See Article page 199.

Commentary: Vascular ring repair: Not always one and done

Carl L. Backer, MD

One of the gratifying components of vascular ring surgery is that usually these children have one operation and then are essentially “cured”—one and done. Over time, we have come to realize that a certain percentage of these patients will develop recurrent symptoms and need a reoperation. This dramatically increases the complexity of the operation and requires another level of preoperative evaluation and surgical expertise.

The review from Boston Children’s Hospital analyzing their patients undergoing reoperation after previous vascular ring surgery is informative on many levels.¹ The authors have identified several lesions that probably should have had a different operation at the first procedure. They have also outlined their protocol for evaluation of these suddenly complex patients. Finally, they have a fairly standardized approach to the reoperation to ensure relief of residual symptoms.

First, regarding the lessons we can learn from an inadequate initial operation, fully 30% of their reoperations involved resection of a Kommerell diverticulum with transfer of the left subclavian artery to the left carotid artery. This should strongly be considered for the first operation rather than just an isolated ligamentum division. Kommerell diverticulum can also occur with double aortic arch—an analysis we recently performed.² Fifteen percent of the reoperations had an aortic uncrossing procedure. Again, this probably should have been considered as the first operation for patients with a circumflex aorta. In our review of reoperations after vascular ring repair, the 2 most common indications were a residual Kommerell diverticulum and a circumflex aorta.³

Carl L. Backer, MD

CENTRAL MESSAGE

Reoperations after vascular ring repair highlight the importance of a correct first operation. Multimodality imaging can reveal the etiology of recurrent symptoms and direct surgical reintervention.

In the current era, precise preoperative 3-dimensional advanced imaging should demonstrate these anatomic lesions and hopefully lead to the correct initial operation, preventing the need for reoperation. An important contribution of the Boston group is their extremely thorough protocol for the evaluation of a patient with residual symptoms. This includes dynamic bronchoscopy, computed tomography with 3-dimensional reconstruction, esophagram, and upper endoscopy. This leads to an evaluation by a multidisciplinary team of pediatric cardiovascular and general surgeons, pediatric otolaryngologists, radiologists, gastroenterologists, and pulmonologists. This multimodality, multispecialty evaluation is able in essentially all cases to pinpoint the reason for the recurrence of symptoms and recommend an operative solution.

The only controversial part of their reoperation protocol is the essentially universal use of both rotational esophagoplasty and posterior tracheopexy. In our review of reoperations, neither of these procedures were part of the reoperation and yet we had a very high success rate. Removing the sites of anatomic compression on the trachea and/or esophagus seemed enough to provide relief without the need for the more extensive procedures the Boston group has employed. I am certain that these procedures are required in some patients but I am not sure that they are necessary for all reoperations.

From the Section of Pediatric Cardiothoracic Surgery, UK HealthCare Kentucky Children’s Hospital, Lexington, Ky; and Cardiothoracic Surgery, Heart Institute, Cincinnati Children’s Hospital Medical Center, Cincinnati, Ohio.

Disclosures: The author 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 Aug 27, 2021; revisions received Aug 27, 2021; accepted for publication Aug 31, 2021; available ahead of print Sept 4, 2021.

Address for reprints: Carl L. Backer, MD, UK HealthCare Kentucky Children’s Hospital, 800 Rose St, C-259, Lexington, KY 40536-0293 (E-mail: Carl.Backer@uky.edu).

J Thorac Cardiovasc Surg 2022;164:208-9

0022-5223/\$36.00

Copyright © 2021 Published by Elsevier Inc. on behalf of The American Association for Thoracic Surgery

<https://doi.org/10.1016/j.jtcvs.2021.08.070>

Lessons learned from vascular ring *reoperations* can be applied to prevent the need for additional surgical procedures by properly selecting the correct initial operation. However, if reoperation is required a multidisciplinary team that has expertise in all aspects of the pathology is necessary for a successful outcome. I thank the Boston group for their strong contribution to our understanding of some of the finer points of reoperative vascular ring surgery.

See Article page 199.

Commentary: Do we need such aggressive treatment?

Michiaki Imamura, MD, PhD

Vascular ring and vascular compression syndrome arise from the abnormal development of the aortic arch and its vessels resulting in compression of the esophagus or tracheobronchial tree, or both.¹ Unusual location of the chest organ of heart, great vessel, trachea, bronchus, and esophagus also causes similar symptoms. Associated tracheobronchial stenosis or malacia is common. The majority of cases having surgical intervention for vascular compression will have relief of symptoms. However, a small proportion of these patients can return or persistently have respiratory or swallowing symptoms.^{2,3}

In this issue of the *Journal*, Labuz and colleagues⁴ in Boston Children's Hospital report reoperation after surgery for vascular ring and vascular decompression. They had 27 patients reoperation between 2014 and 2019. Seven had initial index surgery at their institution and 20 patients elsewhere. This report is the largest series of reoperation after vascular ring or vascular compression surgery. Five etiologies of failure of resolving vascular compression are

References

1. Labuz DF, Kamran A, Jennings RW, Baird CW. Reoperation to correct unsuccessful vascular ring and vascular decompression surgery. *J Thorac Cardiovasc Surg.* 2022;164:199-207.
2. Backer CL, Bharadwaj SN, Eltayeb OM, Forbess JM, Popescu AR, Mongé MC. Double aortic arch with Kommerell diverticulum. *Ann Thorac Surg.* 2019;108:161-6.
3. Backer CL, Mongé MC, Russell HM, Popescu AR, Rastatter JC, Costello JM. Reoperation after vascular ring repair. *Semin Thorac Cardiovasc Surg Pediatr Card Surg Annu.* 2014;17:48-55.

Michiaki Imamura, MD, PhD

CENTRAL MESSAGE

A multidisciplinary team approach for persistent and recurrent symptoms following release of vascular compression can appropriately treat by customized operative approach.

identified. According to etiology of failure, tailored operative procedures were applied. Even if the same anatomical diagnosis, several different kinds of operative procedures were performed with a different approach, such as sternotomy or thoracotomy. At short-term follow-up of median 1 year, 95% of patients had symptomatic improvement.

The limitation of this study is that the majority of patients came from an outside institution brought to incomplete demographic information of index operation. The patients' conditions before index surgery and exact index operative procedure were not available due to the nature of study. This makes it difficult to understand the necessity of some reoperative surgical interventions. Also, the whole cohort is so diverse, with anatomical variations and symptomatic

From the Congenital Heart Surgery, Texas Children's Hospital, Houston, Tex.

Disclosures: The author 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 Sept 1, 2021; revisions received Sept 1, 2021; accepted for publication Sept 2, 2021; available ahead of print Sept 8, 2021.

Address for reprints: Michiaki Imamura, MD, PhD, Division of Congenital Heart Surgery, Texas Children's Hospital, 6651 S Main St, Houston, TX 77030 (E-mail: mximamura@texaschildrens.org).

J Thorac Cardiovasc Surg 2022;164:209-10

0022-5223/\$36.00

Copyright © 2021 by The American Association for Thoracic Surgery

<https://doi.org/10.1016/j.jtcvs.2021.09.001>