

Focus on POCUS for Mobitz II and U

Robert Cobo, DO and Michelle Roth, DO and Joseph Wood, MD JD
Abrazo Health Emergency Medicine Residency, Abrazo Health Network. Goodyear, AZ.

Chief Complaint

Fatigue

Introduction

The identification of consequential cardiac arrhythmia via EKG by the emergency medicine physician is not always straight forward. AV blocks such as 2° type II (Mobitz II) and complete heart block can be particularly challenging in some clinical contexts. Factors such as rate, PR, and QT intervals are a few of the confounding variables that mask a critical rhythm disturbance.

History of Present Illness

77-year-old male with history of essential hypertension and atrial fibrillation presenting to the ED for fatigue worsening over 2 to 3 weeks. He reports associated dyspnea on exertion, intermittent chest pressure, and general malaise over the same duration. 3 weeks ago his amiodarone was discontinued due to low heart rate. His fatigue and dyspnea on exertion has worsened since that time but have been especially worse in the last 1 to 2 days. Denies any beta-blocking medications. He does endorse recent nuclear stress test earlier this year that was “normal.”

Physical Exam

Vitals: HR: 47, BP: 159/69, RR: 19 SaO2: 98%, on room air, T: 36.7°C

General: Well developed. No acute distress.

Heart: Regular rhythm. Bradycardia. No murmurs, rubs or gallops. 2+ peripheral pulses. Trace b/l peripheral edema.

Lungs: Spontaneous non-labored respirations. Clear to auscultation bilaterally.

Laboratory Data

Troponin	<0.04	[<0.04 µg/L]
Potassium	3.3	[3.5-5.0 mEq/L]
Magnesium	1.7	[0.5-2.0 mEq/dL]
Creatinine	1.5	[3.5-5.0 mEq/L]

