conclusion slide, the preventive management of the RVOT, we routinely do a prophylactic resection.

But I would like to ask 1 question. Under what circumstances in your patient cohort could you not do a Lecompte?

Dr Vergnat. We did a Lecompte in 100% of the patients. That may explain why we had more problems with pulmonary arteries. There were some late reinterventions on the pulmonary arteries, but fewer than on the pulmonary outflow tract.

EDITORIAL COMMENTARY

The Taussig-Bing anomaly turns 65: What we have learned in a lifetime

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See related article on pages 1124-32.

The article in this issue of the *Journal* by Vergnat and colleagues reports the largest single-institution experience with the surgical treatment of double-outlet right ventricle (DORV) with subpulmonary ventricular septal defect (VSD), also known as the *Taussig-Bing anomaly*. This report contributes significantly to the aggregate surgical experience with this uncommon disease and continues to clarify a generally accepted management approach.

The outcomes reported here are excellent, and they do provide important information, namely the identification of high-risk coronary artery patterns (Yacoub classes C and E). This recognition has prompted Vergnat and colleagues to pursue routine postoperative surveillance of high-risk patients, including routine angiography. Whether this preemptive approach will mitigate postrepair ischemic events is unclear; with mortality exceeding 20% for patients with high-risk coronary patterns, however, the effort seems justified.

Likewise, other findings reported here are largely consistent with previous reports; there is a relationship between a smaller aorta and reoperation for subsequent right ventricular outflow tract obstruction. Although there is low risk of

mortality after the first year, there continues to be need for subsequent reinterventions (Figure 1, C, in the article of Vergnat and colleagues).¹⁻³

This report, however, also describes findings that are at odds with previous experience. For instance, the need for re-intervention on the left ventricular outflow tract and aorta exceeds the incidence of reintervention on the right ventricular outflow tract and pulmonary arteries combined (Figure 1, D, in the article of Vergnat and colleagues). One explanation may be technical. Vergnat and colleagues' preferred institutional approach to VSD closure was through the native pulmonary valve (83%), but they have also previously reported that postoperative neo-aortic valve regurgitation is related to the placement of VSD sutures within the sinuses of Valsalva. In fact, there were 5 neo-aortic valve replacements and 3 neo-aortic valve repairs among these 69 patients. As an alternative, it has been my experience that a right ventriculotomy provides excellent access to the VSD, allows muscular resection and patching of the right ventricular outflow tract, and is well tolerated. With this approach, the incidence of surgical neo-aortic valve intervention among these patients has been extremely low.

Other possible explanations for differences between this study and others become apparent when one carefully considers the evolution of our clinical understanding of the Taussig-Bing malformation. It was in 1949 that Taussig and Bing first described an unusual form of DORV. This index specimen, which was to become known as the *Taussig-Bing malformation*, was reexamined in 1968 by Richard Van Praagh.⁴ Van Praagh⁴ summarized the qualifying anatomy of the specimen as "double-outlet right ventricle with semilunar valves side-by-side and approximately at the same height, a bilateral conus, and a subpulmonary ventricular septal defect."

The index specimen now serves as an anatomic construct upon which we can hang our conceptual understanding of

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the defect. This is relevant, because the surgical treatment of DORV with subpulmonary VSD has largely become standardized through the last 10 to 20 years, despite the anatomic variability present, even within the confines of Van Praagh's definition.

So, although patients from different institutions and various studies may be assigned to a single morphologic classification, this categorization is based on a single index specimen. These patients are seen to have inherent anatomic variability, however, despite satisfying Van Praagh's criteria, and continue to present the surgeon with unique and patient specific challenges. Looked at from this perspective, it is not surprising that outcomes regarding specific patterns of reintervention may be different from case to case and study to study.

Despite this variability, the study of Vergnat and colleagues adds significantly to a contemporary body of literature, one that supports a consensus regarding the surgical management of patients with DORV and subpulmonary VSD, and can be summarized as follows:

1. The results with biventricular repair have been consistently excellent, with 1-year survival after primary bi-
2. ventricular repair exceeding 90%. With these kinds of reproducible results, few would consider single-ventricle palliation except under unusual circumstances.
3. The experience with staged repair has been inferior to that with single-stage repair, and staged repair has largely been abandoned by most centers.
4. There is a group of patients at high risk for mortality on the basis of coronary artery patterns, and efforts to mitigate this risk are warranted.
5. Reintervention is common and is generally low risk. Active surveillance of these patients is important.

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