

# Benefit of the Combined use of Three-Dimension Anatomical Mapping and Intracardiac Echocardiography in Catheter Ablation of Premature Ventricular Contraction Coming from the Moderator Band of the Right Ventricle: A Case Report

Mysuta Mauricio A, Amrein Eugenia \*, Galizio Nestor O, Carnero Guillermo, Alvarez Correa Mariel, Santillan Eugenia, Ranieri Soledad, Benito Rocío, González José L

Electrophysiology Department, Favaloro Foundation University Hospital, Buenos Aires, Argentina.

**\*Corresponding Author:** Amrein Eugenia, Electrophysiology Department, Favaloro Foundation University Hospital, Buenos Aires, Argentina.

**Received Date:** October 04, 2023 | **Accepted Date:** October 25, 2023 | **Published Date:** November 01, 2023

**Citation:** Mysuta Mauricio A, Amrein Eugenia, Galizio Nestor O, Carnero Guillermo, Alvarez C Mariel., et al, (2023), Benefit of the Combined use of Three-Dimension Anatomical Mapping and Intracardiac Echocardiography in Catheter Ablation of Premature Ventricular Contraction Coming from the Moderator Band of the Right Ventricle: A Case Report, *International Journal of Clinical Case Reports and Reviews*, 15(1);

**DOI:**10.31579/2690-4861/344

**Copyright:** © 2023, Amrein Eugenia. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

## Abstract:

**Introduction:** The moderator band connects the anterior papillary muscle of the tricuspid valve with the free wall of the right ventricle. It is associated with sudden cardiac death risk. Radiofrequency ablation is the treatment of choice for this type of arrhythmias.

**Description:** An 18-year-old patient with no structural heart disease, 17% of premature ventricular contraction in holter. An ablation using three-dimension electroanatomical system was performed with recurrence after 48 hours. Due to the absence of response to antiarrhythmic drugs a new catheter ablation was performed combining three-dimension electroanatomical system and intracardiac echocardiography. The arrhythmia was interrupted 6 seconds after the start of the application. During follow-up, 48 hours Holter monitoring demonstrated no ventricular arrhythmias at 3, 6, 12, and 18 months.

**Conclusion:** It is very important to combine the use of three-dimension anatomical mapping system and intracardiac echocardiogram while performing premature ventricular contraction ablation originated in the moderator band in order to obtain better outcomes in this type of arrhythmias, associated with risk of sudden cardiac death.

**Key words:** case report; ventricular arrhythmias; moderator band; intracardiac echocardiography; three-dimension anatomical mapping

## Introduction

The septomarginal trabecula, also known as the moderator band (MB) is a myocardial tissue structure that connects the anterior papillary muscle of the tricuspid valve with the free wall of the right ventricle (RV) [1].

This structure usually has two insertions, a septal and a lateral one, which leads to the fact that the arrhythmias originated in them can have two different exits and two different ventricular premature contraction morphologies in the electrocardiogram, one with a superior axis and the other with an inferior axis [2].

There is a direct association between MB and severe ventricular arrhythmias (ventricular tachycardia or ventricular fibrillation) in the

absence of structural heart disease. They are often triggered by premature ventricular contraction (PVCs).

Radiofrequency (RF) ablation is the treatment of choice for this type of arrhythmias, due to their risk of sudden death [3]. The use of intracardiac echocardiography (ICE) in combination with three-dimension anatomical mapping allows the identification of the MB and adjacent structures, as well as the correct visualization of the catheter-myocardial contact during the ablation procedure.

## Patient information:

We present an 18-year-old patient with no personal or family history of cardiovascular diseases, candidate for the Argentine air force, who presented ventricular arrhythmia in a cardiological control. He referred palpitations associated with dyspnea.

The electrocardiogram (EKG) showed PVCs with inferior axis and left bundle branch block that seemed to come from the lateral region of the RV tricuspid valve. Holter: 17% PVCs, pairs, bigeminy and trigeminy.

Echocardiogram: left ventricle of normal size, with preserved ventricular function, normal RV, without valve disease. Cardiac magnetic resonance without late enhancement on T1-T2 sequences.

