

# Metastatic Medulloblastoma Presented with Hypercalcemia: A Rare Case

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## Abstract

Parathyroid hormone related protein (PTH-rP) is the major mediator of humoral hypercalcemia of malignancy which is elevated in most patients with humoral hypercalcemia of malignancy. We report a patient with medulloblastoma presenting with hypercalcemia associated with elevated PTH-rP level. Thus, PTH-rP may play a significant role in hypercalcemia in patients with metastatic medulloblastoma. To the best of our knowledge, this is the first reported case of a PTH-rP secreting metastatic medulloblastoma. We illustrate dramatic changes in serum calcium, parathormone and PTH-rP levels after chemotherapy and radiotherapy.

## INTRODUCTION

Hypercalcemia occurs about 10% of cancer patients overall. Parathyroid hormone related protein has been identified as the humorally secreted factor as a cause of hypercalcemia in malignancies. In the current study, we describe a patient with PTH-rP secreting metastatic medulloblastoma who presented with humoral hypercalcemia of malignancy (HHM). To the best of our knowledge, this the first reported case of a PTH-rP secreting metastatic medulloblastoma.

## CASE REPORT

A 21-year-old-man was admitted to the hospital with complaints of fever, pain in the limb and lower back, fatigue and anorexia. In the medical history, he was operated 10 months ago because of medulloblastoma without insertion of a ventriculoperitoneal shunt. Radiotherapy of the entire craniospinal axis was performed. Since the operation, the patient had annual checkups by his primary physicians that included complete metabolic laboratory panel including serum calcium measurements.

On admission, physical examination revealed a cachectic man. He did not have lymphadenopathy and jaundice. The liver was just palpable below the right costal margin, without splenomegaly. Initial vital signs were a temperature of 38 °C, blood pressure of 130/70mmHg, heart rate of 114 beats/min, and respiratory rate of 26 breaths/min. The room oxygen saturation was 95%. Chest X-ray and ECG were unremarkable. Laboratory findings showed hypercalcemia,

decreased levels of parathormone (PTH) and 25-hydroxycholecalciferol (25- vit D), liver dysfunction, and high C-reactive protein, sedimentation with normal levels of complete blood cell count and renal enzymes (table 1).

**Figure 1**

Parameter	On admission	6th day	A.T. 4th day	A.T. 21st day
Hb (g/dl, 12-15)	12	10.3	11.2	12.4
WBC (/mm <sup>3</sup> )	8400	700	4200	7400
PLT (/mm <sup>3</sup> )	68000	44000	89000	192000
ALT (U/L, 10-40)	319	462	247	60
AST (U/L, 10-40)	252	278	127	56
AP (U/L)	1480	2370	1242	386
GGT (U/L, 10-48)	870	857	396	98
Calcium (mg/dl, 8-10)	13.5	12.2	10.4	9.3
Phosphorus (mg/dl, 2.5-4)	2.5	2.3	2.6	3.3
25- vit D (nmol/l, 16-74)	2			36
PTH-Rp (pmol/l, 0.7-1.8)				0.5

A.T.: After Treatment

Urinary calcium level in 24 hours urine-output was 72.1 mg/24 hour (100-300). There were no localising clinical signs of infection. Cultures at the time of admission revealed no bacteria grew on the sputum, blood, or urine. Computerized tomography (CT) scan of the abdomen showed 2.5 cm cystic mass in right hepatic lobe. Brain CT was the same with previous CT (as 6 months ago). Bone scintigraphy displayed enhanced tracer uptake in both iliac bones, the proximal portions of both femurs. His fever did not decrease even with antipyretics and antibiotic. Ultrasonography guided liver biopsy was obtained, which revealed medulloblastoma metastasis. He received chemotherapy and radiotherapy and 4 mg zoledronic acid. His hypercalcemia was partially controlled by hydration, diuretic and zoledranic acid. The serum calcium,

parathormone and 25-hydroxycholecalciferol levels returned to normal with the suppressed serum parathormone-related-peptide (PTH-Rp) level after beginning therapy. In three and six months follow-up examinations, the patient was asymptomatic and his serum calcium levels were normal.

## DISCUSSION

Hypercalcemia is the commonest metabolic complication of malignancy, occurring in 10% of cancer patients overall. PTH-rP was identified as the humorally secreted factor which caused humoral hypercalcemia in malignancies (HHM) without coexisting hyperparathyroidism (<sub>1,2</sub>). HHM is found in tumors of epithelial origin or hematologic malignancies. Hypercalcemia in most patients with cancer has predominantly a humoral basis rather than being caused by osteolysis due to tumor metastasis. Generally, PTH-rP has a multifunctional role in cancer, influencing the progression and development of bone metastasis as well as regulating cell growth and survival. Patients with persistently elevated PTH-rP associated HHM develop marked osteoclastic bone resorption, suppression of osteoblastic bone formation and increased renal tubular reabsorption of calcium (<sub>2</sub>). Loss of bone mineral density develops in patients with HHM. But in our patient it was not performed. Patients with malignancy have suppressed serum parathormone and suppressed 25 hydroxycholecalciferol (<sub>3,4</sub>). We demonstrate the dramatic changes in serum calcium, phosphorus, parathormone and PTH-rP levels after therapy.

To the best of our knowledge, this the first reported case of a PTH-rP secreting medulloblastoma in the literature. Our case highlights the importance of ruling out a PTH-rP secreting malignancy whenever hypercalcemia accompanying a suppressed parathormone, vitamin D levels are encountered. If a patient is presented with hypercalcemia who has intracranial tumor must be investigated to demonstrate HHM, PTH-rP and metastasis.

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