A giant mediastinal parathyroid adenoma presenting as a parathyroid crisis

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DESCRIPTION

A man in his 70s with a history of hypertension and chronic kidney disease of unclear stage presented to the emergency department of our institution with generalised weakness, fatigue and mild confusion for 1 week. Two months previously he had been admitted to another facility with a similar presentation. On that hospital visit he was diagnosed with hypercalcaemia and a mediastinal mass. He underwent an endobronchial ultrasound-guided biopsy and the histopathology was consistent with ectopic parathyroid adenoma. The patient was advised to have an adenoma resection, but he refused the surgical procedure. He had no previous surgical history and denied the use of recreational drugs, tobacco and alcohol.

During this visit to our institution the patient's vital signs were temperature 37°C, heart rate 90 beats/min, blood pressure 175/106 mmHg and oxygen saturation 99% on ambient air. On physical examination the neck was without any palpable mass and the cardiovascular, respiratory and abdominal examinations were normal. He was awake, confused and oriented only to himself, with tremor of the upper extremities bilaterally. The patient had normal motor and sensory function.

The laboratory results showed a calcium level of 20.5 mg/dL (normal range (NR) 8.6–10.2), ionised calcium 2.40 mmol/L (NR 1.13–1.32), intact parathyroid hormone (PTHi) 2934 pg/mL (NR 15–65), magnesium 2.4 mg/dL (NR 1.8–2.2), thyroid stimulating hormone 0.438 mlU/L (NR 0.5–5.0), free T4 0.87 ng/dL (NR 0.8–1.8), creatinine 3.80 mg/dL (NR 0.74–1.35), white blood cell count 17.2×10^9/L (NR 4.0–10.5), haemoglobin 123 g/L (NR 133–163) and 25-hydroxy vitamin D total 24.8 ng/mL (recommended levels >30). ECG showed a shortened QT interval of 324 ms with left ventricular hypertrophy and QRS widening (figure 1). The chest X-ray, CT scan of the brain

Figure 2 CT scan of the chest showing a mass posterior to the left lobe of the thyroid measuring 4.2×3.5 cm with tracheal deviation.

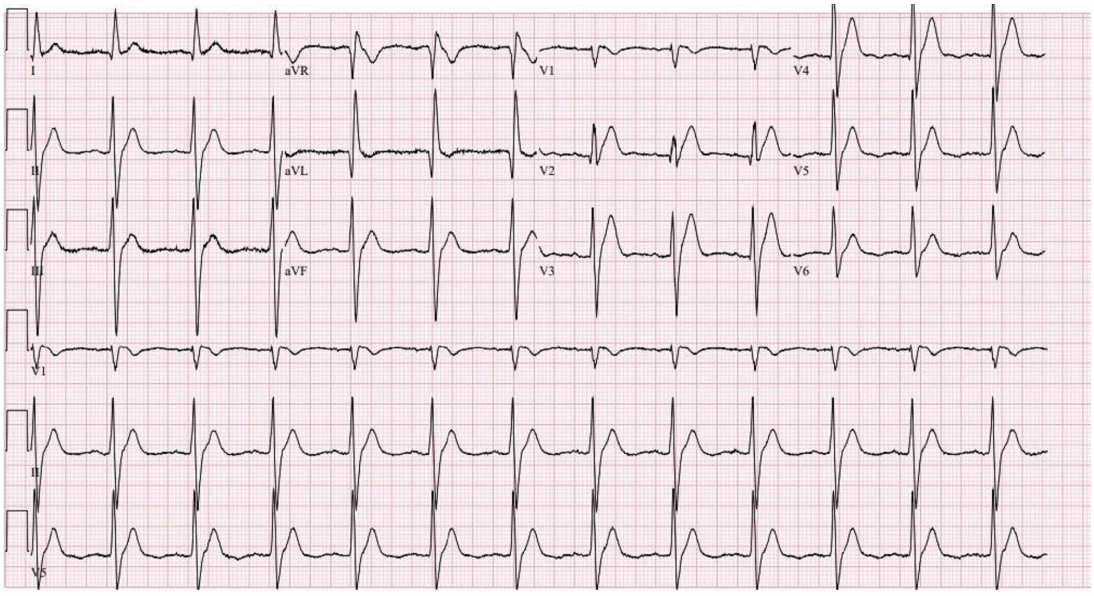

Figure 1 ECG showing shortened QT interval, QRS widening and left ventricular hypertrophy.

