Are all antegrade cerebral perfusion techniques equal?

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Congratulations to Urbanski et al. [1]. We benefited a lot from this report. But we want to put emphasis on some points that—we think—should be taken into consideration by the authors.

Antegrade cerebral perfusion technique is based on two factors: perfusion pressure and direction of the kinetic energy of pump output (2 l/min/m²) during cooling down and warming up periods. Cannulation of the right brachial artery makes the monitoring of the arterial pressure from the right radial artery impossible. In that case, direction of the blood flow will be from the head towards the aortic arch. Suturing an artificial graft to the right subclavian artery in an end-to-side fashion gives us a chance to monitor the arterial pressure from the right radial artery. In addition, it will regulate the kinetic energy of the blood flow antegradely. Suturing an artificial graft to the carotid arteries again in an end-to-side fashion would cause increased perfusion of the body during the cooling down and warming up processes in comparison to cerebral perfusion since cerebral vascular resistance would direct the blood flow to the lower resistant area, namely extracranial vasculature. This technique is unacceptable, particularly where autoregulatory mechanisms of cerebral perfusion get affected by vasoactive agents and temperature.

Moreover, we think that the results of this study would be influenced by several factors: there are significant differences between left and right carotid artery cannulation (LCA and RCA) groups in terms of temperature, cardiopulmonary bypass time and flow indices during cerebral perfusion. It is not clear whether cerebral perfusion was monitored and cerebral oxygen saturation was intervened in during cooling down and warming up periods. Again, the temperature gradient between body and circulating blood during the warming up period is an important factor. These factors should be standardized.

The effects of cerebral perfusion could be assessed by psychological tests and also by the detection of glucose hypometabolic areas with PET scan. We think that the right carotid artery would be more suitable for cannulation in comparison to the left carotid artery because, during cooling down and warming up periods (high flow index), the direction of the blood flow will be away from the brain and blood pressure would be monitored via the right radial artery.

REFERENCE


Reply to Kestelli et al.

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I appreciate the interest of Kestelli et al. [1] in our article published in the June 2010 issue of the Journal [2], and would like to draw their attention to two aspects.

First, the title of their letter implies that it concerns the techniques of antegrade cerebral perfusion for brain protection during circulatory arrest, but it actually addresses the aspects of