Case in Pointes: Acquired Polymorphic Ventricular Tachycardia in a Patient with Alcohol Withdrawal

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Introduction

- Chronic alcoholics presenting with acute intoxication often present a diagnostic and treatment challenge to emergency medicine physicians:
  - The history and physical examination may be limited by altered mental status or combativeness.
  - Early anchoring and labeling patient as 'just another drunk' may lead emergency medicine physicians away from a comprehensive work up.
  - Their clinical status is dynamic with rapid changes occurring during their ED course (i.e. development of alcohol withdrawal).
- We present a case of **alcohol withdrawal syndrome with severe hypomagnesemia**, which led to **acquired Torsades de Pointes and cardiac arrest.**
- **This case illustrates the importance of developing as well as maintaining a methodical approach to routine chief complaints in the ED in order to avoid occult life-threatening conditions.**

Case

- A **45-year-old man with a history of severe alcohol withdrawal** was brought in by family for "detox." He reported months of heavy daily vodka consumption, approximately 750mL per day. He reported vomiting, headache, and tremulousness. He denied taking any medications.
- Initial vital signs: **37C, HR 110, BP 137/104, RR 16, 100% on RA**.
- On exam, he **was atraumatic, sober with a clear sensorium, but mildly diaphoretic with tongue fasciculations**.
- Patient was **actively vomiting** and was given two doses of ondansetron 4mg IV.
- Initial ECG, obtained to evaluate his tachyarrhythmia, showed **sinus tachycardia with QTc 527ms**. Subsequent ECG showed QTc 498ms. Providers attributed his long QT to ondansetron administration. (FIGURE 1)
- Initial labs:

141	93	3	150
3.2	20	0.9	

AG: 27

9.3	16.1	114
	46.4	

AST: 172
ALT: 62
Alk Phos: 143
T.Bili: 1.3
Alb: 4
Lipase: 39

INR: 1.1
PT: 12.8
PTT: 31

Case (continued)

- The anion gap was initially attributed to **alcohol ketoacidosis**, and no further workup was pursued.
- After initial resuscitation with IV fluids and benzodiazepines, the patient was admitted to a monitored bed for **management of alcohol withdrawal syndrome.**
- While boarding in the emergency department, he became unresponsive and was found to have **pulseless ventricular fibrillation**. He received one round of CPR with defibrillation after which he regained full consciousness.
- A retrospective review of his rhythm strip revealed runs of **polymorphic ventricular tachycardia prior to his arrest**. Empiric magnesium repletion was begun for suspected Torsades de Pointes. (FIGURE 2)
- Post-arrest labs revealed **hypomagnesemia** 0.8 mg/dL, **hypokalemia** 3.1 mmol/L, **hypophosphatemia** 2.2 mg/dL, and a mixed metabolic acidosis with respiratory alkalosis.
- After electrolyte repletion, the patient's QTc decreased to 460ms.

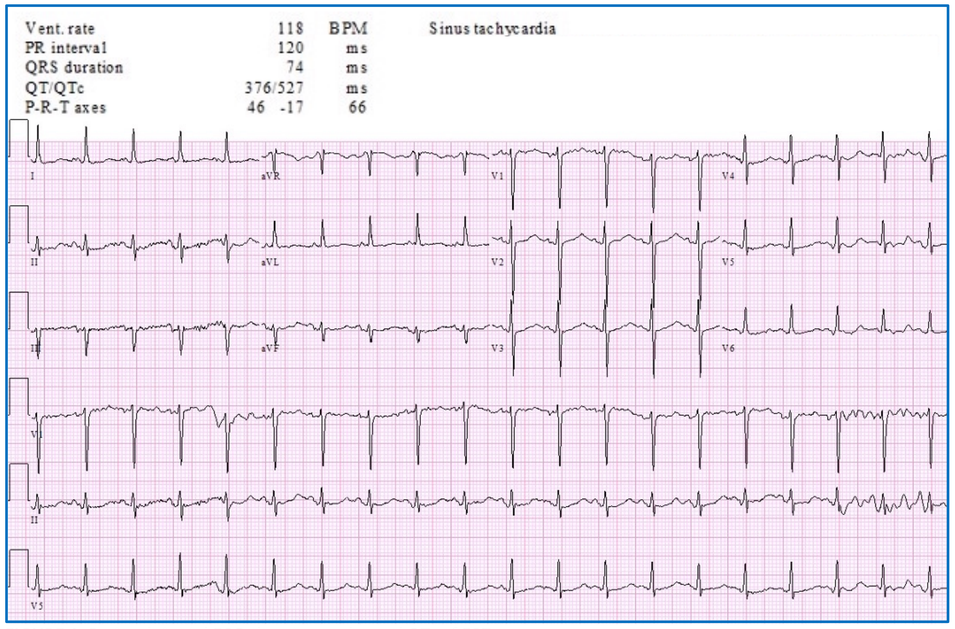

FIGURE 1: Patient's initial ECG showing prolonged QTc of 527 ms.

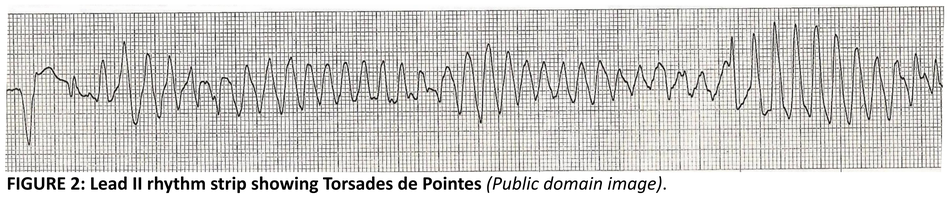

FIGURE 2: Lead II rhythm strip showing Torsades de Pointes *(Public domain image)*.

Discussion

- Acquired Torsades de Pointes is a polymorphic ventricular tachycardia most often caused by **hypomagnesemia**. It is often heralded by QT-interval prolongation with **QTc >500ms associated with the greatest risk of developing Torsades de Pointes.**[1]
- If left untreated, Torsades de Pointes has the potential to degenerate into **ventricular fibrillation**.
- Patients with **chronic alcohol use are at increased risk of hypomagnesemia** and other electrolyte derangements. Acute alcohol consumption promotes urinary wasting of magnesium for up to 30 days following consumption.[2,3]
- Chronic alcohol use can trigger hypomagnesemia via malnutrition or through intracellular shifts precipitated by autonomic overactivity from alcohol withdrawal.[2]
- **The providers in the case anchored prematurely on a diagnosis and focused only on the symptomatic treatment of alcohol withdrawal syndrome, thus missing underlying severe hypomagnesemia**.

Conclusion

- Emergency medicine physicians must maintain a methodical approach to chronic alcoholics presenting with acute intoxication. **Providers must resist premature anchoring and ensure that life-threatening conditions are ruled out prior to final disposition decisions.**
- It is not necessary to obtain the same workup on all patients, but it is important to maintain a high index of suspicion for the following conditions:[4]
  - **Alcohol withdrawal syndrome**
  - **Co-ingestion**
  - **Toxic alcohol ingestion**
  - **Occult trauma**
  - **Pancreatitis**
  - **Bleeding**
  - **Electrolyte derangements**

References

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