

LETTERS TO THE EDITOR

To the Editor— *Bipolar ablation of refractory VT circuits: Current opportunities and limitations*



We've read with great interest the article by Al-Hadithi and colleagues¹ dealing with unstable ventricular tachycardia (VT) treated with bipolar radiofrequency catheter ablation (Bi-RFCA). We find this case a good opportunity for further discussion on Bi-RFCA.

The authors mentioned that the left ventricular summit (LVS) is a challenging location of VT. Bi-RFCA was already utilized for ablation of LVS. We've found that LVS Bi-RFCA between coronary veins and adjacent left ventricular sites is feasible and effective.² Currently we treated with this technique 4 patients with good long-term results (submitted for publication). For arrhythmias originating from the inaccessible LVS, Bi-RFCA targeting the left pulmonary cusp can be considered.³

The authors achieved success using moderate powers (40 W). Sometimes high-power values⁴ are required; however, the safety cut-off for Bi-RFCA remains unknown. One in vitro study brings also some important suggestions regarding steam pops,⁵ which did not occur only when an 8-mm-tip catheter was used as a return electrode (RE). Recently we reported an incidental temperature rise of 4-mm-tip RE.⁶ These findings may suggest a better safety profile of an 8 mm catheter used as RE.

The presented case shows that extracorporeal membrane oxygenation-supported Bi-RFCA can also be feasible in patients with hemodynamically unstable VT. The fact that VT abolition was achieved using moderate power can additionally encourage the use of this approach for the treatment of some resistant midmyocardial VT circuits.

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References

1. Al-Hadithi ABAK, Khakpour H, Cruz D, Boyle NG, Shivkumar K, Bradfield JS. Incessant intraseptal ventricular tachycardia ablated utilizing extracorporeal membrane oxygenation and bipolar ablation. *HeartRhythm Case Rep* 2018;4:557–560.
2. Futyma P, Wysokińska A, Sander J, Futyma M, Kułakowski P. Bipolar endocardial radiofrequency ablation of arrhythmia originating from the left ventricular summit. *Circ J* 2018;82:1721–1722.
3. Futyma P, Kułakowski P. Bipolar ablation delivered between the pulmonary and aortic valve cusps [published online ahead of print October 8, 2018]. *Rev Esp Cardiol (Engl Ed)*. <https://doi.org/10.1016/j.rec.2018.08.022>.

4. Sauer WH, Steckman DA, Zipse MM, Tzou WS, Aleong RG. High-power bipolar ablation for incessant ventricular tachycardia utilizing a deep midmyocardial septal circuit. *HeartRhythm Case Rep* 2015;1:397–400.
5. Nguyen DT, Tzou WS, Brunnquell M, et al. Clinical and biophysical evaluation of variable bipolar configurations during radiofrequency ablation for treatment of ventricular arrhythmias. *Heart Rhythm* 2016;13:2161–2171.
6. Futyma P, Głuszczyk R, Futyma M, Kułakowski P. Right atrial position of a return electrode for bipolar ablation of the left posteroseptal process ventricular tachycardia. *Pacing Clin Electrophysiol* 2019;42:474–477.

Reply to the Editor— *Bipolar ablation of refractory VT circuits: Current opportunities and limitations*



We thank Drs Futyma and Kułakowski for their interest and insights regarding our case report and how it relates to the increasing utilization of bipolar ablation for challenging ventricular tachycardia (VT) substrates.

This case was one of the early bipolar ablations performed at our center and therefore our power utilization was conservative, with gradual up-titration after assessing for lack of complications at lower power. The long-term clinical control of the incessant unipolar-resistant VT, as well as the dramatic septal morphologic and wall motion changes noted on the postablation echocardiogram, demonstrate that the power utilized was sufficient.

Work by prominent electrophysiology groups¹ has greatly advanced our translational science and clinical understanding of bipolar ablation for refractory VT. However, there remain gaps in our knowledge and we eagerly await further human studies to better delineate the optimal parameters for a given substrate/location.

With regard to utilization of bipolar ablation to target left ventricular summit VT, the letter authors have published elegant work demonstrating this technique. However, our group maintains a high level of caution with respect to bipolar ablation between the coronary veins or coronary cusps and adjacent endocardial sites. Given the limited translational data specifically looking at adjacent coronary artery damage with such a technique, it may be safer to consider wire mapping/coil embolization² or alcohol ablation to a small arterial or venous branch³ to limit the risk of collateral damage to larger and more proximal coronary arteries.

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References

1. Nguyen DT, Tzou WS, Brunquell M, et al. Clinical and biophysical evaluation of variable bipolar configurations during radiofrequency ablation for treatment of ventricular arrhythmias. *Heart Rhythm* 2016;13:2161–2171.
2. Tholakanahalli VN, Bertog S, Roukoz H, Shivkumar K. Catheter ablation of ventricular tachycardia using intracoronary wire mapping and coil embolization: description of a new technique. *Heart Rhythm* 2013;10:292–296.
3. Baher A, Shah DJ, Valderrabano M. Coronary venous ethanol infusion for the treatment of refractory ventricular tachycardia. *Heart Rhythm* 2012;9:1637–1639.