Acute type A aortic dissection 101

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I was delighted to read “Surgery for Acute Type A Aortic Dissection” by Tirone David and colleagues¹ and devoured it with intense interest. Readers will find that technical pearls can be found throughout the article. This contribution elegantly and clearly describes a safe and reliable method to perform this emergency procedure to achieve acceptable mortality when the stakes are high.

The surgical approach to acute type A aortic dissection at Washington University is varied and largely surgeon dependent, as previously described.² The single approach in our recent report that strictly adhered to the points stressed by David and colleagues¹ in their landmark article written in 1999 (in an effort to reduce operative mortality) and highlighted in Figure 1 of his recent contribution³ was found to be associated with the lowest long-term mortality when compared with the other surgical approaches. These principles included the avoidance of an aortic crossclamp, performance of an open distal anastomosis, and perfusion in the antegrade fashion via the graft after completion of the distal anastomosis. The majority of the patients at Washington University in this operative strategy group underwent a consistent approach designed to adhere to that described by David and colleagues.¹ This surgical technique was the same approach that Dr David³ now reports in great detail for hemodynamically unstable patients and at Washington University was consistently performed on all patients regardless of hemodynamic status with the following exceptions:

- Femoral artery cannulation was performed before sternotomy with a Y set-up in the arterial tubing for later switch to perfusion via the graft (assuming good femoral pulse preoperatively and no visible dissection in femoral artery on direct inspection, and wire confirmed in the true aortic lumen by transesophageal echocardiography at the time of placement).
- Sternotomy followed by bicaval venous cannulation with the stopcock in line adjacent to the superior vena cava (SVC) cannula for retrograde cerebral perfusion was performed (a single inferior vena cava cannula was placed if active aortic bleeding suspected, and in this case, the

Acute type A aortic dissection as shown evokes anxiety in most cardiac surgeons.

Central Message

Updates are reported on a safe and effective method for the repair of acute type A aortic dissection.

See Article page 279 in the August 2015 issue.

pericardium was left intact over ascending aorta until deep hypothermic circulatory arrest temperature was reached).

- An aortic cannula was never placed on the ascending aorta or arch vessels.
- A left ventricular (LV) vent via right superior pulmonary vein was placed in all patients (pulmonary artery vent was added in rare cases in which LV distention from aortic insufficiency was present and persistent despite intermittent manual compression of the LV and LV venting was functional).
- At the time of deep hypothermic circulatory arrest (18°C via arterial and venous line blood temperatures), a snare was placed around the SVC cannula, continuous retrograde cerebral perfusion was infused via the SVC, and 1 L of retrograde cardioplegia followed by maintenance retrograde cardioplegia (300 mL every 20 minutes while the heart was ischemic) was administered. This temperature allowed up to 60 minutes of safe time in rare cases when individual arch vessel anastomoses were required.
- In the uncommon circumstance of a tear involving the arch, exclusion of the primary tear with a single patch including all 3 arch vessels or individual arch vessel anastomoses were performed.
- Distal and proximal graft anastomoses were performed using a running Prolene suture after a Teflon felt sandwich was constructed around the aortic wall layers (Teflon strips inside and outside of the aortic walls with 2 running layers [mattress followed by baseball] of Prolene suture).

- Resuspension of the aortic valve commissures was performed only if significant aortic insufficiency was present preoperatively.
- The uncommon rupture of sinus of Valsalva (after weaning from cardiopulmonary bypass) or primary dissection tear involving the noncoronary sinus was occasionally successfully repaired with Teflon strips and interrupted sutures, but required root replacement if unsuccessful.
- A single graft with no graft-to-graft anastomosis was used (unless arch replacement was required).

Surgical repair of acute type A aortic dissection may be accomplished by using a variety of techniques, and newer techniques of axillary cannulation, antegrade cerebral perfusion, and mild hypothermia may provide similar long-term results in future comparisons. The ultimate goal in the repair of acute type A aortic dissection is to prevent immediate death due to the disease and then to provide long-term survival. A surgical approach that involves avoidance of placement of an aortic crossclamp, use of deep

hypothermic circulatory arrest to permit an open distal anastomosis, and antegrade reperfusion after repair is one method that can be safely performed with acceptable long-term survival. The surgical principles proposed 16 years ago remain relevant today and have been lifesaving for innumerable patients who have presented with the lethal diagnosis of acute type A aortic dissection.¹ Once again, Dr David³ enlightens us with his expertise and educates us on the performance of this operation under any circumstance. The technical steps to perform this repair are clearly delineated by Dr David in his recent contribution and should be studied by all residents in training.

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