An Irregular Ventricular Tachycardia Induced Reversible Cardiomyopathy

Ibrahim Marai MD[1,2] and Bernard Belhassen MD[3,4]

[1]Department of Cardiovascular Medicine, Tzafon Medical Center, Lower Galilee, Israel
[2]Azrieli Faculty of Medicine, Bar-Ilan University, Safed, Israel
[3]Heart Institute, Hadassah Medical Center, Faculty of Medicine, Hebrew University of Jerusalem, Jerusalem, Israel
[4]Gray Faculty of Medical and Health Sciences, Tel Aviv University, Tel Aviv, Israel

KEY WORDS: cardiomyopathy, irregular ventricular tachycardia, moderator band

IMAJ 2026; 28: 453–454

A persistently irregular wide complex tachycardia is usually related to atrial fibrillation with aberrant conduction but it rarely has a ventricular origin. We present a case of irregular ventricular tachycardia (VT) associated with reversible cardiomyopathy.

PATIENT DESCRIPTION

A 47-year-old male with no significant past personal or familial history was admitted because of severe weakness and recurrent episodes of presyncope during the preceding week. He was not receiving any medication nor taking any toxic drugs. An initial electrocardiogram showed irregular wide complex arrhythmia [Figure 1A]. A physical examination was unremarkable except for an irregular pulse. Electrolytes and thyroid function were normal.

The arrhythmia was irregular and included repetitive ventricular couplets and triplets, which had similar morphology. Rare sinus captures were observed [Figure 1A]. The QRS during the tachycardia had a morphology of left bundle branch block (LBBB) with a superior frontal axis. Couplets and triplets of repetitive premature ventricular complexes (PVCs) with long coupling intervals (coupling intervals of 560–760 msec) were also observed [Figures 1A and 1B]. The first beat of the arrhythmia had a positive morphology in lead II, which progressively changed to negative morphology.

Eventually, after a single oral dose of bisoprolol 2.5 mg, only short-coupled PVCs (coupling interval of 340 msec) were noticed [Figure IC]. Later, during nocturnal electrocardiogram monitoring, no arrhythmias could be observed. An electrocardiogram during sinus rhythm was normal including normal QT interval with no evidence of early repolarization. A baseline echocardiogram showed moderate global left ventricular dysfunction.

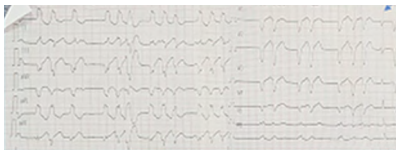
Treatment with ablation was not attempted due to the spontaneous resumption of the arrhythmia. A repeated echocardiogram after 3 days without arrhythmias showed near normal global ventricular function. After a discussion with the patient, it was decided to start quinidine sulfate 200 mg three times a day. During the month of follow-up, the patient remained symptom-free on well-tolerated quinidine therapy.

COMMENT

In our patient, long-lasting irregular wide complex tachycardia was associated with echocardiographic signs of left ventricular dysfunction, which subsided with the disappearance of arrhythmia. The differential diagnosis of irregular wide complex tachycardia included atrial fibrillation

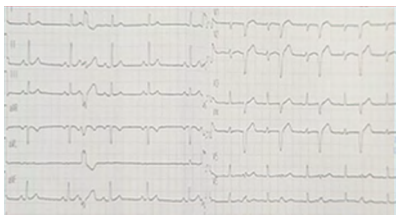
Figure 1. Electrocardiograms at admission and several hours later

[A] Irregular ventricular arrhythmia with capture beat (arrow)



[B] Repetitive ventricular couplets and triplets

[C] Isolated short-coupled ventricular premature beats



with aberrant conduction (intraventricular or accessory pathway) and VT. The presence of capture beats [Figure 1A], the lack of ventricular preexcitation, and the evolution of the arrhythmia from irregular wide complex arrhythmia to repetitive PVCs, in addition to couplets and triplets exhibiting a morphology similar to the tachycardia, strongly supported the ventricular origin of the arrhythmias.