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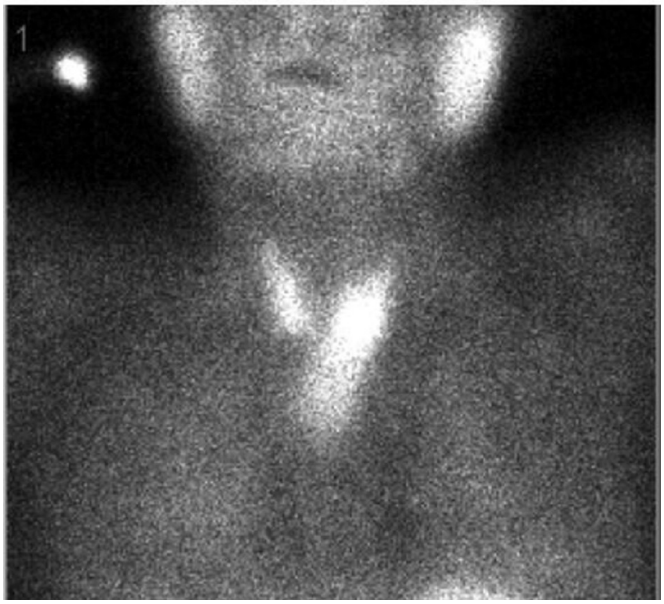

Figure 3 Nuclear medicine parathyroid scan showing parathyroid adenoma in the left tracheoesophageal groove.

without contrast and thyroid ultrasound were unremarkable. CT scan of the neck and chest without contrast showed an elongated mass posterior to the left lobe of the thyroid measuring 4.2×3.5×6.6 cm. The mass descended into the upper and medial mediastinum resulting in tracheal deviation and abutted the arch of the aorta (figure 2). A nuclear medicine parathyroid scan revealed scintigraphic evidence of parathyroid adenoma in the left tracheoesophageal groove (figure 3).

The patient was treated with IV fluids, one dose of zoledronic acid 4 mg IV, 4 doses of calcitonin 4 IU/kg IM, cinacalcet 30 mg oral twice daily, furosemide 40 mg IV daily and one session of intermittent haemodialysis. Subsequently, the serum calcium corrected to a level of 10.8 mg/dL. The patient was administered a single oral dose of vitamin D 50 000 IU for prophylaxis of hungry bone syndrome prior to a combined right robotic-assisted thoracoscopic and mediastinal parathyroid mobilisation with cervical parathyroidectomy. Histopathology was consistent with a parathyroid adenoma weighing approximately 16 g.

The patient's postoperative course was complicated by a right-sided pneumothorax and small parapneumonic effusion which resolved with a chest tube. Prior to surgery the patient's voice was normal; however, he developed postoperative hypophonia with hoarseness. He underwent a fibreoptic laryngoscopy examination which showed left vocal cord paresis in the paramedian position, and he was referred for possible vocal cord medialisation. After surgery and prior to discharge the calcium levels were 8.0 mg/dL and PTHi 15 pg/mL. He was discharged on calcitriol 0.5 μg twice daily and calcium 1000 mg oral with meals. He was scheduled to follow-up with primary care, otolaryngology for vocal cord medialisation, endocrine surgery and speech therapy. Unfortunately, he was readmitted to the hospital 1 month later with acute-on-chronic renal failure and hypercalcaemia (calcium 19.3 mg/dL, ionised calcium 2.0 mmol/L, PTHi 3 pg/mL), which was likely iatrogenic due to supplementation for his hungry bone syndrome and past resolution of his metabolic derangement. Vitamin D and calcium were discontinued. After treatment with IV fluids the calcium normalised and the renal function improved. At follow-up 1 week after discharge his vitamin D and calcium levels remained normal.

DISCUSSION

Our patient's mass was in the mediastinum, and a fine needle aspiration (FNA) was done prior to arrival at our hospital for a definitive preoperative diagnosis. Except for unusual or difficult cases, FNA of the parathyroid is not recommended or performed if carcinoma is suspected (due to risk of dissemination, haematoma and parathyromatosis).[1]

Clinical manifestations of hypercalcaemia include altered mental status, generalised weakness, nephrolithiasis, kidney injury, decreased bone density, bone fracture and ECG changes such as shortening of the QT interval.[2 3] Acute treatment of severe hypercalcaemia includes isotonic IV fluids of normal saline, IV bisphosphonates, calcitonin and furosemide once the patient is volume replete. Parathyroidectomy is the definitive treatment for PTH-secreting parathyroid adenoma.[4]

Learning points

- Clinical manifestations of hypercalcaemia include altered mental status, generalised weakness, nephrolithiasis, kidney injury, decreased bone density and fracture.
- Prior to parathyroidectomy, a single oral dose of vitamin D 50 000 IU is administered for prophylaxis of hungry bone syndrome prior to surgery.
- Treatment of severe hypercalcaemia includes IV fluids of normal saline, IV bisphosphonates, calcitonin and furosemide.

Contributors MNZ, AH, IF and DC conceptualised and designed the case. MNZ and AH performed data collection and analysis, and wrote the initial manuscript. MNZ, AH, IF and DC performed subsequent article revision, data integration, image collection and editing. MNZ, AH, IF and DC reviewed the final manuscript and approved the final version to be submitted.

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