



## **Oral Boards Case: Torsades de Pointes**

**Chief Complaint:** 'I passed out'

**Brief case:** This is a 22 year old female brought in by EMS after an episode of syncope that occurred while the patient was walking to the restroom from her desk in her office.

**Vital signs:**

HR 86            BP 126/76            RR 10            SpO2 98% on room air            Temperature 98 F

**What do I see when I walk in the room?**

Patient sitting in the stretcher, alert, appears stated age, with no obvious traumatic injuries.

**Primary Survey:**

Airway: speaking comfortably

Breathing: no increased work of breathing

Circulation: Skin warm with normal capillary refill

**Action:**

Place IV

Consider supplemental oxygen as needed

Place patient on monitor

Draw labs: UA, Urine HCG, CBC, metabolic profile, ECG

Consider orthostatic vital signs

**History:**

HPI: This is a 22 year old female with a past medical history of insomnia who developed palpitations while sitting at her office desk today. She attempted to ambulate to the bathroom when her colleagues report she collapsed and would not respond to them for 2 minutes. EMS was called and transported the patient to the ED. She had normal mental status and vital signs by the arrival of EMS and has been feeling normal since the episode.

Past medical history: Insomnia and anxiety

Past surgical history: None

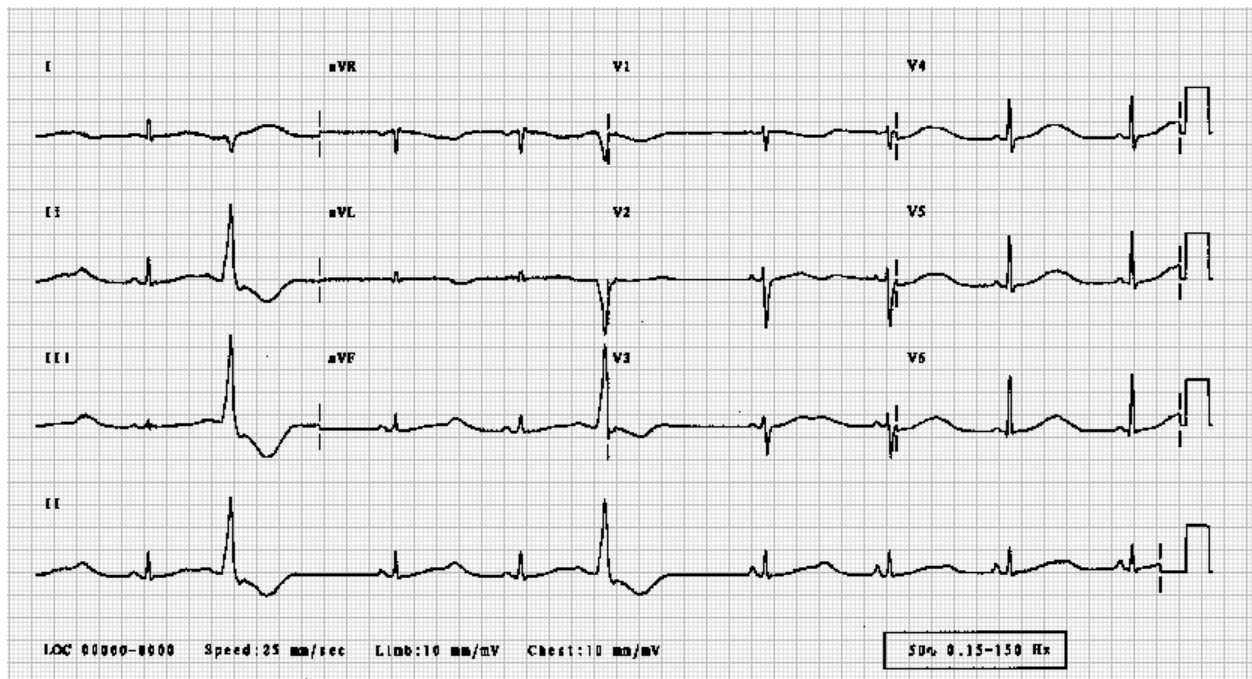
Medications: Recently started on Seroquel QHS for insomnia by her psychiatrist

Allergies: None

Social history: Works as a paralegal; no tobacco or drug use; sexually active with her husband only.

Family history: The patient reports her brother also 'passes out' from time to time but otherwise no significant family history.