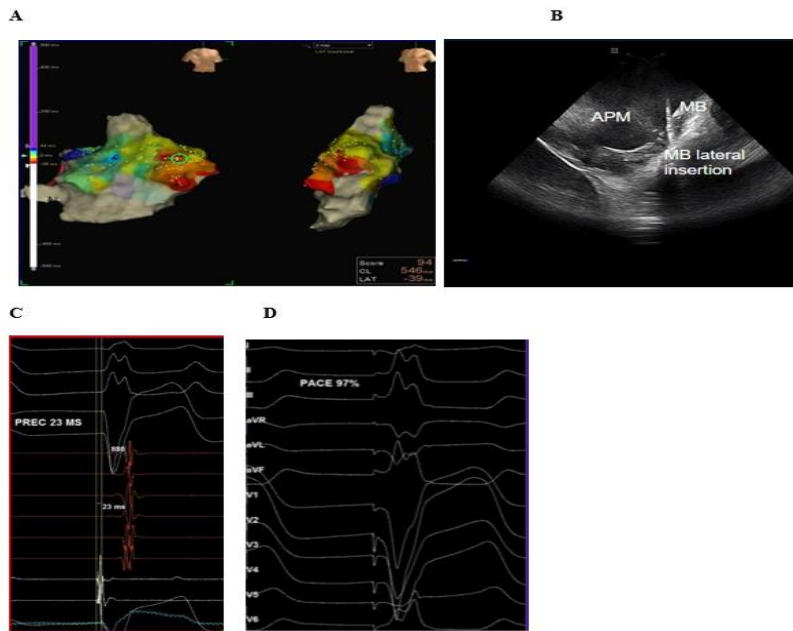
On August 3rd, 2021, radiofrequency (RF) ablation was performed (three-dimension electroanatomical system - NAVX en SITE - Abbott). PVCs coming from the lateral region of the RV were eliminated. At 48 hours after ablation an EKG showed PVCs with similar morphology (figure 1).



**Figure 1:** Description: EKG with PVC inferior axis, late transition in precordials (V5), QRS 100ms.

Due to the absence of response to antiarrhythmic drugs a new catheter ablation was performed combining NAVX en SITE - Abbott and ICE. The following catheters were used: a deflectable quadripolar catheter for coronary sinus recording, an Advisor HD Grid SE for mapping, and a ViewFlex™ Xtra ICE Catheter intracardiac ultrasound.

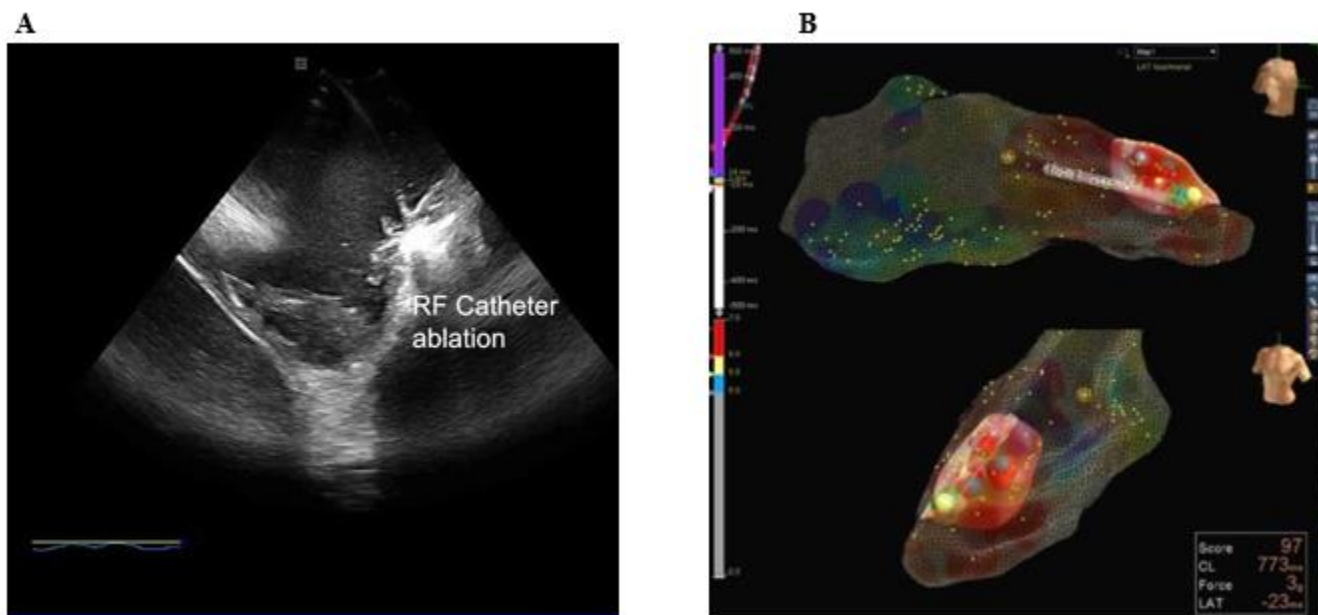
Reconstruction of the RV anatomy and a map of PVCs prematurity were made (Figure 2A) guided by ICE (Figure 2B), showing an area of greater prematurity (-23ms) (Figure 2C) at the level of the junction of the BM with anterior papillary muscle in the free wall of the RV and a pace-mapping concordance of 97% (Figure 2D).



