CASE REPORT

The exception to Marriot's sign

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Differentiation of a wide complex arrhythmia can pose as a clinical challenge in the acute care setting. Two broad differentials exist including ventricular tachycardia versus supraventricular tachycardia with aberrancy, underlying bundle branch block or intrinsic conduction defect. To aid in distinguishing between supraventricular tachycardia and ventricular tachycardia, Brugada criteria is commonly used, albeit new algorithms have become more common. Marriot's sign, a taller peak in the first *R* wave when compared to *R'* is considered a specific criterion for distinguishing between these two entities and strongly favors the diagnosis of ventricular tachycardia. In this case we present a wide complex tachycardia, which is an exception to Marriot's sign.

KEYWORDS

atrial flutter, basic, noninvasive techniques-electrocardiography/clinical, ventricular tachycardia

1 | INTRODUCTION

Differentiation of a wide complex arrhythmia can pose as a clinical challenge in the acute care setting. Two broad differentials exist including ventricular tachycardia versus supraventricular tachycardia with aberrancy, underlying bundle branch block or intrinsic conduction defect. To aid in distinguishing between supraventricular tachycardia and ventricular tachycardia, Brugada criteria is commonly used, albeit new algorithms have become more common (Kaiser et al., 2015; Vereckei, 2014). Marriot's sign, a taller peak in the first *R* wave when compared to *R'* is considered a specific criterion for distinguishing between these two entities and strongly favors the diagnosis of ventricular tachycardia (Kaiser et al., 2015; Vereckei, 2014). In this case we present a wide complex tachycardia, which is an exception to Marriot's sign.

2 | CASE PRESENTATION

A 62-year-old male with a known past medical history significant for early liver cirrhosis and hypertension presented to the hospital with a sensation of palpitations and dizziness. Vitals were unremarkable on presentation apart from significant tachycardia with a heart rate of approximately 250 beats per minute. The remainder of the physical

examination was within normal limits. On auscultation, the heart rhythm appeared to be regular without a clear S1 and S2 appreciated. A 12-lead EKG was performed at this time showing a wide complex rhythm shown in Figure 1.

Interpretation: A regular wide complex tachycardia with a heart rate of approximately 250 appreciated. In lead V₂ the presence of an atypical right bundle branch block is appreciated. Left axis deviation is also appreciated.

The working differentials at this time were monomorphic ventricular tachycardia versus a supraventricular tachycardia with aberrancy. Due to concern for acute decompensation, a 20 mg IV diltiazem push was given with the subsequent EKG shown below in Figure 2.

The repeat EKG obtained after Cardizem was given showed a rhythm consistent with atrial flutter with 2:1 conduction with 1 PVC and an underlying right bundle branch block and left anterior fascicle block (bifascicular block). This finding after administration of diltiazem supported a diagnosis of atrial flutter 1:1 conduction on initial presentation. During the hospitalization, he was appropriately managed with rate control with oral metoprolol succinate and successfully cardioverted after TEE.

Interpretation: Atrial flutter with 2:1 conduction, right bundle branch block and left anterior fascicle block appreciated. Atypical right bundle branch block morphology in Lead V₂ is still appreciated.

FIGURE 1 Interpretation: A regular wide complex tachycardia with a heart rate of approximately 250 appreciated. In lead V_2 the presence of an atypical right bundle branch block is appreciated. Left axis deviation is also appreciated

FIGURE 2 Interpretation: Atrial flutter with 2:1 conduction, right bundle branch block and left anterior fascicle block appreciated. Atypical right bundle branch block morphology in lead V_2 is still appreciated

3 | DISCUSSION

In this case, we describe a wide complex tachycardia wherein the differentials included supraventricular tachycardia with aberrancy or conduction defect versus monomorphic ventricular tachycardia. Application of Brugada criteria helps distinguish between these two arrhythmias. Marriot's sign, a taller peak in the first R wave when compared to R' is considered a very specific criteria for distinguishing between these two entities and strongly favors the diagnosis of ventricular tachycardia. In this case, however, in lead V_2 although the first R wave is taller than the R' , the underlying arrhythmia is a supraventricular tachycardia as opposed to ventricular tachycardia. This finding illustrates an important exception to Marriot's sign. In the presence of an underlying right bundle branch block and left anterior fascicle block, the baseline morphology of a right bundle branch block may be altered such that the first R wave is taller than the subsequent R' making Marriot's sign obsolete (Marriott, 2002). Thus in this case, although the arrhythmia did show an atypical right bundle branch block, it is not consistent with a ventricular tachycardia as the baseline EKG

is consistent with a right bundle branch block and left anterior fascicle block. In such a setting is important to consider the clinical situation as well as other aspects of Brugada criteria and the newer algorithms for ventricular tachycardia as well.

REFERENCES

- Kaiser, E., Darrieux, F. C., Barbosa, S. A., Grinberg, R., Assis-Carmo, A., Sousa, J. C., ... Scanavacca, M. I. (2015). *Differential diagnosis of wide QRS tachycardias: Comparison of two electrocardiographic algorithms*. Europace: WB Saunders Company, 17, 1422–1427.
- Marriott, H. J. L., (2002). *Challenging ECGs*. Philadelphia: Hanley & Belfus.
- Vereckei, A. (2014). *Current algorithms for the diagnosis of wide QRS complex tachycardias*. Current Cardiology Review, 10, 262–276.

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