Secondary Cross-Clamping and Blood Cardioplegia for Refractory Ventricular Fibrillation

To the Editor:

We read with interest the recent article by Watanabe and coworkers [1] and have some brief comments. The authors reported injection of 20 mL potassium chloride solution (KCl) into the aortic root to resolve refractory ventricular tachycardia (VT) and ventricular fibrillation (VF) after removal of the aortic cross-clamp. Refractory VT and VF may occasionally occur after aortic declamping, and this situation is usually associated with significant ventricular hypertrophy, observed in patients with aortic valve disease or patients who have advanced coronary artery disease with low ejection fraction. The exact mechanism of refractory VT and VF following aortic declamping is not completely understood, but poor myocardial protection is held responsible. The incidence of this situation has recently decreased with the use of the current blood cardioplegia methods.

Nowadays, refractory sustained fibrillation is rarely observed, but if it does occur, we prefer re-cross-clamping and induction of secondary blood cardioplegia for 3 to 5 minutes to maintain cardiac arrest. Lazar and colleagues obtained better outcomes with secondary blood cardioplegia in an animal model in which they examined the recovery of subjects following 45 minutes of normothermic ischemic arrest [2]. Robicsek reported successful treatment of sustained VF in 6 patients by inducing ischemic arrest through secondary aortic cross-clamping along with crystalloid cardioplegia administration [3].

We have previously reported restored sinus rhythm using secondary cross-clamping and normothermic blood cardioplegia in 3 patients who had initially suffered from refractory VF after cross-clamp removal [4]. Until recently, we used secondary cross-clamping and normothermic blood cardioplegia in more than 10 patients who had undergone aortic valve replacement, coronary artery bypass grafting, or complex pediatric cardiac surgery. When compared with secondary cross-clamping and normothermic blood cardioplegia, the main limitation of KCl injection into the aortic root is the inhomogeneous distribution of the KCl solution in the coronary arteries. The distance between the injection site and the aortic root determines the amount of K concentration in the myocardium. Secondary cross-clamping and normothermic blood cardioplegia can provide more constant cardiac arrest. The cardioplegia is continued for 1 to 2 minutes after cardiac arrest to restore myocardial energy depletion.

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References


Blood Conservation Guidelines for Pediatric Patients

To the Editor:

I commend Ferraris and colleagues [1] on their 2011 update regarding blood conservation during cardiac surgery. However I was disappointed to note the statement “for almost all topics reviewed only evidence relating to adult patients entered into the final recommendations, primarily because of limited availability of high quality evidence relating to pediatric patients having cardiac procedures.” In 2008 Wypij and associates [2] published the combined results of 2 prospective randomized trials of hematocrit levels during cardiopulmonary bypass in infants. The authors concluded that a hematocrit level of approximately 24% or higher during cardiopulmonary bypass is associated with higher psychomotor development index scores at 1 year of age and reduced lactate levels intraoperatively. Lower hematocrit levels were also associated with more positive intraoperative fluid balance. These 2 large National Institutes of Health–supported trials also demonstrated that a goal hematocrit level of either 30% or 35% could be achieved during bypass without greater need for transfusion relative to the standard hematocrit level of 20% that was previously applied widely for pediatric cardiopulmonary bypass. This information was also derived from a review of 12 randomized trials of aprotinin involving children undergoing cardiac surgery with cardiopulmonary bypass.

Regarding the topic of aprotinin, the authors are to be congratulated in pointing out that in contrast to equivocal results in adults, randomized trials suggest that aprotinin is beneficial in infants undergoing cardiopulmonary bypass. A metaanalysis by Arnold and colleagues [3] concluded that “aprotinin reduced the proportion of children who received blood transfusion during cardiac surgery with cardiopulmonary bypass.” This information was also derived from a review of 12 randomized trials of aprotinin involving children undergoing cardiac surgery with cardiopulmonary bypass.

Once again, the authors are to be commended on the extensive review of evidence supporting blood conservation clinical practice guidelines. We hope that in future updates close attention will be paid to evolving literature on this topic involving neonatal and infant cardiac surgery.

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References

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