Parathyroid crisis in a 20 year old—an unusual cause of hypercalcaemic crisis

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Abstract
Since the advent of automated serum analysis, patients with primary hyperparathyroidism (PHPT) are often asymptomatic at presentation or have mild symptoms attributable to the disease. Parathyroid crisis is a rare and potentially fatal complication of PHPT in which patients develop severe hypercalcaemia with signs and symptoms of multiple organ dysfunction. A case of parathyroid crisis in a 20 year old man who presented with brown tumours and renal stones is described. (Postgrad Med J 2001;77:468–470)

Keywords: hypercalcaemia; hyperparathyroidism; parathyroid crisis; hypercalcaemic crisis

Case report
A 20 year old college student presented with left knee pain after a minor sport’s injury. Plain radiographs of the knee demonstrated multiple lytic bone lesions in the distal femur and proximal tibia, which were confirmed by magnetic resonance imaging. Bone scan demonstrated generalized increased uptake with focal moderate activity around the left knee. High resolution ultrasound demonstrated parathyroid adenoma (arrows) inferior to the left lobe of the thyroid. Lower image using Doppler demonstrated flow in vessels (arrow heads) feeding parathyroid adenoma.

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history of nausea with vomiting usually upon awakening. The patient’s mother reported that the patient seemed irritable and depressed. Blood chemistry demonstrated a raised total calcium of 3.8 mmol/l (15.3 mg/dl) and creatinine of 141.4 µmol/l (1.6 mg/dl). Ultrasound of the neck identified a hypoechoic, hypervascular, ovoid mass inferior to the right lobe of the thyroid consistent with a parathyroid adenoma (fig 1D).

The patient underwent a bilateral neck exploration that identified four gland parathyroid hyperplasia. The largest gland was the right inferior parathyroid, which weighed 7.92 g and extended into the mediastinum (fig 2A). Several large feeding arteries and veins were identified. Three parathyroid glands were resected and the right superior parathyroid gland was generously biopsied leaving approximately 60 mg of parathyroid tissue. Intraoperative PTH concentrations were evaluated during neck dissection (fig 2B). PTH concentrations normalised 10 minutes after neck dissection was completed and serum calcium normalised within three days (fig 2B).

The patient’s creatinine peaked at 194.5 µmol/l (2.2 mg/dl) and evaluation with a renal ultrasound and computed tomography revealed multiple stones, diffuse nephrocalcinosis, and mild hydronephrosis of the right kidney. Haematological evaluation revealed a normocytic, normochromic anaemia. The patient was discharged on 500 mg of calcium daily. One month postoperatively, his serum calcium was 2.1 mmol/l (8.4 mg/dl) and creatinine was normal (106.0 µmol/l, 1.2 mg/dl). He reported resolution of his fevers, fatigue, vomiting, and arthralgias.

Discussion

Hypercalcaemic crisis is characterised by severe hypercalcaemia, usually with a calcium >3.5 mmol/l (>14 mg/dl), with associated signs and symptoms involving multiple organ systems. Patients often display metabolic encephalopathy, renal insufficiency, gastrointestinal symptoms, and cardiac dysrhythmia. Malignancy is the most common cause of hypercalcaemic crisis, which results from secretion of PTH related polypeptide or from bone resorption related to osseous metastases. Cancers most commonly associated with hypercalcaemia include squamous cell carcinoma of the lung, breast cancer, renal cell carcinoma, bladder cancer, and multiple myeloma.

Hypercalcaemia occurring with a raised intact PTH is pathognomonic for primary hyperparathyroidism (PHPT). Severe hypercalcaemia occurs in 1%–2% of patients with PHPT and has been referred to as acute hyperparathyroidism, parathyroid crisis, parathyroid storm, and parathyrotoxicosis. Other complications which are common in patients with parathyroid crisis include kidney stones, renal insufficiency, brown tumours, proximal muscle weakness, neuropsychiatric syndrome with decreased ability to concentrate and depression, and a normochromic, normocytic anaemia. Hypercalcaemic crisis has been reported to be as high as 50% in children age

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Primary hyperparathyroidism (PHPT) must be considered in the differential diagnosis for hypercalcaemic crisis.

Hypercalcaemia in the setting of a raised intact parathyroid hormone is pathognomonic for PHPT.

Although PHPT is rare in young adults and children, they often present with hypercalcaemic crisis.

Parathyroid crisis requires immediate medical management for hypercalcaemia followed by urgent surgery.

Normalisation of serum calcium concentrations leads to gradual reversal of metabolic abnormalities associated with hypercalcaemia.

Learning points

- Primary hyperparathyroidism (PHPT) must be considered in the differential diagnosis for hypercalcaemic crisis.
- Hypercalcaemia in the setting of a raised intact parathyroid hormone is pathognomonic for PHPT.
- Although PHPT is rare in young adults and children, they often present with hypercalcaemic crisis.
- Parathyroid crisis requires immediate medical management for hypercalcaemia followed by urgent surgery.
- Normalisation of serum calcium concentrations leads to gradual reversal of metabolic abnormalities associated with hypercalcaemia.