5. Tian DH, Wan B, Bannon PG, Misfeld M, Lemaire SA, Kazui T, et al. A meta-analysis of deep hypothermic circulatory arrest versus moderate hypothermic circulatory arrest with selective antegrade cerebral perfusion. *Ann Cardiothorac Surg*. 2013;2:148-58.

Key words: ascending aorta, reoperative cardiac surgery, selective antegrade cerebral perfusion, carotid artery cannulation

EDITORIAL COMMENTARY

More than one way to skin a cat

Joseph S. Coselli, MD, and Ourania Preventza, MD

See related article on pages e94-6.

The phrase “more than one way to skin a cat” raises a visual image of the mistreatment of our furry feline friends. A southern interpretation, however, is derived from the numerous ways to skin a catfish. Catfish don’t have scales and, consequently, have to be skinned. You can start from the head, you can start from the tail, you can go up and down the middle, and so forth.

In this issue of the *Journal*, Wehman and colleagues¹ describe a complex aortic case that involves the successful repair of a giant pseudoaneurysm of the aorta in a patient who previously had an ascending graft replacement for aortic dissection with dehiscence of the aortic valve and valvular insufficiency. The main thrust of their report focuses not on the specific techniques of separating the sternum from the pseudoaneurysm but rather on cerebral protection.

After Michael E. DeBakey’s first successful replacement of the transverse aortic arch,² the landscape changed entirely in 1974 when Randall Griepp³ demonstrated the

clinical effectiveness of deep hypothermic circulatory arrest for arch replacement. Three of four patients survived neurologically intact after undergoing arch replacement, showing clearly that hypothermia provided not only adequate brain protection but also a quiet, dry field in which to conduct aortic reconstruction.

Despite the proven benefits of hypothermic circulatory arrest alone, it remains a challenge to provide adequate global cerebral protection, and of course there is the ever-present risk of stroke. Historically, the sites of cannulation for pump return have been the ascending aorta and the femoral artery. In patients with a significant burden of atherosclerosis, peripheral vascular disease, or both, however, these sites are not optimal. In an effort to provide a safe yet prolonged circulatory arrest period for complex arch reconstruction, antegrade cerebral perfusion has increasingly gained in popularity.^{4,5} Sabik and colleagues⁶ at the Cleveland Clinic made an important contribution in this area by helping to popularize the use of the axillary artery as an alternative peripheral site of arterial cannulation. That technique is particularly useful in assisting antegrade cerebral perfusion via the right common carotid artery. Urbanski⁷ made a further contribution by using left common carotid artery cannulation in 2 patients, each with acute aortic dissection and malperfusion, for both cardiopulmonary bypass and antegrade cerebral perfusion during aortic arch repair.

Wehman and colleagues¹ have carried the concept further with bilateral carotid artery exposure through separate small neck incisions and direct cannulation, for both cardiopulmonary bypass and antegrade cerebral perfusion, with the addition of a left ventricular vent inserted through a separate small thoracotomy incision. Under the protection of antegrade cerebral perfusion and reduced flow, they achieved sternal reentry uneventfully, then entered the large pseudoaneurysm under moderate hypothermia. Total transverse arch and root replacement were then carried out successfully. Despite a complex postoperative course, they report the patient to be doing well 2 years later. With

From the Department of Cardiovascular Surgery, Texas Heart Institute, and the Division of Cardiothoracic Surgery, Michael E. DeBakey Department of Surgery, Baylor College of Medicine, Houston, Texas.

Disclosures: W. L. Gore & Associates and Cook Medical, Inc, have provided travel expenses for O.P. in the past. O.P. serves as a consultant for Medtronic, Inc. J.S.C. was provided program support by and has given lectures for W. L. Gore & Associates, and he serves as principal investigator for clinical trials conducted by W.L. Gore & Associates, Medtronic, Inc, and Cook Medical, Inc. In addition, J.S.C. serves as a consultant to and receives royalties from Vascutek Ltd, a subsidiary of Terumo Corporation. Authors have nothing additional to disclose with regard to commercial support.

Received for publication Feb 12, 2015; accepted for publication Feb 19, 2015.

Address for reprints: Joseph S. Coselli, MD, One Baylor Plaza, BCM 390, Houston, TX 77030 (E-mail: jcoselli@bcm.edu).

