


Sixty eight-year-old male with ischemic cardiomyopathy has this EKG finding

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1 | CASE DESCRIPTION

A 68-year-old-male with past medical history of ischemic cardiomyopathy (ejection fraction 35%-40%), hyperlipidemia, and chronic obstructive pulmonary disease presented to the hospital with worsening dyspnea on exertion and orthopnea for 4-5 days. He denied any chest pain, palpitations, leg swelling, dizziness, syncope, fever, chills, nausea, or vomiting. Vital signs on presentation were as follows: temperature—98.9 F, blood pressure—132/84 mm Hg, pulse—121 beats per minute, and respiratory rate—19 per minute. Oxygen saturation was 94% on room air. Cardiopulmonary examination revealed tachycardia, regular S1, S2, presence of S3, jugular venous distension, and bilateral inspiratory crackles. Initial electrocardiogram (EKG) in emergency department showed sinus tachycardia at 115 beats per minute with nonspecific intraventricular conduction delay without any ischemic changes. Chest x-ray showed pulmonary congestion. His TSH was normal (2.82 IU/mL). Patient was admitted for heart failure exacerbation and started on intravenous loop diuretic. He was not on beta-blocker at home, and hence, beta-blocker was not started on admission. Myocardial infarction was ruled out. By day 3 of hospitalization, he diuresed well and his breathing improved. He was switched to oral loop diuretic, and carvedilol 12.5 mg twice a day was initiated. The EKG performed later that

day is shown in Figure 1. What would be the next best step in the management of this patient?

1. Increase dose of carvedilol to 25 mg twice a day.
2. Stop carvedilol and start amiodarone.
3. Electrophysiology study (EPS).
4. Permanent pacemaker implantation.

2 | DISCUSSION

The answer is C. The EKG here shows sinus tachycardia versus atrial tachycardia with predominantly 3:2 atrioventricular (AV) block. There is 4:3 AV block at the end. His baseline EKG on admission is shown in Figure 2. The p-wave morphology in the baseline EKG is slightly different compared to the p-wave in the EKG which is presented here. However, the p-wave axis is exactly the same. Hence, although there is a possibility of atrial tachycardia, it could just be sinus tachycardia. In the EKG presented here, every other complex appears to be aberrantly conducted. P-waves in the beginning and the end are marked by arrows (Figure 3). They march throughout the EKG. Although presence of 4:3 AV block at the end might suggest Mobitz 1 AV block throughout, one cannot be certain. As every second

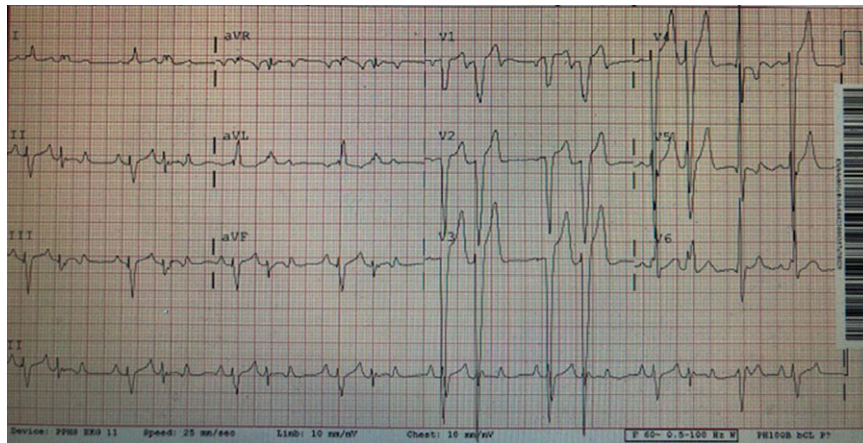


FIGURE 1 EKG on day 3 after initiation of beta-blocker

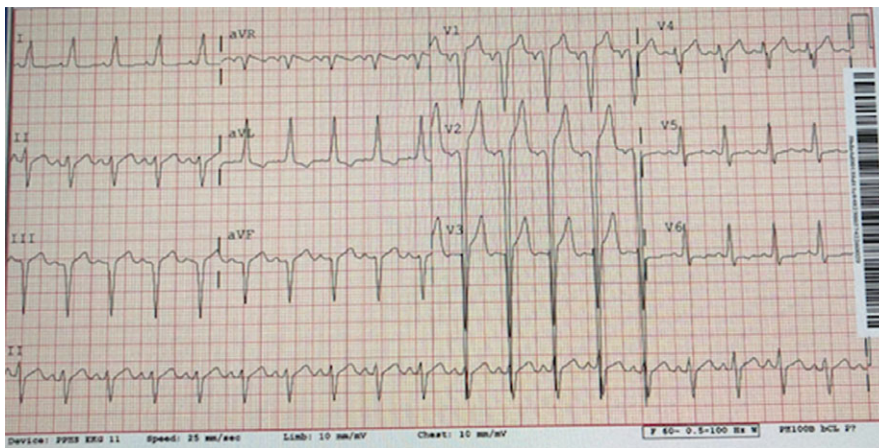


FIGURE 2 EKG on admission showing sinus tachycardia at 115 beats per minute with nonspecific intraventricular conduction delay



FIGURE 3 EKG showing sinus tachycardia with predominantly 3:2 AV block with 4:3 AV block at the end. P-waves in the beginning and end of the EKG are marked by black arrows

p-wave falls on t waves, it is difficult to say if there is prolongation of PR interval from first to the second conducted beat. Every third p-wave is blocked up until the end where third p-wave is conducted

with a prolonged PR interval causing a slightly narrower QRS complex (second last QRS complex). This is probably due to more recovery time in the bundle of His. It is possible that patient has Mobitz 2

AV block in the beginning and Mobitz 1 at the end. When distinction between Mobitz 1 and Mobitz 2 is not definitively possible on the surface EKG, EPS is indicated.¹ Even Mobitz 1 AV block can be infranodal, and that can only be determined by EPS.² If Mobitz 1 AV block is found to be intra- or infra-Hisian on EPS, permanent pacing is indicated.¹ Hence in this patient, EPS is indicated for three reasons: (i) to distinguish between Mobitz 1 and Mobitz 2 AV block, (ii) if it is Mobitz 1, to determine whether it is supra-Hisian or intra-/infra-Hisian, and (iii) to help differentiate if the atrial rhythm is sinus or atrial tachycardia. Option A is not correct as if patient does have Mobitz 2 AV block or intra-/infra-Hisian Mobitz 1 AV block, he can progress to complete heart block with beta-blockers. Option B is not correct as patient needs beta-blocker for his cardiomyopathy. However, it is important to make sure whether he needs pacemaker or not as discussed above. Also, there is no indication for amiodarone in this patient. Option D is not correct as we do not know for sure if he will need a pacemaker.

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CONFLICT OF INTEREST

Authors declare no conflict of interests for this article.

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