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## Commentary: On aortic uncrossing: New variation on an old controversy

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Circumflex retroesophageal aorta is a rare congenital anomaly in which a right aortic arch runs posterior to the trachea and esophagus and forms a vascular ring with a left-sided ligament. The exact incidence of this lesion is unknown, and review of the literature shows only isolated case reports and small case series.<sup>1,2</sup> The aortic uncrossing procedure is the standard of care for symptomatic patients and involves division of the ligamentum with translocation of the descending thoracic aorta to the ascending aorta-anterior to the trachea and esophagus. All previously reported cases have required periods of circulatory arrest with aortic crossclamping.

Said and colleagues<sup>3</sup> report the use of normothermic continuous total-body perfusion during an aortic uncrossing procedure. To accomplish this, both the innominate artery and descending thoracic aorta were cannulated, which allowed for total-body perfusion during the uncrossing procedure with the avoidance of circulatory and cardioplegic arrest. This is a novel application for this perfusion strategy for the treatment of circumflex aorta. However, similar cannulation strategies have been described in aortic arch reconstruction surgeries as well as the Norwood procedure.<sup>4</sup> Readers will appreciate the accompanying video that the authors have prepared, which is informative of not just the cannulation approach but the uncrossing procedure as well.

Numerous cardiopulmonary bypass cannulation strategies have been reported for the treatment of neonatal and

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### CENTRAL MESSAGE

Aortic uncrossing procedure for a circumflex aorta treated with beating-heart and total-body perfusion highlights a continuing controversy.

infant aortic arch operations.<sup>4,5</sup> Advocates for continuous and regional perfusion strategies cite that circulatory arrest is associated with increased end-organ dysfunction, postoperative bleeding, and neurologic injury.<sup>4</sup> Nevertheless, despite the intuitive risks, no compelling literature is available linking the use of hypothermic circulatory arrest with worse perioperative outcome or neurologic injury when compared with alternative perfusion strategies.<sup>6,7</sup> However regional perfusion may be beneficial for the lower-body organs, which may not tolerate ischemia as well or may not be as regenerative as the neonatal brain. This highlights one of the major controversies in our field and underscores the need for a well-designed clinical trial or different-aged subjects that uses sensitive biomarkers and other cutting-edge techniques to assess organ injury that may result from circulatory arrest and regional perfusion.

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