CRITICAL DECISIONS IN EMERGENCY MEDICINE · APRIL 2025

The Critical ECG: Junctional Tachycardia

Daniel Rivera-Moran, MD · Peter Vandersteenhoven, MD · William Brady, MD

University of Virginia School of Medicine, Charlottesville

120–200 bpm

TYPICAL JET HEART RATE RANGE

Narrow complex tachycardia · predominantly regular · may include isorhythmic AV dissociation

80-yo

WOMAN WITH PALPITATIONS, DIZZINESS, CHEST PAIN, SOB

Onset while reaching overhead · HX hypothyroidism, HTN

6 ng/mL

MILDLY ELEVATED TROPONIN

Otherwise unremarkable workup

~130 bpm

AVERAGE JET RATE

Distinct from AVRT (~220) · AVNRT (~180) · Atrial Flutter (~150)

CASE PRESENTATION

Initial workup unremarkable; repeat ECG reveals JET.

An 80-year-old woman presents with dizziness, chest pain, and shortness of breath that began earlier in the morning when she was reaching overhead. She has a history of hypothyroidism and hypertension. She reports palpitations and chest tightness and states that her heart rate was in the 130s at home.

On examination, she appears well and is in no acute distress. Initial vital signs include BP 142/77 and P 115; SpO_2 100% on room air.

Initial workup includes ECG, chest x-ray, metabolic panel, CBC, magnesium, TSH, troponin, D-dimer (Figure 1).

The patient is given 1 L of intravenous fluids while awaiting results. Lab results return relatively unremarkable aside from a mildly elevated troponin level of 6 ng/mL. Her chest tightness has resolved, but she remains tachycardic, with rates in the low 120s. A repeat ECG (Figure 2) reveals JET.

ECG FINDINGS + ETIOLOGIES

JET: enhanced automaticity from an ectopic AV-junction focus.

Junctional tachycardia (JET), also known as junctional ectopic tachycardia, is a rare form of nonparoxysmal supraventricular tachycardia that originates from the atrioventricular (AV) junction. Because of JET's rarity, evidence is currently limited on its diagnosis and management in adult patients.

Potential etiologies of JET:

- Chest trauma
- Sick sinus syndrome
- Radiation therapy
- Myocarditis
- Medications (eg, clonidine, lithium, digoxin)
- Myocardial ischemia
- Inherited channelopathies

Distinguishing features. Heart rate > 100 bpm (usually 120–200). Predominantly regular. Narrow complex. May or may not occur with AV dissociation; when present, isorhythmic AV dissociation excludes AVRT and makes AVNRT highly unlikely.

COMPARISON TABLE 1 — ARRHYTHMIA DIFFERENTIATION

JET vs AVRT vs AVNRT vs Atrial Flutter.

Feature	JET	AVRT (Ortho)	AVRT (Anti)	AVNRT	A-Flutter
QRS	Narrow	Narrow	Wide	Narrow	Narrow
P waves	Variable; if present, slower than QRS	Retrograde; RP > 70 ms	Usually absent	Early retrograde, buried in QRS	"Sawtooth"
Pattern	Predominantly regular	Regular	Regular	Regular	Irregular
Avg rate	~130 bpm	~220 bpm	~240 bpm	~180 bpm	~150 bpm
Treatment	Depends on cause	DC cardioversion (unstable); vagal/adenosine/verapamil (stable)	Cardioversion (unstable); vagal/adenosine/ β-block/CCB (stable)	Adenosine unmasks underlying atrial rhythm	—

AVNRT row reflects slow-fast AVNRT (80–90% of cases). Atypical patterns not included in this discussion.

LEARNING POINTS

JET is a regular narrow-complex tachycardia — etiology drives treatment.

- JET typically presents as a regular narrow complex tachycardia with or without P waves. Isorhythmic AV dissociation helps distinguish JET from AVRT and AVNRT.
- JET arises from enhanced automaticity in the AV junction and may be triggered by medications, connective tissue disease, ischemic conditions, or vagal stimulation. Treatment depends on the etiology.
- Digoxin and myocardial ischemia are two widely recognized causes of JET.

ASK ME ABOUT

- The repeat-ECG decision
- Differentiating JET from AVNRT
- Adenosine response in JET
- Underlying triggers