The QRS pattern (LBBB, superior axis) was similar during all the forms of arrhythmia suggesting a common origin close to the right ventricular moderator band [1]. Importantly, positive R in lead II in the initial part of the QRS was present in our patient as well as in three of the ten patients reported by Sadek and colleagues [1]. In those patients, the arrhythmia was ablated at the moderator band. Interestingly, the PVCs were found to have both short- and long-coupling intervals.

The moderator band is a unique intracavitary structure. It extends from the septum to the anterior papillary muscle of the right ventricle and contains the right bundle branch within its muscular structure, which remains undivided until it reaches the papillary muscle [1]. The electrophysiological properties of the moderator band differ from the surrounding myocardium. The moderator band is a well-known source of ventricular arrhythmia, including short-coupled PVCs, which can initiate ventricular fibrillation. In addition, reentrant regular ventricular tachycardias use the moderator band as one limb of the reentrant circuit and the right ventricular myocardial free wall and septum as the other limb [2]. Chen et al. [3] reported a case series of eight patients with idiopathic accelerated ventricular arrhythmia or VT originating from the right bundle branch close to the moderator band. None of their patients had irregular VT.

After an extensive review of the literature, we found only one report of irregular VT like our present case, which induced cardiomyopathy [4]. The arrhythmia was mapped and ablated at a focal origin in the moderator band close to its insertion into the anterior papillary muscle [4]. The authors attributed the mechanism of the tachycardia to triggered activity secondary to calcium overload when some oscillatory potentials reached the threshold and initiated an action potential [4]. Such mechanisms might also have been operative in our patient.

Our case is similar to that reported by Gonzalez and co-authors [4], but ours also included the documentation of short-coupled PVCs, which raises questions about the arrhythmic prognosis of such arrhythmia.

The treatment of ventricular arrhythmia originating from the moderator band may include antiarrhythmic medications, radiofrequency ablation [1,4], and implantable cardioverter-defibrillator implantation. Since some types of ventricular arrhythmia originates from the moderator band, such as those associated with short-coupled PVCs, may cause VF [1], the decision may be difficult. In our patient the arrhythmia spontaneously subsided, which made the mapping and ablation difficult. Cardiac magnetic resonance imaging looking for structural heart disease, myocardial fibrosis, and late Gadolinium enhancement is valuable for decision making.

For our patient, we decided to prophylactically give quinidine, a well-known and effective therapy for idiopathic ventricular fibrillation [5].

CONCLUSIONS

We presented a rare case of reversible cardiomyopathy secondary to irregular VT assumed to originate from the right ventricular moderator band.

Correspondence

Dr. I. Marai
Dept. of Cardiovascular Medicine, Tzafon Medical Center, Lower Galilee 15208, Israel
Email: imarai@tzmc.gov.il; ibrahimmarai1973@gmail.com

References

1. Sadek MM, Benhayon D, Sureddi R, et al. Idiopathic ventricular arrhythmias originating from the moderator band: electrocardiographic characteristics and treatment by catheter ablation. *Heart Rhythm* 2015; 12: 67-75.
2. Walton RD, Pashaei A, Martinez ME, et al. Compartmentalized structure of the moderator band provides a unique substrate for macroreentrant ventricular tachycardia. *Circ Arrhythm Electrophysiol* 2018; 11: e005913.
3. Chen M, Gu K, Yang B, et al. Idiopathic accelerated idioventricular rhythm or ventricular tachycardia originating from the right bundle branch unusual type of ventricular arrhythmia. *Circ Arrhythm Electrophysiol* 2014; 7: 1159-67.
4. Gonzalez ML, Sriram CS, Gonzalez MD. Irregular ventricular tachycardia originating from the moderator band. *J Electrocardiol* 2023; 78: 25–28.
5. Belhassen B, Glick A, Viskin S. Excellent long-term reproducibility of the electrophysiologic efficacy of quinidine in patients with idiopathic ventricular fibrillation and Brugada syndrome. *Pacing Clin Electrophysiol* 2009; 32: 294-301.

A man needs a little madness, or else he never dares cut the rope and be free.
Nikos Kazantzakis (1883–1957), Greek poet and novelist