

See Article page 245.



Commentary: An ounce of prevention is worth a pound of cure

Andrew Well, MD, MPH, MSCHCT, and
Ziv Beckerman, MD, FACS, MECS

Complete atrioventricular heart block is morbid; whether it manifests as a congenital heart block or a postoperative complication. Pediatric patients account for approximately 1% of all permanent pacemaker implants.¹ This population presents a clinical challenge as many children are either too small or have cardiac or vascular anatomies which prohibit the traditional transvenous approach of lead placement. In this issue of *JTCVS Techniques*, Nellis and colleagues² describe a novel, minimally invasive approach for epicardial lead placement in children. The authors are to be commended for developing an additional technique to address this challenging management situation. Their approach focuses on placement of sutured epicardial leads via video-assisted thoracoscopy (VATS), negating the need for thoracotomy or sternotomy.

The authors report the use of this approach in 5 patients, with lead placement successful in 4 of these attempts. Although initial threshold voltages for the leads were elevated, the performance of the leads was stable after more than 1 year of follow-up. The single failed patient required conversion to a thoracotomy with subsequent successful lead placement. This failure was in a patient with hypoplastic left heart syndrome post-total cavopulmonary completion (Fontan procedure). Although the report represents a small sample of patients, this failure does give pause regarding the ability to use this technique in the most

From the Division of Pediatric and Congenital Cardiothoracic Surgery, Department of Surgery and Perioperative Care, University of Texas Dell Medical School and Texas Center for Pediatric and Congenital Heart Disease, UT Health Austin/Dell Children's Medical Center, Austin, Tex.

Disclosures: The authors reported no conflicts of interest.

The *Journal* policy requires editors and reviewers to disclose conflicts of interest and to decline handling or reviewing manuscripts for which they may have a conflict of interest. The editors and reviewers of this article have no conflicts of interest.

Received for publication March 20, 2021; revisions received March 20, 2021; accepted for publication March 22, 2021; available ahead of print March 26, 2021.

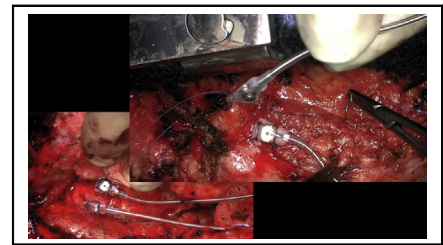
Address for reprints: Ziv Beckerman, MD, FACS, MECS, Texas Center for Pediatric and Congenital Heart Disease, Dell Children's Medical Center, 4900 Mueller Blvd, Suite 3S.003, Austin, TX 78723 (E-mail: zbeckerman@austin.utexas.edu).

JTCVS Techniques 2021;7:249-50

2666-2507

Copyright © 2021 The Author(s). Published by Elsevier Inc. on behalf of The American Association for Thoracic Surgery. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

<https://doi.org/10.1016/j.jtc.2021.03.022>



Epicardial pacemaker electrode placement via a fifth-time repeat sternotomy in a heterotaxy patient status post-total cavopulmonary connection completion.

CENTRAL MESSAGE

A novel, minimally invasive technique for epicardial sutured permanent pacing leads adds an additional intervention option. The complexity of intervention choices highlights the need to avoid complete heart block whenever possible.

complex patients. Nonetheless, further attempts are warranted, as these complex patients may require an additional learning curve beyond that of the general surgical technique.

A greater concern remains regarding the need for permanent pacing. Rates of heart block after congenital heart surgery that require permanent pacing are reported in 1% of all cases³; however, the reported rates of postoperative complete heart block are quite high in certain operations, at 15.6% after double switch and 7.8% after tricuspid valve replacement.³ Two of the patients in this report required permanent pacing after congenital heart surgery. A reduced rate of postoperative heart block will obviate the need for pacing and its associated complications and multiple reinterventions. In our experience, rates of postoperative heart block can be reduced to near zero across many intervention types.⁴⁻⁶

The minimally invasive approach described by Nellis and colleagues is an important add-on to our armamentarium, particularly in patients in whom permanent pacing is unavoidable, such as with congenital heart block. This technique will likely require a learning curve for congenital cardiac surgeons who infrequently perform VATS procedures within their normal practice. Further evaluation is needed to determine appropriate patient selection criteria

to reduce the risk of failure of this technique, particularly in patients with complex anatomy and surgical history. The need for new approaches as well as new devices (leads and pacing devices) is indeed warranted, but perhaps even more important is the refinement of our surgical expertise and avoidance of complete heart block to the point of viewing its occurrence as a never event in congenital heart surgery.

References

1. Lotfy W, Hegazy R, AbdElAziz O, Sobhy R, Hasanein H, Shaltout F. Permanent cardiac pacing in pediatric patients. *Pediatr Cardiol*. 2013;34:273-80.
2. Nellis JR, Alsarraj MK, Sauer JS, Klapper JA, Idriss SF, Turek JW. A minimally invasive approach for atrial and ventricular sew-on epicardial lead placement. *J Thorac Cardiovasc Surg Tech*. 2021;7:245-8.
3. Liberman L, Silver ES, Chai PJ, Anderson BR. Incidence and characteristics of heart block after heart surgery in pediatric patients: a multicenter study. *J Thorac Cardiovasc Surg*. 2016;152:197-202.
4. Mery CM, Zea-Vera R, Chacon-Portillo MA, Zhang W, Binder MS, Kyle WB, et al. Contemporary results after repair of partial and transitional atrioventricular septal defects. *J Thorac Cardiovasc Surg*. 2019;157:1117-27.e4.
5. Mery CM, Zea-Vera R, Chacon-Portillo MA, Zhu H, Kyle WB, Adachi I, et al. Contemporary outcomes after repair of isolated and complex complete atrioventricular septal defect. *Ann Thorac Surg*. 2018;106:1429-37.
6. Scully BB, Morales DLS, Zafar F, McKenzie ED, Fraser CD Jr, Heinle JS. Current expectations for surgical repair of isolated ventricular septal defects. *Ann Thorac Surg*. 2010;89:544-9; discussion 550-1.