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A Case Report: Pseudohypoparathyroidism (PHP)

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Abstract

Calcium is an essential element in the body. About 90% of the Calcium in the body is in bone complexed with other elements. The remaining 10% of body Calcium is found in the extracellular fluid in three forms: 50% is ionized, 40% is bound to serum albumin, and 10% is complexed with anions such as phosphate, bicarbonate, citrate and lactate.

Keywords: Pseudohypoparathyroidism, Calcium, Acidosis, Calcitonin.

Introduction

Calcium is an essential element in the body. About 90% of the Calcium in the body is in bone complexed with other elements. The remaining 10% of body Calcium is found in the extracellular fluid in three forms: 50% is ionized, 40% is bound to serum albumin, and 10% is complexed with anions such as phosphate, bicarbonate, citrate and lactate. Acidosis increases ionized Calcium by decreasing its binding to albumin. Serum Calcium is maintained at a narrow range of normal: 2.20 - 2.60 mmol/l (8.80 - 10.40 mg/dl). Lesser Calcium values exist in the interstitium and the intracellular space. Calcium makes up 1.0 kg to 1.5 kg of the ideal body weight.

Calcium metabolism is under the control and influence of many hormones, such as Vitamin D, Parathyroid Hormone (PTH), and Calcitonin. The effect of these hormones on Calcium metabolism in many organs in the body - bone, kidney, gut and blood - are as shown on Table 1. The diverse functions of Calcium in the body are: bone mineralization, blood clotting, muscle contraction, enzyme action, exocytosis of hormones, neurotransmission, nerve conduction and intracellular signaling. Both excess and deficiency of Calcium in the body are associated with diverse and severe medical ailments.

The adult daily calcium requirement is about 500 mg. Children require more, 1200 mg daily; while pregnant and lactating mothers need up to 1500 mg of calcium daily. The other elements required for normal growth and the maintenance of normal body function are – magnesium, phosphorus, sodium, potassium, chloride and sulphur. Mineral elements with daily requirement of less than 100 mg daily are called trace elements, such as iron, iodine, copper, manganese, zinc, selenium, fluoride and molybdenum. Mineral elements and vitamins perform diverse chemical and biological functions in the body.

Case Report

Master CM is a ten-year-old boy that was referred to us for endocrinology care by a family physician. His mother who is well educated and a civil servant gave most of the history and provided the investigation results carried out in the preceding year of 2024 as shown in Table 2. The results of the additional investigation results done by us are also in Table 2. The history of his illness started two years prior to our seeing him. He presented with the history of recurrent attacks of cramps in both lower limbs which were often severe and prevented him from movement and other physical activity. His developmental milestones are normal, and his academic performance was always above average.

His laboratory results in 2024, showed elevated serum Parathyroid Hormone (PTH), elevated Phosphate and low Calcium. A repeat investigation as we requested showed a similar pattern with more elevated values of PTH and Phosphate. Serum calcium was still low although better. The results of serum Magnesium and Vitamin D (25 OH) are shown in Table 2. The CT Scan of the neck was unremarkable and normal. The urinalysis and kidney function are normal. There was mild anaemia. The X-ray of both hands did not show any abnormal anatomical features (Figure 1).

Discussion

Low serum Calcium is not a common clinical problem. Request for serum Calcium is not a routine clinical requirement except when indicated. Laboratory request for serum Calcium is usually in the setting of renal impairment, malnutrition, malabsorption syndrome, severe liver disease and childhood rickets. Low serum parathyroid hormone (PTH) value as a feature of hypoparathyroidism occurs during and after thyroid surgery. Low serum PTH value may also be due to autoimmune damage to the parathyroid, which may be isolated or part of autoimmune polyglandular syndrome (APG-1). Low serum PTH value may be congenital as in Di George Syndrome. Primary deficiency of PTH is associated with low serum Calcium and elevated serum phosphate values [1,2].

Hypocalcaemia with low serum phosphate has many causes which include: reduced intake of Calcium and Phosphate in diet, reduced absorption from the gut as in malabsorption syndrome, rickets and due to increased demand as in pregnancy. Impaired metabolism of Vitamin D in the liver due to liver disease may reduce the absorption of Calcium and Phosphate from the intestine [2,3]. Some medications such as barbiturates and phenytoin induce liver enzymes that may inactivate Vitamin D. Hypomagnesaemia and pancreatitis are also associated with hypocalcaemia. In Type 1 Rickets there is 1 alpha hydroxylase enzyme deficiency which leads to low plasma value of Calcitriol (1,25 (OH)2 Vitamin D). In Type 2 Rickets there is Vitamin D

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receptor defect [3,4].

Table 1: *Comparative actions of Vitamin D, Parathyroid Hormone (PTH), and Calcitonin.*

s/n	Organ	Vitamin D	Parathyroid Hormone	Calcitonin
1.	Bone	↑ Osteoclast activity ↑ Bone resorption (Note that Vitamin D deficiency causes demineralization)	↓ Osteoblast activity (if Constant) ↑ Bone resorption (if Constant) ↑ Osteoblast activity (if Intermittent) ↓ Bone resorption (if Intermittent)	↓ Osteoclast activity ↓ Bone resorption
2.	Kidney	↑ Calcium reabsorption ↑ Phosphate reabsorption	↑ 1α-hydroxylase Synthesis ↑ Calcium reabsorption ↓ Phosphate reabsorption	↓ Calcium reabsorption ↓ Phosphate reabsorption
3.	Gut	↑ Calcium absorption ↑ Phosphate absorption	↑ Calcium absorption (indirect action) ↑ Phosphate absorption (indirect action)	
4.	Blood	↑ Calcium ↑ Phosphate	↑ Calcium ↓ Phosphate	↓ Calcium ↓ Phosphate

