Reviewer’s report

Title: Right axillary and femoral artery perfusion with mild hypothermia for aortic arch replacement

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Reviewer: Sreekumar Subramanian

Reviewer’s report:

The authors are to be congratulated on their excellent results in a challenging cohort of patients with acute type A aortic dissection, the majority of whom were treated with total arch replacement. This paper is one of a series of papers showing a trend towards milder hypothermia in complex aortic arch surgery and reflects, as the authors indicate, advances in technical skill translating to faster circulatory arrest times. Several papers have reported on selective addition of femoral arterial cannulation, but these authors report on their strategy of combined right axillary and femoral arterial perfusion in all patients with excellent results, suggesting that this technique may optimize outcomes when these operations are performed at mild hypothermia. My comments, subdivided into categories, include:

Major Compulsory Revisions: None

Minor Essential Revisions

1) Reporting the proportion of patients who had Debakey Type I and II aortic dissections would be useful.

2) The femoral artery was cannulated – was this artery dissected in some of these patients? As these were aortic dissection cases, presumably some of them were Debakey Type I and this could lead to perfusion of the false lumen. Did all of these patients have a non-dissected femoral artery? Was the femoral artery side (right vs, left) chosen based on the presence or absence of a dissection?

3) Reporting the baseline Creatinine is important to determine the incidence of renal dysfunction. The authors have used a doubling of presumably the upper limit of normal creatinine to make this determination, but a doubling of each patient’s baseline creatinine should be the threshold for establishing the diagnosis of renal dysfunction.

4) Why did the authors choose intubation > 72 hours to define respiratory failure? Were the 2 tracheotomized patients separate from the 5 patients who were intubated > 72 hours, or were these 2 among the 5 total patients intubated > 72 hours?

5) Additional information on lactate might be useful to validate the use of this perfusion strategy over using the right axillary perfusion alone or over using combined right axillary and left carotid perfusion. Certainly, routinely perfusing the lower body and the brain for as much time as possible makes theoretical
sense; however, particularly in aortic dissection cases, additional cannulation sites are not always risk-free and the authors have not demonstrated that this technique should be preferred, but only that it worked well in a small series of patients.

6) Why was the dorsalis pedis artery cannulated, was this to assess distal limb perfusion ipsilateral to the femoral cannulation? Would contralateral femoral artery monitoring be better? During the time of femoral artery perfusion to the lower body, what was the pressure in the dorsalis pedis artery - this would be important if the authors contend that lower body perfusion avoids visceral ischemic complications at mild hypothermia. The flow rates should be reported as ml/kg to standardize for weight.

7) Spelling/Grammar corrections: See attached file

Discretionary Revisions: None

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Needs some language corrections before being published

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I declare that i have no competing interests.