented in various journals. The etiology in most cases is not fully understood; however, there is an established fact that there is a link with cytokine release. We report a case of a 65year-old man who presented with hypercalcemia, during the course of his illness. Possible causes of hypercalcemia such as hyperparathyroidism, vitamin D intoxication, solid tumors, and ectopic parathyroid hormone production were excluded. From the case report, it is concluded that leukemia may be complicated by hypercalcemia and physicians should bear this in mind as they manage patients with leukemia.

Keywords: hypercalcemia, leukemia, hyperparathyroidism, vitamin D

Introduction

Hypercalcemia is an elevated calcium[Ca] level in the blood. It can be an asymptomatic laboratory finding. Symptoms occur when calcium levels in the blood reach 3mmol/L. Hypercalcemia can be life-threatening and is the most common metabolic disorder associated with cancer. Studies have shown that hypercalcemia is a relatively common finding in patients with cancer, occurring in about 20 to 30% of cases[1]. It occurs in solid tumors and hematological malignancies such as multiple myeloma and lymphomas /leukemia. Though very rare, hypercalcemia is found in leukemia. Herein is presented a case of a patient who had incidental hypercalcemia while being managed for leukemia[1].

Case Report

We report a case of a 65year old retired soldier who was admitted and managed for acute myeloid leukemia. Initial presenting complaints were fatigue, nausea and vomiting, polyuria, gum bleeding and generalized body weakness. Basic investigations done were thyroid function test, liver function test, serum electrolyte, urea and creatinine, full blood count with differential, bone marrow aspirate with trephine biopsy. The electrolyte showed

elevated calcium value of 3.1mmol/L, albumin of 30g/L and a corrected calcium of 3.30mmol/L. Coagulation studies were deranged and potassium value was 2.9mmol/L. Liver function test showed elevated liver enzymes (Aspartate aminotransferase and Alanine aminotransferase). Uric acid was moderately elevated. The bone marrow showed accumulated malignant cells within the marrow with some blast cells. Immuno-phenotyping was also requested for. Serial calcium assay and subsequently corrected calcium calculated for various days that followed were in the ranges of 3.32, 3.35, 3.40 and 3.33mmol/L respectively. The patient was rehydrated and frusemide was commenced immediately while preparing the patient for bisphosphonate therapy.

Mechanism of Hypercalcemia in Acute Myeloid Leukaemia

From the above-reported case. It appears that hypercalcemia is a possible finding in leukemia patient and various pathophysiologies have been suggested[2]. Hypercalcemia, in this case, is due to the increased absorption of calcium from the gut with elevated 1,25-dihydroxy vitamin D3 which appears to be frequent in adult T-cell leukemia, multiple myeloma and other hematological malignancies such as non-Hodgkin's and Hodgkin's lymphoma. Hypercalcemia in multiple myeloma is associated with lymphotoxin production and osteoblastic bone destruction[3].

Currently, there are three major mechanisms of hypercalcemia of malignancy viz: osteolytic metastases with local release of cytokines (including osteoclasts activating factor), tumor secretion of the parathyroid hormone-related peptide (PTHrP), and tumor production of 1,25-dihydroxycholecalciferol (calcitriol). Patients with hypercalcemia related to malignancy have poor prognosis[4].

Clinical Features of Hypercalcemia in Acute Myeloid Leukemia

There are a number of clinical features associated with hypercalcemia and many of them are non-specific. Common clinical features can be generalized (e.g. nausea, vomiting, constipation, anorexia) or neurologic (e.g. fatigue, delirium, myopathy). In severe cases, patients can experience seizures, coma or cardiovascular collapse[5]. The rapidity of onset as more likely to correlate with severity of symptoms rather than the degree of hypercalcemia. Untreated, severe hypercalcemia can be fatal, but treatment can relieve many symptoms in addition to positively affecting the quality of life[4].

Diagnosis

To make a diagnosis of hypercalcemia of malignancy, serial plasma/serum calcium (free, and total) assay is done alongside with albumin. Other possible causes of hypercalcemia such as hyperthyroidism, thiazide therapy, hyperparathyroidism have to be excluded.

Discussion

Hypercalcemia is a rare finding in leukemia. In recent years, there has been an increasing interest in malignant disorders associated with hypercalcemia. There have been few reports of hypercalcemia being found in leukemia patients. As far back as 1966, Roberts Knisley reported a case of a 64-year-old Caucasian woman being managed for acute myeloid leukemia, who and also presented with hypercalcemia on laboratory assessment[6]. In 1990, Bernard RB *et al* reported a case of a 10-year-old boy with leukemia-associated hypercalcemia who was treated with aminohydroxypylidione biphosphonate when the condition failed to respond significantly to rehydration frusemide therapy and hemodialysis with calcium-free dialysate. The drug successfully reduced the plasma calcium levels[7]. Also, Muna Q *et al*

reported the case of an 8-month old non-Down syndrome infant with acute myeloid leukemia who had severe hypercalcemia at presentation. This was the first case of hypercalcemia complicating AML reported in the pediatric literatures[8]. Earlier in 1983, Steward AF *et al* had reported cases of two patients who had AML and developed hypercalcemia in the course of their illness[9]. Again, Todo S *et al in 1987,* reported a case of 2 years and 7 months old girl with acute lymphoblastic leukaemia (ALL) and severe hypercalcemia, the girl also had elevated prostaglandin E2 (PGE 2) levels, (130mg/l). The PGE2 was thought to be produced by the leukemia cells and was considered to be the pathogenic mechanism responsible for the occurrence of hypercalcemia in the patient. Both serum calcium and PGE_2 levels returned to normal after chemotherapy[10]. Similarly, Laffan MA et al reported the cases of two young adults with ALL associated hypercalcemia and osteolytic lesions. Both were found to have T-cell ALL[11].

Conclusion

Hypercalcemia complicating leukemia is a rare but well-recognized finding in clinical practice, it is possible that the clinical features of hypercalcemia may be the first complaints of patients, even before the diagnosis of leukemia is made. This case report and the previous reports emphasize the possibility of leukemia-causing hypercalcemia albeit rarely. Physicians should thus bear this in mind as they manage patients with leukemia, especially considering the possibility of fatality associated with severe hypercalcemia.

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