**Figure 2:** Description: A: Tridimensional reconstruction of the RV and PVC precocity map in the union between BM, APM and RV free wall. B: ICE: MB insertion from the RV free wall and APM. C: (-) 23 ms precocity to ablation catheter. QS complex in unipolar. D: Stimulation from the ablation catheter with 97% concordance.

RF application was delivered using a TactiCath™ internal irrigated catheter (Abbott) with 35 Watts and a temperature of 42°C. The arrhythmia was interrupted 6 seconds after the start of the application

(figure 3). After 30 min and isoproterenol infusion no PVCs were triggered.



**Figure 3:** Description: A: ICE catheter observing the ablator in the insertion of MB. B: RF applications with internal irrigated catheter TactiCath (Abbott) in MB.

During follow-up, 48-hour Holter monitoring demonstrated no ventricular arrhythmias at 3, 6, 12, and 18 months.

### Discussion

There is a direct association between PVCs originated from the MB with ventricular tachycardia/ventricular fibrillation, even in asymptomatic patients. Therefore, catheter ablation should be considered as first line therapy.

RF ablation is a challenge for electrophysiologists due to the instability of the catheter and the complex anatomy of the BM. The use of ICE is very important because it allows real-time visualization of MB and guide the tip of the catheter to the proper place in the area of interest.

The combination of ICE, three-dimension anatomical mapping navigators, catheters with high point density to generate voltage and prematurity maps and contact force catheters for ablation, improve the success in this particular PVCs.

### Conclusion

It is very important to combine the use of three-dimension anatomical mapping system and ICE while performing PVC ablation originated in the MB in order to obtain better outcomes in this type of arrhythmias that is associated with risk sudden death.

### References

1. Lee JY, Hur MS. (2019). Morphological classification of the moderator band and its relationship with the anterior papillary muscle. *Anat Cell Biol.* 52(1):38-42.
2. Chen-Xi Jiang, De-Yong Long, Meng-Meng Li, Cai-Hua Sang, Ri-Bo Tang, et al. (2020). Evidence of 2 conduction exits of the moderator band: Findings from activation and pace mapping study. *Heart Rhythm*, Volume 17, Issue 11, Pages 1856-1863.
3. Sadek MM, Benhayon D, Sureddi R, Chik W, Santangeli P, et al. (2015). Idiopathic ventricular arrhythmias originating from the moderator band: Electrocardiographic characteristics and treatment by catheter ablation. *Heart Rhythm.* 12(1):67-75.



This work is licensed under Creative Commons Attribution 4.0 License

To Submit Your Article Click Here:

**Submit Manuscript**

DOI:[10.31579/2690-4861/344](https://doi.org/10.31579/2690-4861/344)

**Ready to submit your research? Choose Auctores and benefit from:**

- fast, convenient online submission
- rigorous peer review by experienced research in your field
- rapid publication on acceptance
- authors retain copyrights
- unique DOI for all articles
- immediate, unrestricted online access

At Auctores, research is always in progress.

Learn more <https://auctoresonline.org/journals/international-journal-of-clinical-case-reports-and-reviews>