Unusual presentation of more common disease/injury

Hypocalcaemic laryngospasm in the emergency department

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Summary

A 51-year-old African male presented to the emergency department with a sore throat, a productive cough and a striking pinched voice. Investigation revealed severe hypocalcaemia (0.97 mmol/l) with a prolonged QT interval on ECG. The authors administered intravenous calcium in the emergency department, which instantly improved the quality of the patient's voice. He was eventually diagnosed with primary hypoparathyroidism and an upper airway infection. Severe hypocalcaemia is a life-threatening condition. Identifying laryngospasm as an atypical presentation in the presence of a concomitant airway infection and prompt treatment in the emergency department are critical.

BACKGROUND

Tetany is the hallmark of hypocalcaemia. However, despite severe hypocalcaemia, tetany was not the presenting symptom in our patient. Laryngospasm is a rare presenting symptom of hypocalcaemia, especially without signs of overt tetany or seizures.

Failure to recognize hypocalcaemia by interpreting symptoms as being caused by an upper airway infection can lead to discharge of a patient at risk for serious complications such as seizures, dysrhythmias such as torsade de pointes, and even cardiac arrest.

CASE PRESENTATION

A 51-year-old African male presented to the emergency department with a sore throat and a productive, purulent cough for the last few days without fever. Over previous months, he had noticed a progressively coarse voice and occasional cramping pain in his hands, arms and around his throat, without chest pain. His medical history was non-contributory, he was not taking any medications and his family history was unremarkable.

On physical examination the patient was non-dyspnoeic, afebrile, haemodynamically stable and had a striking pinched voice. Furthermore, there was bilateral lymphadenopathy in the neck, which was painful on palpation. Cardiopulmonary and abdominal examinations were normal. Inspection of the throat showed slight erythema, but no swelling. Trousseau's and Chvostek's signs were absent.

INVESTIGATIONS

ECG showed a sinus rhythm with a heart beat of 78/min and a prolonged QT interval of 484 ms (QTc interval of 515 ms using Bazett's formula). On admission routine blood tests include a full blood count, electrolytes, liver function tests, an erythrocyte sedimentation rate (ESR) and a C-reactive protein. The results included a corrected calcium of 0.97 mmol/l (2.20–2.65 mmol/l), and a raised ESR, anorganic phosphate and C-reactive protein. Liver function tests and additional blood gas analysis were normal.

DIFFERENTIAL DIAGNOSIS

- ▶ Hypoparathyroidism
- ▶ Chronic kidney failure
- ▶ Vitamin D deficiency
- ▶ Malabsorption
- ▶ Rhabdomyolysis, magnesium depletion and hyperphosphataemia.

TREATMENT

Calcium gluconate (2.25 mmol calcium) was administered intravenously in the emergency department while the patient's heart was monitored, which improved the quality of the patient's voice almost immediately.

OUTCOME AND FOLLOW-UP

The patient was initially admitted to the cardiac care unit for monitoring of his heart while calcium was administered intravenously. After 48 h he had been given 30 mmol calcium intravenously which resulted in a serum calcium of 1.90 mmol/l (2.20–2.65 mmol/l) and normalisation of the QTc interval.

The patient was transferred to the medical ward where calcium supplementation was continued orally. Further analysis yielded a parathyroid hormone of <0.3 pmol/l (1.0–7.0 pmol/l) and a vitamin D (250) of 42 nmol/l (50–200 nmol/l).

The patient was diagnosed with primary hypoparathyroidism, for which he has been treated with alfacalcidol and calcium supplements. The patient's calcium levels are monitored at regular intervals and remain within normal limits.

Additionally, *Streptococcus pyogenes* (group A) was cultured in the patient's sputum for which he was treated with a course of feneticillin.

DISCUSSION

Hypocalcaemia can manifest with cardiovascular and neurological complications, with muscle cramps and tetany being the most common symptoms.^{1 2}

Hypocalcaemia causes a prolonged QT interval on ECG by prolonging the action potential through the rate

of change of serum calcium concentration and decreased function of the myocyte calcium channels.¹ This can lead to torsade de pointes, which can degenerate into ventricular fibrillation and sudden death. Hypocalcaemia may also be associated with hypotension, cardiomyopathy and congestive heart failure, and in selected cases with seizures, depression and psychotic behaviour.¹⁻⁴

Hypocalcaemic tetany is most commonly caused by acute onset hypocalcaemia.¹⁻³ The symptoms of tetany may be mild (muscle cramps, paresthesias of the hands and feet) or severe (laryngospasm, carpopedal spasm and seizures).¹⁻⁵ Tetany is a common feature if the ionised serum calcium level falls below 1.10 mmol/l.¹⁻⁵ In spite of severe hypocalcaemia, Trousseau's and Chvostek's sign may both be absent at presentation.¹

Laryngospasm is a common presentation of hypocalcaemia in infants,⁶⁻⁸ but is rare in adults and mostly seen in patients with pseudohypoparathyroidism caused by hypomagnesaemia.⁸⁻¹⁰ In our patient, the hallmark of hypocalcaemia, tetany, was not present nor were the clinical tests positive for latent tetany despite severe hypocalcaemia. We presumed that longstanding rather than acute hypocalcaemia was responsible for the atypical presentation in this case.

It is uncertain if concomitant upper airway infections play a role in the aetiology of laryngospasm.

Failure to perform routine laboratory serum calcium tests and an ECG could have led to this patient's complaints being attributed to a throat infection. This could have resulted in discharge of a patient at risk for serious complications such as seizures, dysrhythmias like torsade de pointes and even death.

Competing interests None.

Patient consent Obtained.

Learning points

- Laryngospasm is a rare presenting symptom of hypocalcaemia.
- In patients with non-specific complaints of the throat and voice, serum calcium testing and an ECG should be part of routine investigation in the emergency department.
- Concomitant infections may obscure the diagnosis of hypocalcaemia.
- In case of severe hypocalcaemia, calcium should instantly be administered intravenously in the emergency department.

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