J Thorac Cardiovasc Surg 2015;149:e96-7
0022-5223/\$36.00

Copyright © 2015 Published by Elsevier Inc. on behalf of The American Association for Thoracic Surgery

<http://dx.doi.org/10.1016/j.jtcvs.2015.02.031>

FIGURE 1. Computed tomography shows a patient with an extensive pseudoaneurysm that has eroded through the sternum and lies just under the skin. Reoperation in such cases is fraught with danger, because one must control circulation before sternal reentry to avoid extensive blood loss.

this approach, they reduce the risks associated with deep hypothermia, such as coagulopathy, by cooling only to 25°C. Further, they avoid the specific risk of left ventricular dilatation, which occurs when hypothermia results in ventricular fibrillation before sternal reentry, by placing a left ventricular vent.

We have to be mindful that when antegrade cerebral perfusion is used in the replacement of the aortic arch, most perioperative strokes are not secondary to a lack of cerebral

protection but rather are a consequence of embolization, and that the carotid arteries are prone to atherosclerosis in the patient population needing such surgery. Additionally, the approach excludes the vertebral arteries, which in many patients may be an important source of cerebral arterial inflow, particularly at higher temperatures.

Many complex issues are involved in the surgical treatment of patients with pseudoaneurysms adjacent to the back of the sternum (Figure 1), which often necessitate cannulation for cardiopulmonary bypass and cerebral protection before sternal reentry in such patients undergoing aortic arch replacement, and these issues demand innovative approaches and a diverse armamentarium for the cardiac surgeon. The techniques described by Wehman and colleagues¹ contribute to that arsenal. One size does not fit all, and there is more than one way to skin a cat.

References

1. Wehman B, McCormick B, Pham S, Taylor BT. Safe sternal reentry in the setting of a giant aortic pseudoaneurysm and aortic regurgitation. *J Thorac Cardiovasc Surg.* 2015;149:e94-6.
2. DeBakey ME, Crawford ES, Cooley DA, Morris GC Jr. Successful resection of fusiform aneurysm of aortic arch with replacement by homograft. *Surg Gynecol Obstet.* 1957;105:657-64.
3. Griep RB, Stinson EB, Hollingsworth JF, Buehler D. Prosthetic replacement of the aortic arch. *J Thorac Cardiovasc Surg.* 1975;70:1051-63.
4. Bachet J, Guilmet D, Goudot B, Termignon JL, Teodori G, Dreyfus G, et al. Cold cerebroplegia. A new technique of cerebral protection during operations on the transverse aortic arch. *J Thorac Cardiovasc Surg.* 1991;102:85-93; discussion 93-4.
5. Kazui T, Washiyama N, Muhammad BA, Terada H, Yamashita K, Takinami M, et al. Extended total arch replacement for acute type a aortic dissection: experience with seventy patients. *J Thorac Cardiovasc Surg.* 2000;119:558-65.
6. Sabik JF, Lytle BW, McCarthy PM, Cosgrove DM. Axillary artery: an alternative site of arterial cannulation for patients with extensive aortic and peripheral vascular disease. *J Thorac Cardiovasc Surg.* 1995;109:885-90; discussion 890-1.
7. Urbanski PP. Carotid artery cannulation in acute aortic dissection with malperfusion. *J Thorac Cardiovasc Surg.* 2006;131:1398-9.

Lessons learned from a thorny case

Isabelle Claudet, MD, MSc,^a Camille Bréhin, MD,^a Daniel Roux, MD,^b and Sébastien Hascoët, MD,^c Toulouse, France

From the Pediatric Emergency Unit,^a Children's Hospital, CHU Toulouse, Toulouse, France; the Cardiovascular Surgery Unit,^b Rangueil Hospital, CHU Toulouse, Toulouse, France; and the Pediatric Cardiology Unit,^c Children's Hospital, CHU Toulouse, Toulouse, France.

Disclosures: Authors have nothing to disclose with regard to commercial support. Received for publication Feb 16, 2015; accepted for publication Feb 21, 2015; available ahead of print March 24, 2015.

Address for reprints: Isabelle Claudet, MD, MSc, Pediatric Emergency Department, Children's Hospital, 330 Great Britain Ave, TSA 70034, 31059 Toulouse Cedex 9, France (E-mail: claudet.i@chu-toulouse.fr).

J Thorac Cardiovasc Surg 2015;149:e97-9

0022-5223/\$36.00

Copyright © 2015 by The American Association for Thoracic Surgery

<http://dx.doi.org/10.1016/j.jtcvs.2015.02.041>

We report a case of pericardial penetration of a medium-sized cactus spine in a child.

CLINICAL SUMMARY

A 5.5-year-old boy was admitted to the emergency department of a level I regional hospital after being pushed onto a spiny cactus. He had difficulty breathing and refused to lie down. During transportation his vital signs were as follows: pulse, 111 beats/min; blood pressure, 136/87 mm Hg; and oxygen saturation by finger-probe pulse oximetry, 99%. At hospital admission (6:00 PM), the physical