CASE REPORT

Increasing pace mapping properties in parahissian premature ventricular contraction. Novel insight from HD grid multipolar catheter

Filippo Maria Cauti MD1 | Pietro Rossi MD, PhD1 | Greta Allegretti BioMedEng2 | Luigi Iaia MD1 | Stefano Bianchi MD1

1Arrhythmology Unit, Ospedale S. Giovanni Calibita, Fatebenefratelli Isola Tiberina, Rome, Italy
2Abbott, St Jude, Abbott Medical Italia, Agrate Brianza, Italy

Correspondence
Filippo Maria Cauti, Arrhythmology Unit, Ospedale S. Giovanni Calibita, Fatebenefratelli Isola Tiberina, Rome, Italy. Email: filippocauti@hotmail.it

Abstract
A 23-year-old athlete with symptomatic low burden premature ventricular contraction (PVC) with left bundle branch block morphology and inferior axis morphology was sent to our department for RV mapping and PVC ablation. Exit zone of the PVC was easily and clearly defined by the bipoles A3-A4 achieving optimal and detailed pacemapping (Panels A-C) near the His bundle (yellow dots). The spatial conformation and the smooth shape of the catheter would definitely help everyday procedures in the setting of low burden PVC/noninducible focal ventricular arrhythmia, especially when the focus is located very close to the conductive tissue.

KEYWORDS
High-density mapping, multipolar catheter, pacemapping, premature ventricular contraction, right ventricular outflow tract ablation

1 | INTRODUCTION

The complex physiopathology of ventricular tachycardias is the main reason of technical difficulties during their ablation.

Pacemapping is a widely used method during mapping of ventricular arrhythmias, especially during the focal pattern. The rationale of this technique is to identify the exit site of the arrhythmia. The more punctual and detailed is the pacemap; the more optimal is matching with the spontaneous tachycardia's morphology allowing to identify the best anatomical limited tissue's area as a target for ablation. The high-density pacemap with more precise identification of the exit area is particularly important in case of the focus is located near conductive tissues.

The pacemapping accuracy depends on different factors such as the activation front, the size of electrodes that deliver the stimulus, the interelectrode spacing, and the applied energy. These factors determine a variable accuracy in the precise discrimination of the exit site.

The technology development and, particularly, the new multipolar catheters with small electrodes and very short inter electrode space have allowed a better discrimination of ventricular substrate1,2 and probably can fill the gap due to the inaccuracy of pacemapping as demonstrated by this clinical case.

2 | CASE REPORT

A 23-year-old athlete with symptomatic low burden (=8000 over 24 hours Holter monitoring) premature ventricular contraction (PVC) with left bundle branch block morphology and inferior axis morphology was sent to our department for right ventricle (RV) mapping and PVC ablation (competitive medical certification reason). The patient was scheduled for RV and PVC mapping (substrate analysis and eventually PVC ablation) with EnSite Precision Navigation System and the use of the new HD Grid Mapping catheter (Abbott Medical, USA). The design of the catheter has equidistant spacing...
allowing an HD Wave bipole recording along and across the splines to help substrate mapping and taking into account for directionality. The high-density grid mapping provides similar coverage to a single or double loop catheter, while offering predictable navigation and consistency when compared to a branch catheter. The smooth shape and the close design allow a safe navigation, prevention entrapping from valvular chordae and valves muscles, and soft mapping over the His region. The Grid flexibility due to the bidimensional concept can be placed stable in the interest region and permits acquisition and pacing with different bipoles (across and along) covering a wide area without bumping the focal arrhythmia or damaging the conduction system. Due to the intraoperative inconsistent arrhythmic burden, focal map activity was recorded during few PVC. The area of interest was detected proximal to His bundle (yellow dots in the RV map) with an offset of—30 milliseconds. The spatial electrodes position of the catheter (interelectrodes space of 3 mm) allows to cover a wide myocardial area and to pace and to record from multiple vectors without moving the catheter. Detailed pace map was performed near the area of interest and the PVC exit zone was clearly defined by the selected bipoles (A3-A4) achieving 97% of pace mapping score (95% across the splines, 97% along the splines; Figure 1). All the other pacing sites tested were below 90% of pace matching scores.

Due to the continuity of the arrhythmic focus with the His bundle, the low burden of PVC, the normal substrate of the right ventricle, the result of the PES (negative up to 4 extrastimuli even with isoprenaline infusion), the focus ablation was not performed. No complication occurred during the mapping procedure as well as no right bundle branch block morphology.

3 | DISCUSSION

To the best of our knowledge, this is the first report that highlights the utility of the new high-density multipolar Advisor HD Grid over the high-density mapping purpose.

This spatial conformation and the smooth shape of the catheter would definitely help everyday procedures in the setting of low burden PVC/noninducible focal ventricular arrhythmia, especially when the focus is located near the His bundle.

CONFLICT OF INTEREST

Filippo M. Cauti received grant fee for honoraria teaching purpose from Abbott Medical. Greta Allegretti is an Engeneer employee in Abbott Medical.

ORCID

Filippo Maria Cauti https://orcid.org/0000-0003-2088-8070
REFERENCES

1. Cauti FM, Rossi P, Iaia L, Bianchi S. Critical isthmus of Fallot ventricular tachycardia easily identified by linear multipolar diagnostic catheter. Europace 2018;20(2):170. https://doi.org/10.1093/europace/euy106

2. Bellmann B, Plenge T, Sultan A, Steven D. First endocardial mapping of the left ventricle using the AdvisorTM HD Grid Catheter in a patient with a mitral valve clip. Eur Heart J 2018;39(31):2911. https://doi.org/10.1093/eurheartj/ehy183.

How to cite this article: Cauti FM, Rossi P, Allegretti G, Iaia L, Bianchi S. Increasing pace mapping properties in parahissian premature ventricular contraction. Novel insight from HD grid multipolar catheter. J Arrhythmia. 2019;35:149–151. https://doi.org/10.1002/joa3.12135