Table 2: Laboratory Results with dates.

s/n	Parathyroid Hormone (PTH) (pg/ml)	Calcium (mmol/l)	Phosphate (mmol/l)	Date
1.	268.9 (12.0 – 80.0)	1.27 (2.25 – 2.75)	2.54 (0.97 – 1.94)	22/02/2024
2.	377.4 (12.0 – 80.0)	1.48 (2.25 – 2.75)	3.35 (0.97 – 1.94)	18/11/2025

3. Magnesium = 0.63 mmol/l (0.65 – 0.95) – (22/02/2024)
4. Vitamin D (25 OH) = 19.2 ng/ml (> 20.0) – (18/11/2025)
5. ESR = 35 mm/hr. (0 – 20)
6. Blood Group = A Rh D +
7. Haemoglobin = 11.5 g/dl (13 – 18)
8. SE/U/Cr: Normal: Na 146.3 (135-150), K 4.1 (3.5-5.0), Cl 98 (96-108), Urea 20 (15-40), Creatinine 1.1 (0.5-1.5).
9. Urinalysis = Normal.
10. CT scan of the neck (21/11/2025): unremarkable.
11. X-Ray of both hands: see Figure 1.

Hypocalcaemia with high serum phosphate values are due to either renal failure or primary hypoparathyroidism. In this patient the renal function is normal. In primary hypoparathyroidism the PTH is low, unlike in this case with markedly elevated PTH. The hypocalcaemia of Pseudohypoparathyroidism (PHP) is associated with elevated PTH and elevated serum phosphate as in this case report. PHP is a genetic disorder of target-organ unresponsiveness to PTH. The Type 1B of PHP as in this case has low serum Calcium, elevated Phosphate and elevated PTH. There are no somatic features as in this case. The type 1A PHP in addition to the biochemical changes has somatic features, as described in Albright Hereditary Osteodystrophy (AHO). The somatic features of AHO are: short stature, round neck, short neck, obesity, bradydacryly (short digits), shortened metacarpals, subcutaneous ossifications and reduced intelligence. In pseudopseudohypoparathyroidism (PPHP) the somatic features of AHO are present, while the blood biochemical values of Calcium, Phosphate and PTH are normal [3-5].

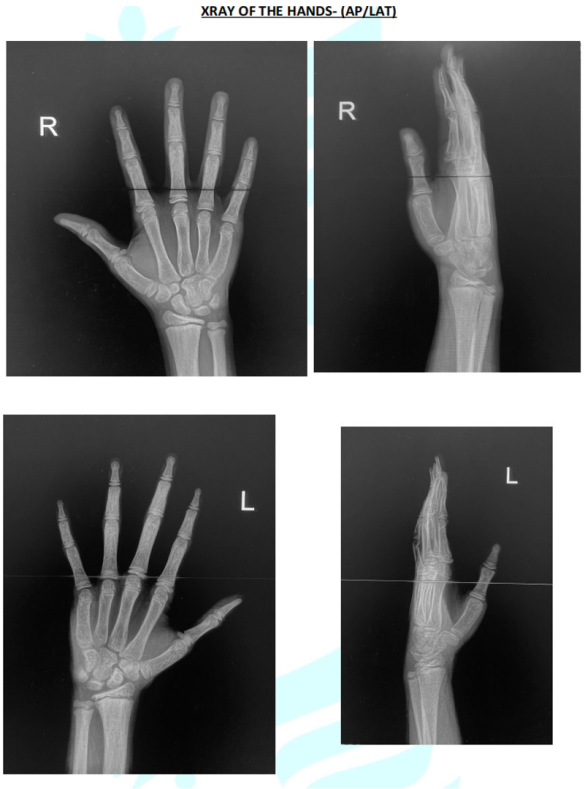

Figure 1: *X-Ray of the Hands- (AP/LAT).*

In osteomalacia or osteoblastic bone metastasis, serum alkaline phosphatase enzyme is usually elevated. Activating mutations of the Calcium Sensing Receptor (CaSR) may cause hypocalcaemia. Proton pump inhibitors e.g. Omeprazole are in common clinical use for the treatment of peptic ulcer disease. The absorption of magnesium is reduced by the use of proton pump inhibitors because of the reduced acidity it produces. Hypomagnesaemia is associated with Vitamin deficiency [5]. Other medication associated with hypocalcaemia are: cinacalcet, denosumab, bisphosphonates, cisplastin, leucovorin, 5-fluorouracil, and the antiviral foscarnet. Foscarnet is used in the treatment of cytomegalovirus [5].

References

1. Scanlon VC, Sanders T Parathyroid Gland. Essentials of Anatomy and Physiology.Chapter 10. (7th edn), pp. 264.
2. Holt RIG, Hanley NA. Calcium and Metabolic Bone Disorder. Essential Endocrinology and Diabetes. Chapter 9, (6th edn), pp. 190 - 212.
3. Shoback DM, Schafer AL, Bikle DD. Metabolic Bone Disese. Greenspan's Basic and Clinical Endocrinology. Chapter 8, (10th edn), pp. 239 - 297.
4. Bilezikian JP, Walker MD, Binkley N, Goltzman D, Mannstadt M. Hormones and Disorders of Mineral Metabolism. Williams Textbook of Endocrinology. Chapter 27, (15th edn), pp. 1171 - 1226.
5. Abbas A. Diagnosis and management of hypocalcaemia in adult (Case 16). Endocrinology and Diabetes: Cases Studies, Questions and Commentaries. Case 16, (1st edn), pp. 133 - 140. Editors (Springer): Ramzi Ajjan and Stephen M Orme.