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Feasibility of fast ventricular tachycardia mapping using the Rhythmia™ system in a patient with an Impella™

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ABSTRACT

Use of 3D navigation systems may be sometimes impossible in patients with left ventricular assist devices because of major electromagnetical interferences with some 3D systems based on magnetic localization. Mapping with the Rhythmia™ system in patients implanted with an Impella™ is described to be non feasible. We relate how to overcome this technical issues in this case.

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Percutaneous left ventricular assist devices (LVAD) are sometimes needed for ablation procedures in unstable patients [1]. However use of 3D navigation systems may be difficult or sometimes impossible in patients with percutaneous LVAD because of the major electromagnetical interferences created by the turbine of the device, leading to potential major issues with available 3D systems based on magnetic localization [2]. To date, feasibility of mapping with the Rhythmia™ system in patients implanted with an Impella has been shown to be non feasible [3].

We relate how to fix technical issues during ablation using the Rhythmia™ system in a 51 year-old man with recent myocardial infarction and dilated left ventricle (EF < 20%) with subnormal right ventricular function (TAPSE 16 mm). Because of recurring ventricular fibrillation despite anti-arrhythmic drugs, he had been equipped with an Impella CP™ (Abiomed Inc., Danvers, MA, USA) in bridge to recovery/destination LVAD or transplantation, using an axillary artery approach due to severe peripheral artery disease.

Calibration of the Rhythmia™ cutaneous back patch could only be done after the Impella™ was transiently switched off. We then performed a first electro-anatomical map during ventricular pacing with the Orion™ catheter during sequences of 3 minutes turning off separated by 3 minutes periods turning on the Impella™. Once the anatomical map acquired and the impedance field created, we could use the impedance-based localization for the Orion™ catheter (designed as a Constellation™ catheter for the system to localize it) and could freely perform full mapping of a very fast ventricular tachycardia while the Impella™ was consistently on (Fig. 1).

This report highlights how to deal with electromagnetical fields created by an Impella™ device for performing ablation with the Rhythmia™ system. If this technique allows high quality 3D mapping with other Impella™ models or with 3D systems remains to be determined.

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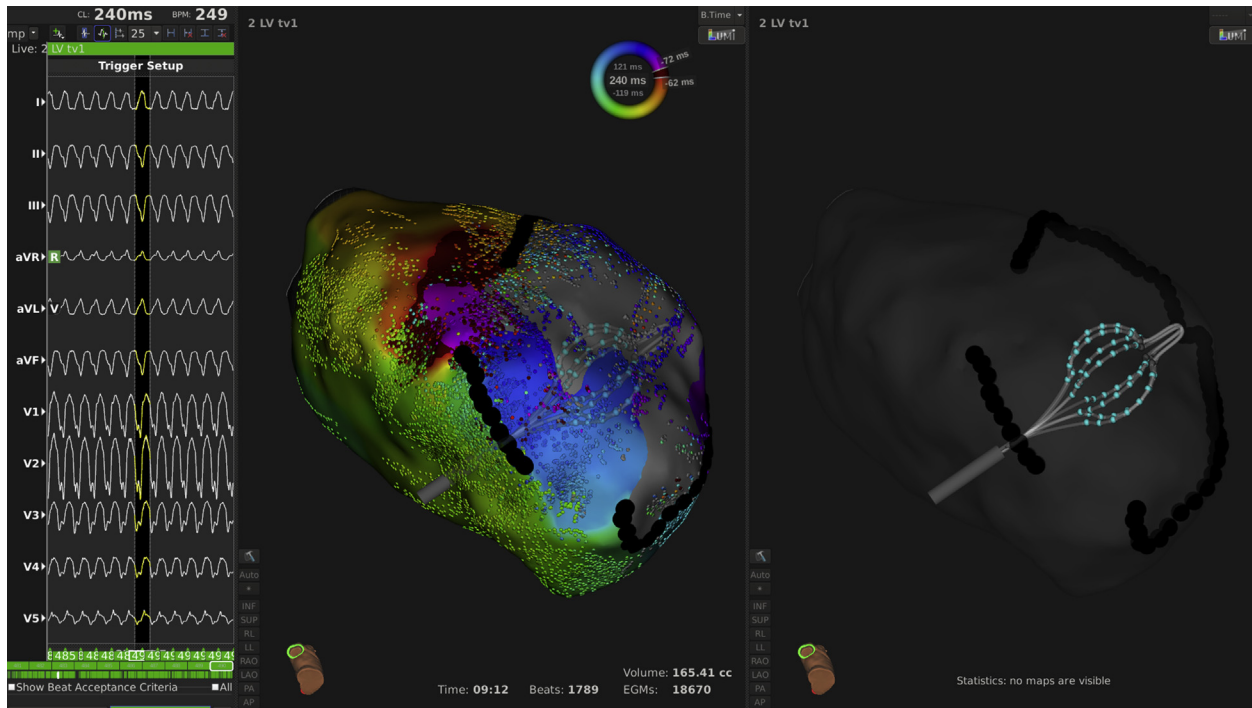


Fig. 1. Activation map during fast ventricular tachycardia (240 msec cycle length) showing reentrant circuit through two gaps inside the previous line of encircling lesions (black dots). The activation was recorded by the Orion™ catheter (designed as a Constellation™ catheter for allowing impedance-based localization) and projected on the anatomical map previously acquired while the Impella™ was turned off. More than 18000 EGMs could be collected during 9 minutes of mapping without interference with the device.

References

- [1] Reddy YM, Chinitz L, Mansour M, Bunch TJ, Mahapatra S, Swarup V, Di Biase L, Bommana S, Atkins D, Tung R, Shivkumar K, Burkhardt JD, Ruskin J, Natale A, Lakkireddy D. Percutaneous left ventricular assist devices in ventricular tachycardia ablation: multicenter experience. *Circ Arrhythm Electrophysiol* 2014;7:244–50.
- [2] Vaidya VR, Desimone CV, Madhavan M, Noheria A, Shahid M, Walters J, Ladewig DJ, Mikeell SB, Johnson SB, Suddendorf SH, Asirvatham SJ. Compatibility of electroanatomical mapping systems with a concurrent percutaneous axial flow ventricular assist device. *J Cardiovasc Electrophysiol* 2014;25:781–6.
- [3] Neuzner J, Dietze T, Paliege R, Gradaus R. Effectiveness of a percutaneous left ventricular assist device in preventing acute hemodynamic decompensation during catheter ablation of ventricular tachycardia in advanced heart failure patients: a retrospective single-center analysis. *J Cardiovasc Electrophysiol* 2019. <https://doi.org/10.1111/jce.14199>.