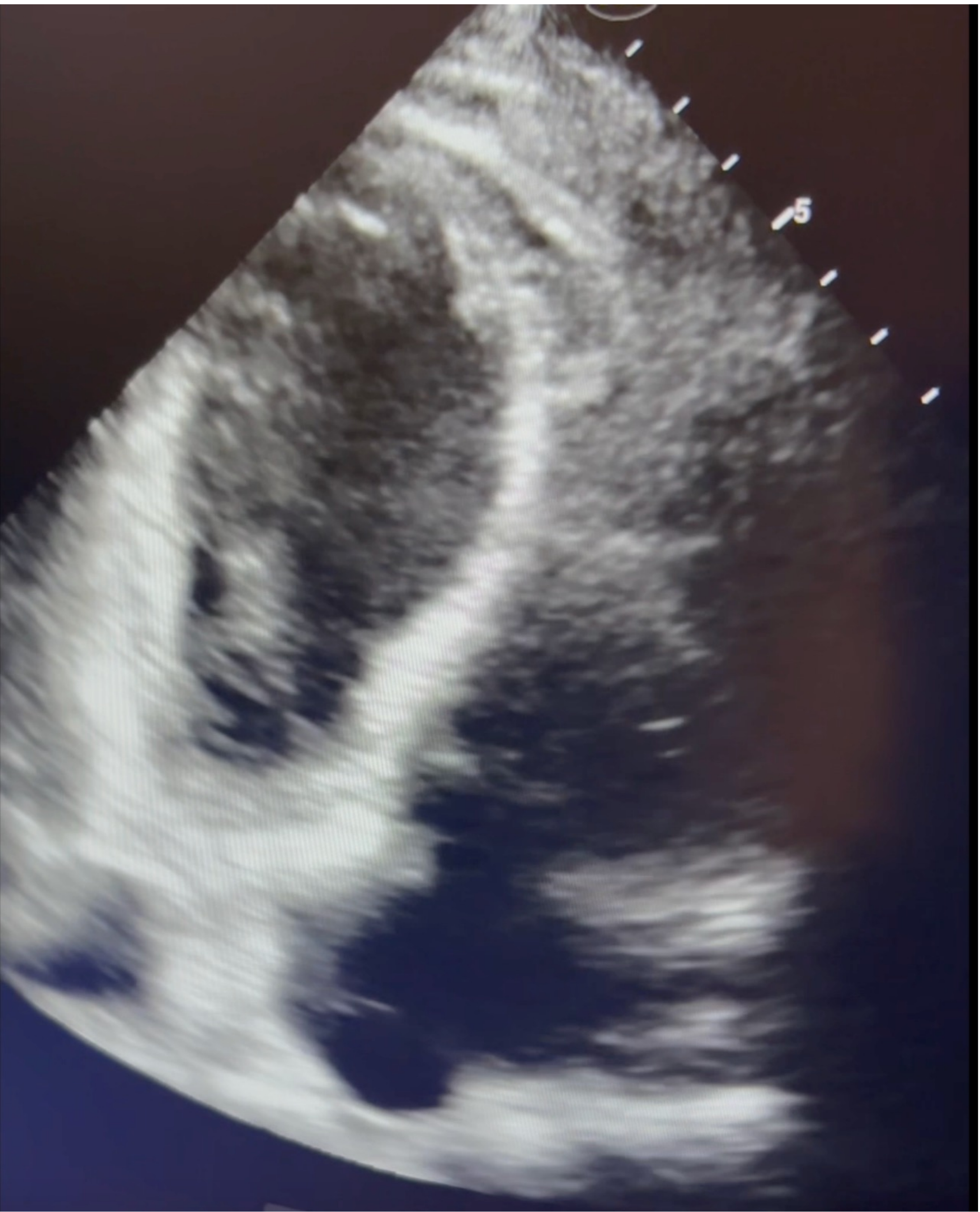


Image 1. POCUS with apical 2.5 chamber view showing the RV, partial LV, and LA

Clinical Questions

Q1: Can POCUS detect cardiac arrhythmia in cases with ambiguous electrocardiography?

A1: B-mode ultrasound can be used as an adjunct to support EKG analysis and may change treatment and disposition.

Q2: Can echocardiography be used to identify AV dissociation?

A2: Echocardiography has been used in multiple practice settings to identify AV dissociation.

Discussion

The EKG in figure 2 appears to show sinus bradycardia. In fact, the auto-interpretation software coded it as such. On closer examination, the presence of terminal T wave changes could suggest a U wave vs. partially buried P wave. The importance of such a distinction is critical as the presence of an AV block in this pattern would support a 2° type II AV block. This would necessitate cardiology consultation and admission. In contrast, isolated sinus bradycardia or U waves can be a benign finding and does not require regular cardiology consultation or admission. Cardiac POCUS is ubiquitous in the modern emergency department. However, its utility for assessing the cardiac rhythm has been mostly limited to resuscitation of cardiac arrest patients for confirmation of electrical-mechanical dissociation.¹ Numerous other use cases have been reported. These include: In utero identification of AV dissociation,² wide-complex tachycardia on EKG with POCUS confirmation of AV dissociation for diagnosis of ventricular tachycardia,³ and even M-mode wave forms suggestive of 2:1 AV blocks triggering EKG confirmation of 2° type II block.⁴

In our patient, POCUS was used to obtain (with some difficulty) apical 2.5 chamber view shown in figures 1 and 3. Two equally spaced atrial contractions were present and correlated to AV valve activity. Every other atrial contraction had an associated ventricular contraction. This supports the presence of 2° type II AV block with 2:1 conduction ratio. A true Mobitz II is a complicated EP diagnosis but is further supported in this patient by the presence of widened QRS (122ms), RBBB morphology, prolonged PR interval (240ms), a persistent PP interval (atrial rate of 88bpm), and persistent PR interval.⁵



Image 3. Scan to view the cardiac ultrasound [video](#) from this case.

References

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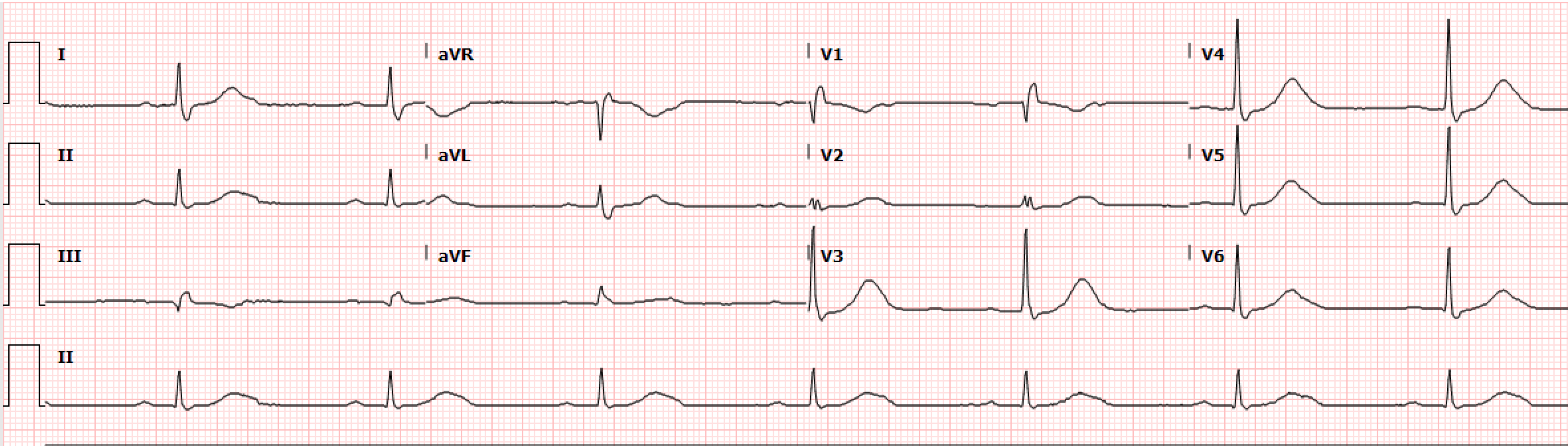


Image 2. EKG with sinus bradycardia, PR prolongation, widened QRS, terminal T-wave abnormalities.