Non-Infectious Lead Extractions

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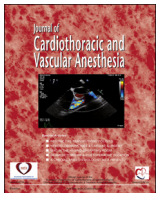

Perioperative Echocardiography
Editorial

Non-Infectious Lead Extractions: Enemy of Good?

WITH THE PROGRESSIVE aging of the population and the widening indications for cardiac implantable electronic devices (CIEDs), the number of patients in need of transvenous lead extractions (TLE) has grown. Annually, more than 1 million CIEDs are implanted globally.[1] With the CIEDs reaching the end of their operational life, there is a consequent increase in TLE. The debate of extraction versus expectant management is based on the status of the lead. Whereas most consider infection as an absolute indication for removal, there are multiple options for malfunctioning and upgradable systems. In either scenario, the 2 popular clinical options are lead extraction or abandonment. Both are associated with risks, benefits, and pertinent safety concerns. Recognizing this dilemma, The Heart Rhythm Society published an expert consensus on the management of TLE in 2009 that was endorsed by the American Heart Association.[2] This document provided an elaborate protocol on the decision-making and management regarding TLE. In the authors' opinion, this document could be the foundation for individual patient care. Lead extraction decreases the long-term risks of vascular complications and the need for infection-related future extractions of older leads. It carries a mortality risk and other major vascular complications, cardiac injury, lead breakage, and migration.[2,3] Patients with abandoned leads are at risk for a lower success rate of future lead removal, which doubles every 3 years.[4] Other risks include a 2%-to-7% increase of infection at each device change,[5] venous thrombosis or occlusion, tricuspid regurgitation (TR), lead-to-lead interaction, and precluding any magnetic resonance imaging (MRI) studies.

Despite its high-risk nature, high volume centers reported that lead extraction was safe, with 97.6% success, 0.9% major complication rate, and no extraction-related mortality.[3] The decision for TLE or lead abandonment should be a highly individualized process considering patient age and life expectancy, lead age and functionality, and most importantly, the patient's wishes. Risk stratification should be performed so that benefits of lead removal should outweigh the risks based on the aforementioned factors. In addition, a multidisciplinary care team should be present or readily available during the procedure. Furthermore, procedural guidance with real-time transesophageal echocardiography (TEE) and fluoroscopy is desirable.

In this issue of the *Journal*, Hai et al[6] have reported a case of tricuspid valve injury resulting in severe TR and right-to-left atrial shunt after extraction of a right ventricular implantable cardioverter-defibrillator (ICD) lead in a 67-year-old male patient.[6] This patient, with a history of ischemic cardiomyopathy (ICM) due to a prior anterior myocardial infarction and atrial flutter, received a Medtronic Virtuoso ICD in 2007 with a right ventricular Fidelis (Medtronic) lead. Since the elective replacement interval (ERI) was reached, a clinical decision had to be made regarding the Fidelis lead. Based on patient preference of not wanting to undergo another lead extraction, a decision was made in favor of complete extraction and re-implantation of a new device. Besides total extraction, other recommended feasible options possibly could include new device/lead implantation with or without extracting the current leads or placing epicardial leads through video-assisted thoracoscopic surgery (VATS).[2,7]

Unfortunately, this particular case was complicated by development of new severe TR caused by mechanical avulsion of the anterior and/or septal valve leaflets. This resulted in right atrial volume and pressure overload, with consequent right-to-left shunting via a patent foramen ovale. The patient experienced an acute period of hypoxemia during the procedure and was transferred to the coronary care unit for postoperative monitoring. The authors of this report must be commended for their vigilant monitoring and making a timely diagnosis. Their detail-oriented monitoring resulted in significant therapeutic impact. Considering the pre-existing cardiomyopathy, this patient was a poor surgical candidate for immediate tricuspid valve repair or replacement. While this was not an acute emergency, the semi-elective nature of the circumstances did not reduce the gravity of the situation. It was an unanticipated mechanical leaflet injury with significant valve dysfunction. Besides the lack of consent, the evolving availability of percutaneous options had to be considered as part of the clinical decision-making process. A multidisciplinary decision was reached to place the patient on a watchful waiting program with frequent echocardiographic follow-up.

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In conclusion, indications for TLE in the absence of infection remain controversial. On a daily basis, cardiac teams are dealing with the difficult choice of extraction or abandonment of sterile leads. In these patients, a careful and individualized risk-benefit evaluation is necessary. TLE is not necessarily the best strategy, and in the absence of randomized, controlled trials of TLE versus abandonment, individual judgment and patient wishes are still key elements in the decision-making process.

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