MCQ Answer: Hypercalcemia

MCQ Discussion:

The ECG shows sinus rhythm with wide right bundle branch-like QRS complex, likely secondary to hypercalcemia. Hypercalcemia often manifests as shortening of the QT interval, but can also cause widening of QRS, prolonged PR interval, atrioventricular block, cardiac arrest, and may even mimic an ST-segment elevation myocardial infarction (1-2). Most of the variations in QT interval are due to prolonged ST segment duration, rather than T wave duration (2). These changes are due to alterations in membrane potentials that affect normal electrical conduction time. Severe hypothyroidism usually presents as bradycardia with low QRS voltage and wide-spread T-wave abnormalities (3). Digoxin toxicity has a wide array of presentations, such as down sloping ST segment depression, flattened T waves, shortened QT, and atrial tachyarrhythmias with atrioventricular block. ECG artifact usually presents as fuzzy irregular baseline (4).

The patient was admitted to the medical intensive care unit for the management of severe hypercalcemia and worsening renal function. Review of medications revealed that calcium carbonate, given for hyperphosphatemia management, was taken in between meals causing an iatrogenic increase in calcium. Work-up for malignancy was unremarkable. Parathyroid hormone level was 9.0 pg/mL (normal range, 10-55 pg/ml). Hypercalcemia was managed with intravenous hydration, calcitonin and diuresis. Repeat ECG approximately 11 hours later showed resolution of wide-complex QRS with QTc of 424 ms (Figure 2).