

# Better outcomes depend on surgeons joining cardiologists.

Leonardo Mulinari <sup>1</sup> and Luciana Fonseca<sup>2</sup>

<sup>1</sup>University of Miami Miller School of Medicine

<sup>2</sup>Children's Hospital of Pittsburgh of UPMC

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## Abstract

Closure of muscular ventricular septal defects remains a challenge for cardiac surgeons and interventional cardiologists. Different techniques, approaches, and devices are available to increase the success of these procedures. Changwe et al, in this issue of the Journal, describe a novel approach with the usage of a probe-guided system, with encouraging results.

Title:

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Authors

Leonardo Mulinari

(Corresponding Author)

University of Miami Miller School of Medicine, Surgery

1611 NW 12th Ave

East Tower Suite 3016A

Miami, FL, USA 33136-1015

[l.mulinari@med.miami.edu](mailto:l.mulinari@med.miami.edu)

Luciana da Fonseca da Silva

Children's Hospital of Pittsburgh of UPMC, Cardiothoracic Surgery

4401 Penn Avenue

5th Floor Faculty Pavilion

Pittsburgh, PA, USA 15224

4125234078

[dafonsecadasilval@upmc.edu](mailto:dafonsecadasilval@upmc.edu)

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Hybrid approaches are being used for aortic stent implantation, pulmonary valve implants, intraoperative stent implantation, and perventricular ventricular septal defects closure.<sup>11</sup> Agrawal H, Alkashkarib W, Keny D. Evolution of hybrid interventions for congenital heart disease. *Expert Review of Cardiovascular Therapy*, 15:4, 257-266, DOI: 10.1080/14779072.2017.1307733

Closure of apical ventricular septal defects in infants is challenging for surgeons and interventional cardiologists. Although a hybrid approach has been used for some time, Changwe et al<sup>22</sup> Changwe GJ, Hongxin L, Zhang HZ, et al. Percardiac closure of large apical ventricular septal defects in infants: novel modifications and mid-term results. *Journal of Cardiac Surgery in press* describe a novel surgical technique to close apical ventricular septal defects that uses a probe-assisted delivery system. This is done through a chest incision with the aid of transesophageal echocardiography.

Trans-catheter repair of apical interventricular septal defects (VSDs) has been expanded to different defect types since its introduction into clinical practice. Continuous improvements in occlusion devices and sheaths have occurred. Vascular and bodyweight limitations, as well as associated complications, led to the conception of percardiac device closure techniques, especially for apical muscular VSDs.<sup>33</sup> Amin Z, Gu X, Berry JM, Titus JL, Gidding SS and Rocchini AP. Periventricular closure of ventricular septal defects without cardiopulmonary bypass. *Ann Thorac Surg* 1999; 68:149-53.

This retrospective report by Changwe et al. reviews their clinical experience since 2011 with 36 infants undergoing perventricular or peratrial device closure of apical muscular VSDs. They divided the population into three groups according to the access pathway applied. They detail the advantages and limitations of the surgical technique in each group, and report different locations and configurations of muscular VSDs (Cylindrical, Tunnel, Cave-like, Multiple holed) that can interfere with the surgical approach. The peratrial approach was more aesthetical, less traumatic and painful, preserved RV wall intact, and had a shorter length of hospital stay. However, the acute angle formed by the peratrial route for VSD closure precludes its use in some circumstances. Therefore, perventricular was the route of choice for complex VSD types (tortuous tunnel-shaped, cave-like, multiple) and the anterior apical location. They showed that the perventricular pathway was suitable for the occlusion of all types of apical VSDs.

There are limitations to this retrospective analysis when comparing the three groups, mainly due to the morphological complexity of the defects. The authors did not explain which criteria they used to choose the access route in the different types and locations of the defects. Increased success rate, without immediate complications, without the use of Xray, small residual VSD percentage, with clinical improvement in this challenging group of patients, reinforces the superiority of the percardiac approach.

This approach provides an excellent alternative in the treatment of patients with muscular VSDs. Long-term outcomes were excellent, and morbidity associated with cardiopulmonary bypass and conventional surgical repair was avoided. <sup>44</sup> Kang SL, Tometzki A, Caputo M, Morgan G, Parry A, Martin R. Longer-term outcome of perventricular device closure of muscular ventricular septal defects in children. *Catheter Cardiovasc Interv*. 2015 May;85(6):998-1005. doi: 10.1002/ccd.25821. Epub 2015 Feb 3. PMID: 25573696.

Patients with apical muscular VSD are challenging and the collaborative approach between surgeons and interventional cardiologists seems to be the best approach for better care.