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Visual Case Discussion

Carpal spasm in a young alcoholic with a history of eating disorders

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A 29 year old female presented to the emergency department with a chief complaint of worsening 10/10 painful hand cramping for the past six hours and concerns for alcohol withdrawal. Her past medical history was consistent with alcohol abuse; she reported consumption of "a twelve pack" of beer daily. She also described a history of eating disorders, specifically anorexia and bulimia. The patient stated "I quit drinking yesterday" with subsequent, numerous bouts of non-bloody, non-bilious emesis throughout the night. The morning of presentation the emesis was reported to have ceased, yet her nausea persisted. The patient also endorsed generalized body aches during her history of present illness interview, but denied chest pain, shortness of breath, syncope, seizures, abdominal pain, or disequilibrium during a comprehensive review of systems. Upon further interview, the patient endorsed a six year history of similar, intermittent and severe carpal spasm, ventricular arrhythmias, and a single cardiac arrest due to ventricular fibrillation approximately one year earlier. Her primary care provider's current treatment included prescribing magnesium oxide 800 mg by mouth four times a day. When probed, the patient admitted medication noncompliance secondary to frequent alcohol intoxication and incapacitation.

The patient's vitals on presentation were: blood pressure, 107/82 mm Hg; heart rate, 125 beats/minute; respiration rate, 22 breaths/min, and a temperature, 96.6 °F (35.9 °C) orally. Upon this clinician's entrance into the patient's ED exam room, the patient was tearful and in moderate distress from her hands "cramping". HEENT exam was unremarkable with Cranial Nerves II-XII grossly intact, 5/5 muscle strength in all extremities, gross sensation intact in all limbs, and was without evidence of focal neurological deficits. No Chvosteks sign was observed. Cardiac auscultation revealed a tachycardic, regular rhythm without murmurs, rubs, or gallops. The musculoskeletal system exam revealed bilateral hands' ten digits and bilateral wrists were both flexed and rigid. Bilateral wrists and fingers could be passively extended by the clinician with increased patient complaints of pain, and upon release, the joints immediately assumed their original flexion status. (Fig. 1) The exam ended with the clinician inquiring and patient denying homicidal and suicidal ideation or intent. The patient voiced, and the clinician positively reinforced, she was willing to remain at the hospital to receive treatment.

An electrocardiogram was ordered immediately based on history of electrolyte disturbances with cardiac arrhythmias and current symptoms.

Fig. 1. Physical exam finding of carpal spasm.

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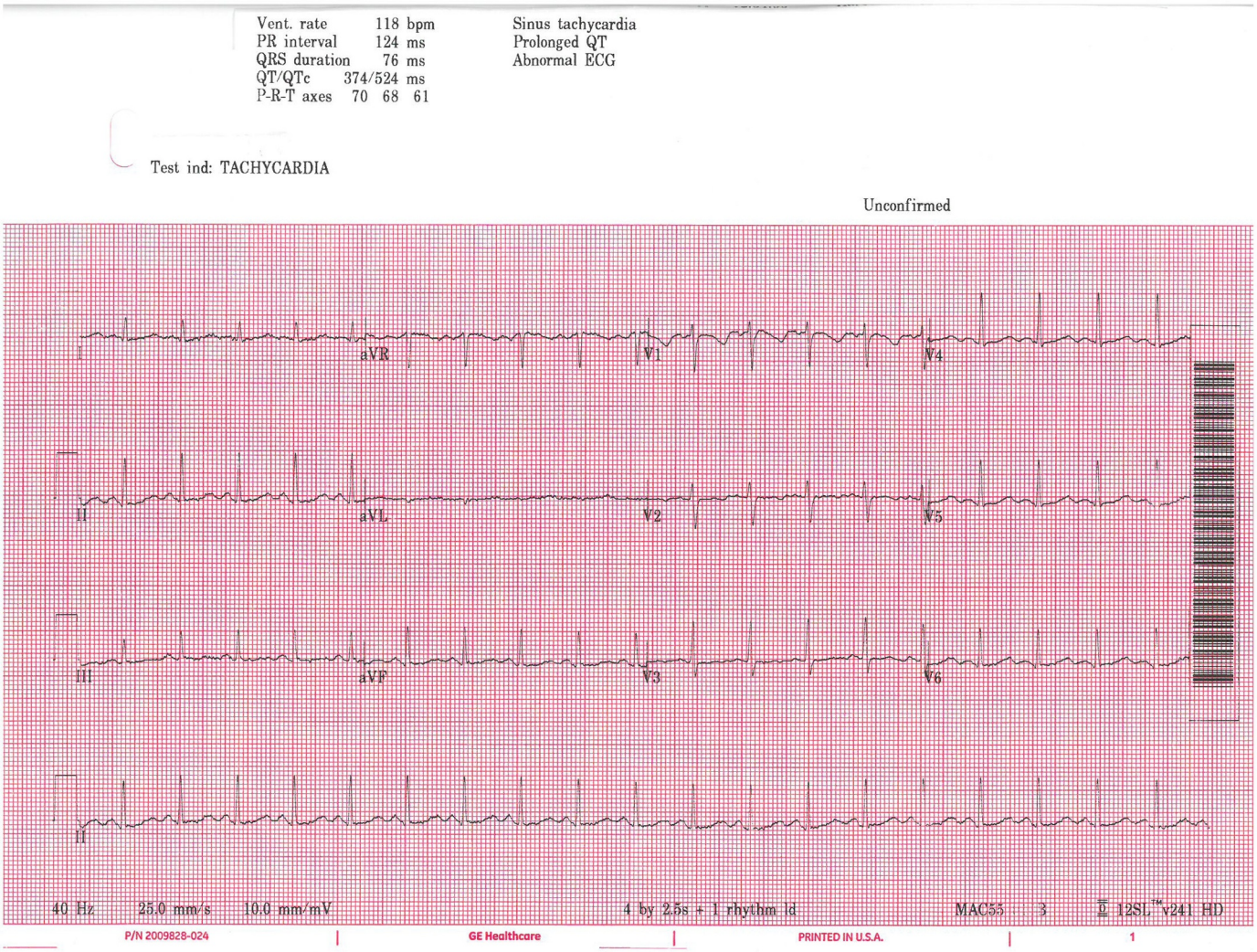

