Sutureless repair and postoperative residual stenosis: “Never leave with a lesion”

Rachel D. Vanderlaan, MD, PhD,^a and Christopher A. Caldarone, MD^b

From the ^aDivision of Cardiac Surgery, University of Toronto, Toronto, Ontario, Canada; and ^bDivision of Cardiovascular Surgery, Hospital for Sick Children, Toronto, Ontario, Canada.

Disclosures: Authors have nothing to disclose with regard to commercial support.

Received for publication March 17, 2018; accepted for publication March 21, 2018; available ahead of print April 25, 2018.

Address for reprints: Rachel D. Vanderlaan, MD, PhD, Hospital for Sick Children, 555 University Ave, Rm 1518b Hill Wing, Toronto M5G 1X8, Ontario, Canada (E-mail: christopher.caldarone@sickkids.ca).

J Thorac Cardiovasc Surg 2018;156:287-8
0022-5223/\$36.00

Copyright © 2018 Published by Elsevier Inc. on behalf of The American Association for Thoracic Surgery
<https://doi.org/10.1016/j.jtcvs.2018.03.080>

The optimal therapeutic strategy for pulmonary vein stenosis (PVS) arising after routine repair of total anomalous pulmonary venous drainage is not clearly defined. In this issue of the *Journal*, Kalfa and colleagues¹ present an important analysis of multi-institutional experience of 14 European and North American institutions with postsurgical pulmonary vein stenosis (PSPVS). The authors present striking data suggesting that the sutureless repair is the optimal surgical strategy for PSPVS.

Kalfa and colleagues¹ use a complex scoring system incorporating assessment of the severity of “upstream” PVS to control for severity of disease before repair. The authors demonstrate that sutureless repairs are associated with lower postoperative PVS scores, and this benefit persisted at most recent follow-up, supporting the superiority of the sutureless approach. Furthermore, multivariable analysis demonstrated that sutureless repairs were associated with lower incidence of restenosis.

However, further examination of the data demonstrates that concluding superiority of the sutureless repair is far less simple than it appears. The authors included an analysis of the importance of postoperative PVS score (before discharge) and found that higher residual PVS scores were strong predictors of subsequent restenosis, reintervention, and mortality. Thus, minimization of residual obstruction was the dominant determinant of postoperative outcomes regardless of the type of operation.

WHAT CAN WE TAKE AWAY?

First, intraoperative assessment of the pulmonary veins with echocardiography should be obtained in every patient after pulmonary vein surgery. Although not universally a standard of care, the data from Kalfa and colleagues¹ suggest that it should be. Furthermore, we should maintain a low threshold to revise an anastomosis when an

Intraoperative transesophageal echocardiogram with residual PVS.

Central Message

The extent of residual stenosis after repair of postsurgical PVS is a critical determinant of long-term outcomes. The sutureless technique is associated with a higher likelihood of achieving a repair with less residual stenosis and a better long-term outcome.

See Article page 278.

intraoperative gradient is detected, consistent with the old surgical adage “Never leave with a lesion” (Figure 1).

Second, even with the sutureless repair, the authors report that approximately 30% of patients with PVS will undergo reoperation or die within 2 years, a sad truth that is consistent with other reports.² Therefore, PSPVS has not been conquered, even with the optimal choice of surgical procedure. A rational approach to improving outcomes is to detect early recurrent disease with a proactive surveillance

FIGURE 1. Intraoperative transesophageal echocardiogram with residual PVS.

protocol. At the Hospital for Sick Children, we adopted a protocol incorporating computed tomography or magnetic resonance imaging at 1, 6, and 12 months after PSPVS repair. Echocardiography is helpful to screen but is not sufficient as the sole surveillance mode because of poor intrapulmonary windows and intrapulmonary flow redistribution that causes underestimation of disease progression.^{3,4} Early diagnosis is likely to be important because prognosis is extremely poor for patients with progression into the upstream pulmonary veins.⁵

Finally, multi-institutional studies like the current report by Kalfa and colleagues¹ are important to extract knowledge from clinical experience. There is also power in collaborative groups working proactively to standardize therapeutic approaches, gather data, and translate practice-based evidence into evidence-based practice. The PVS Network (PVSNetwork.org) is a rapidly growing

network of clinicians and parents collecting registry data while providing the organizational infrastructure to improve outcomes in patients with all forms of PVS.

References

1. Kalfa DK, Belli E, Bacha E, Lambert V, di Carlo D, Kostolny M, et al. Outcomes and prognostic factors for postsurgical pulmonary vein stenosis in the current era. *J Thorac Cardiovasc Surg*. 2018;156:276-86.
2. Quinonez LG, Gauvreau K, Borisuk M, Ireland C, Marshall AM, Mayer JE, et al. Outcomes of surgery for young children with multivessel pulmonary vein stenosis. *J Thorac Cardiovasc Surg*. 2015;150:911-7.
3. Greenway SC, Yoo S-J, Baliulis G, Caldarone CA, Coles J, Grosse-Wortmann L. Assessment of pulmonary veins after atriopercardial anastomosis by cardiovascular magnetic resonance. *J Cardiovasc Magn Reson*. 2011;13:72.
4. Kotani Y, Zhu J, Grosse-Wortmann L, Honjo O, Coles JG, Van Arsdel GS, et al. Anatomical risk factors, surgical treatment, and clinical outcomes of left-sided pulmonary vein obstruction in single-ventricle patients. *J Thorac Cardiovasc Surg*. 2015;149:1332-8.
5. Lo Rito M, Gazzaz T, Wilder TJ, Vanderlaan RD, Van Arsdel GS, Honjo O, et al. Pulmonary vein stenosis: severity and location predict survival after surgical repair. *J Thorac Cardiovasc Surg*. 2016;151:657-66.