**Stimulus 1:** ECG (courtesy of ecglibrary.com)



**Examination:**

HEENT: normal

Chest/heart: normal

Abdomen: normal

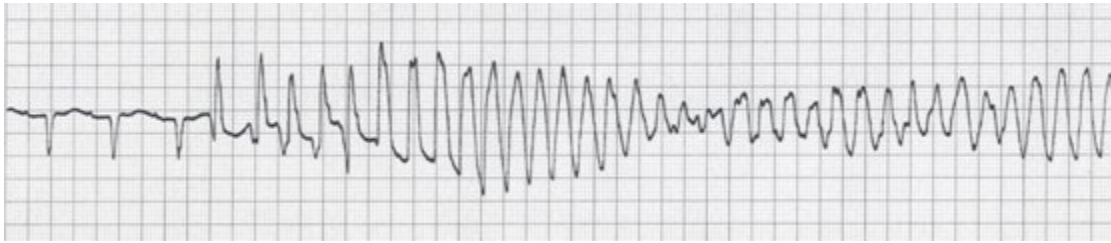
Extremities: normal

Neuro: normal

Skin: normal

**Patient reassessment:** Patient complains of palpitations and then becomes unresponsive.

**Monitor:**



**Primary survey reassessment:**

Airway: patent

Breathing: no spontaneous respirations

Circulation: No pulse – torsades de pointes on the monitor

**Critical Actions:**

Begin CPR

Attach pads and defibrillate at 200 J

Continue CPR and administer 2 g IV magnesium sulfate

Epinephrine 1 mg may also be administered IV

**Patient reassessment:** Patient has normal distal pulses and is in sinus tachycardia at 120 bpm on patient reassessment.

**Laboratory results (Normal range):**

**CBC**

WBC	12,000/mm <sup>3</sup> (4500 –10,000/mm <sup>3</sup> )
Hgb	12.5g/dL (Males 13.5-16.5 g/dL; Females 12.0-15.0 g/dL)
Hct	36% (Males 41-50%; Females 36-44%)
Platelets	115,000mm <sup>3</sup> (100,000-450,000)
Segs	80% (54-62%)
Lymphs	9% (24-44%)

Monos 7% (3-6%)

### Chemistry

Na+ 135 mEq/L (135-147 mEq/L)

K+ 4.0 mEq/L (3.5-5.2 mEq/L)

HCO<sub>3</sub><sup>-</sup> 20 mEq/L (19-25 mEq/L)

Cl<sup>-</sup> 104 mEq/L (95-107 mEq/L)

Glucose 162 mg/dL (60-110 mg/dL)

BUN 25 mg/dL (7-20 mg/dL)

Creatinine 1.1 mg/dL (0.5-1.4 mg/dL)

### Urinalysis

Color Yellow (Yellow: light pale to dark amber)

Sp Gravity 1.030 (1.005-1.025)

Glucose Negative (< 130 mg/dL)

Protein Negative (Negative)

Ketones Negative (Negative)

LE Negative (Negative)

Nitrites Negative (Negative)

Leukocyte esterase Negative (Negative)

WBC 0-2/HPF (< 2/HPF)

RBC 0-2/HPF (<2/HPF)

**HCG** Negative (Negative)

### Venous blood gas

pH 7.34 (7.32-7.42)

pCO<sub>2</sub> 34 mm/Hg (38-52 mm/Hg)

### Liver panel

AST 35 U/L (8-48 U/L)

ALT	38 U/L (7-55 U/L)
Alk Phos	60 U/L (45-115 U/L)
T. Bili	0.8mg/dL (0.1-1.2 mg/dL)
Albumin	4.0g/dL (3.5-5.0 g/dL)
Protein	7.0g/dL 6.3-7.9 g/dL)
Lipase	70 U/L (0-160 U/L)

### **Coagulation Studies**

INR	1.0 (0.8-1.2)
PTT	32 seconds (25-35 seconds)

**Troponin I** 0.01 ng/mL (less than 0.02 ng/mL)

### **Critical Actions:**

Identify long QT interval on baseline ECG.

Managed torsades de pointes with defibrillation, IV magnesium sulfate, and consider IV epinephrine for persistent arrhythmia.

Admit the patient to the ICU – identify concern for prolonged QT induced Torsades de Pointes – possible due to recent initiation of quetiapine for insomnia.

Update the patient’s family members about her admission.

Contact the patient’s PMD.

### **Examiner Instructions:**

This is a case of drug-induced torsades de pointes, in a patient who may have familial long QT syndrome.

The patient has a family history of a brother with episodes of syncope, making underlying long QT a possibility. Antipsychotic agents such as quetiapine may cause prolonged QT due to blockade of potassium rectifier channels. Commonly used medications such as ondansetron can prolong the QT, thus increasing the risk of drug-induced torsades de pointes. While torsades de pointes is often self-limited, management should include CPR, cardioversion, epinephrine and magnesium sulfate IV.



Discussion points for individual or group debrief:

-Prolongation of the QT interval increases the risk of tachydysrhythmias, especially torsades de pointes.

-Females account for the majority of cases of drug-induced torsades de pointes.

-Numerous medications prolong the QT interval, and should be used with extreme caution in patients with increased risk of drug-induced torsades, particularly female patients. Testosterone is protective against QT prolongation, as testosterone enhances the cellular production of potassium channels. The QT interval is prolonged by blockade of potassium rectifier channels. Further, QTc prolongation increases in the presence of high estrogen concentrations.

-In patients with syncope, an ECG should be carefully assessed for long QT. In patients at increased risk of long QT, such as female patients, or patients with a family history of syncope, drugs that may increase the QT by blocking potassium rectifier channels should be used with extreme caution.

#### **References:**

Annette Lopez and Robert G. Hendrickson. (2016) *Sex and Gender: Pharmacology, efficacy, Toxicity, and Toxicology in Sex and Gender in Acute Care Medicine* (pp. 63-76). New York, NY. Cambridge University Press.