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Lyte at the end of the tunnel

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Lyte at the end of the tunnel

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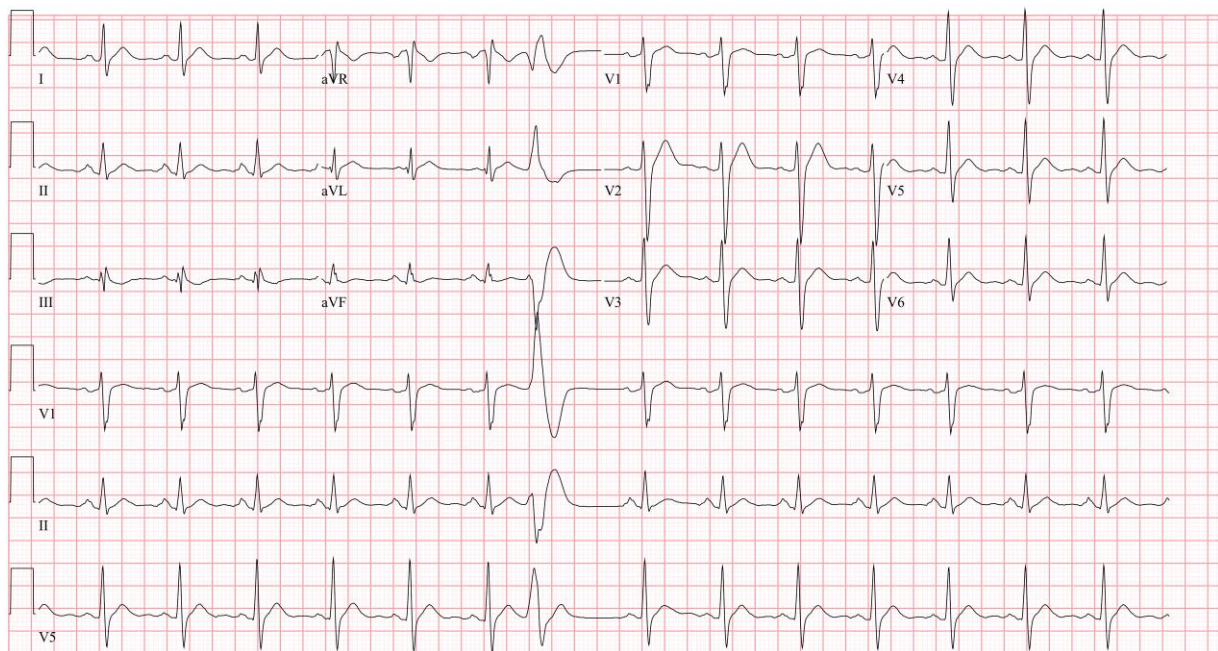
Vignette

A 55-year-old male with hypertension presented to the hospital with 5 days of nausea and vomiting. The episodes were associated with oral intake, and symptoms were not relieved with over-the-counter antacids. The review of systems was notable for decreased oral intake, an associated 10-pound weight loss, generalized weakness, and fatigue. Home medications included lisinopril and hydrochlorothiazide, and there were no recent medication changes. The following electrocardiogram (ECG) was taken on admission.

Question 1: Based on the clinical vignette and ECG shown, what is the most likely diagnosis?

- Anterior STEMI
- Hypokalaemia
- Hyperkalaemia
- Hypocalcaemia
- Hypercalcaemia

Answer choice e) Hypercalcaemia: Calcium on admission was 14.5 mg/dL (albumin was 4.0 g/dL). As inward flow of calcium affects Phase 2 of the action potential, elevated calcium concentrations can cause absence of the ST segment.¹ This absence corrected on subsequent ECGs after hypercalcaemic treatment with fluid resuscitation, calcitonin, pamidronate, and dexamethasone. The other choices are



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not correct as there is no convex ST elevation, J-point elevation, or reciprocal ST depressions; [choice (a)], no QTc prolongation [choices (b) and (d)], and no U waves or ST segment depression [choice (b)] or peaked T waves or prolonged QRS [choice (c)] present.²

Question 2: In severe hypercalcemia, the Q-oT interval (onset of the QRS to onset of the T wave) shortens, and which of the following best describes the changes seen in the QTc duration?

- Prolonged
- Shortened
- Unchanged
- Depends on the degree of calcium elevation
- Unable to determine

Answer choice d) Depends on the degree of calcium elevation: Bronsky et al.³ have reported that hypercalcaemic patients were found to have a shortened QTc interval that inversely correlated with the degree of hypercalcaemia. However, once the calcium level exceeded 16 mg/dL, the T-wave would become increasingly broadened, and this correlation was no longer observed.

Question 3: Based on the clinical vignette, what is the likely cause of the patient's hypercalcemia?

- Undiagnosed malignancy
- Adverse effect of the hydrochlorothiazide
- Vitamin D deficiency
- Acute pancreatitis
- Hypoparathyroidism

Answer choice a) Undiagnosed malignancy:

This patient was subsequently discovered to have diffuse lytic lesions of the calvarium, humerus, and pelvis on radiographic imaging. Subsequent testing confirmed a diagnosis of multiple myeloma. The patient underwent a bone marrow transplant but unfortunately had

recurrence of his disease and subsequently passed. Choice (b) is not correct, as hydrochlorothiazide would cause only mild hypercalcaemia as negative feedback through changes in parathyroid hormone will dampen the calcium changes.⁴ Answer choices (c), (d), and (e) are not correct as these choices are associated with hypocalcaemia.

Supplementary material

Supplementary material is available at *European Heart Journal – Case Reports*.

Consent: The patient reported in this case is deceased. Despite the best efforts of the authors, they have been unable to contact the patient's next-of-kin to obtain consent for publication. Every effort has been made to anonymize the case. This situation has been discussed with the editors.

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Data availability

The data underlying this article are available in the article and in its online [supplementary material](#).

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