Fig. 2. EKG findings of Tachycardia and prolonged QT interval.

(Fig. 2) Intravenous access was gained to draw labs which included a venous blood gas with electrolytes because of the quick lab turnaround time for this specific study. Intravenous fluid replacement was initiated; 1 L bolus of 0.9% Normal Saline with anti-emetics was also ordered and administered immediately. Additional labs were ordered based on the history of alcoholism, eating disorders, and probable history of pancreatitis to help guide the inpatient team with this patient's impending admission. Pertinent labs from the venous blood gas with electrolytes returned quickly with: Sodium of 130 mEq/L, Potassium of 2.9 mEq/L, Ionized Calcium of 0.81 mmol/L, L-Lactate of 9.2 mmol/L, and normal venous blood gas. A decision to replete calcium and magnesium immediately, based on the venous blood gas, was made. The results of the electrocardiogram showed Sinus Tachycardia with a prolonged QT interval of 524 ms was consistent with the serum results, showing magnesium of 0.8 mg/dL. Liver enzymes and lipase results were also elevated and assessed as secondary to her reported alcoholism. A blood alcohol level was negative. The patient received three liters of normal saline total along with intravenous repletion of magnesium, calcium, and potassium. After repletion of magnesium, the patient's carpo spasm slowly resolved over a period of 20 min and the QT interval on her electrocardiogram returned to normal. She also received 2 mg of intravenous Lorazepam for anxiety relating to withdrawal symptoms resulting in significantly less objective and subjective agitation. The decision was made to admit to the internal medicine service for profound electrolyte abnormalities with electrocardiogram changes for serial labs and monitoring. Prior to admission, the patient's phosphorus and thiamine levels were repleted, and two additional does of IV lorazepam were provided for recurring psychological agitation and to prevent withdrawal seizures. At time of admission, the patient was assessed to be in stable condition.

Questions

1 At what level of serum magnesium do symptoms of hypomagnesemia typically begin to present [1]?
   a 1.8
   b 1.6
   c 1.4
   d 1.2
2 Physical Exam findings of hypomagnesemia include which of the following [2]
   a Trousseau sign
   b Chvostek sign
   c Tremor
   d Nausea or Vomiting
   e All the above
3 What is the most life threatening effect of hypomagnesemia [3]?
   a Renal Failure
   b Compartment Syndrome
   c Ventricular Arrhythmia
   d Dehydration

Answers

1 D. Symptoms usually present with levels at 1.2 mg/dL and below. Hypomagnesemia is defined as levels below 1.8 mg/dL. Below 1.8 mg/dL is criteria to replace potassium orally and below 1.2 mg/dL requires parenteral repletion.

2 E. All the Above. It can also include anorexia, weakness, lethargy, and muscle fasciculations. Chvostek and Trouseau signs are symptoms of tetany and can include constant carpopedal spasm. Trousseau sign is precipitation of carpal spasm by reducing blood supply to the hand with BP cuff inflated to 20 mm Hg over the systolic BP on the forearm for 3 min. Chvostek sign is involuntary twitching of the facial muscles elicited by lightly tapping on the facial nerve anterior to the auditory meatus.

3 C. The primary ECG changes are prolonged CT interval followed by significant ventricular arrhythmias typically with worsening concurrent hypokalemia. Treatment of Torsades de Pointes is a rapid IV bolus of 2 g of Magnesium.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.visj.2019.100599.

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