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THE IMPORTANCE LIES ON THE PROCESS AND CARE DELIVERY OF RESUSCITATION IN PERIOPERATIVE CARDIAC SURGICAL CARE

Reply to the Editor:

I read with interest the letter from Buckberg and colleagues, "Resuscitation in Cardiac Surgical Patients: Symptoms Versus Cause," written in response to the recent expert review of resuscitation practices in cardiac surgery by Gosev and associates¹ and the accompanying commentary.² The letter's authors report their experience treating a diverse subset of patients with perioperative sudden cardiac death by institution of cardiopulmonary bypass, insertion of left ventricular vent, aortic crossclamping, and delivery of controlled reperfusion with a substrate-enriched reperfusate.³ More importantly, they emphasize correction of the underlying etiology. This particular study involved 34 patients from 4 institutions, only 10 of whom were patients with sudden cardiac arrest occurring in the intensive care unit after cardiac surgery. All patients in this setting had sudden cardiac death occur after coronary artery bypass grafting. The controlled reperfusion technique with warm glutamate and aspartate-enriched blood cardioplegic solution was reported in 1992 by the same group, describing 14 patients with witnessed perioperative sudden cardiac arrest.⁴ Results were promising, with 11 patients being discharged

from the hospital after receiving prolonged perioperative cardiopulmonary resuscitation. These 2 studies both describe an excellent survival and neurologic outcome, and both had patients with cardiac arrest that ranged from 20 to 150 minutes before institution of extracorporeal circulation. The letter authors then propose that this method be mentioned and urge the audience to be aware of this technique, specifically in the prolonged resuscitation cases that are rendered hopeless.

Although commendable, these results are difficult to reproduce and incorporate in a standard approach. Moreover, it is difficult to conclude that the improved neurologic outcome was due to the use of the controlled reperfusion technique, rather than excellent resuscitation technique before the institution of cardiopulmonary bypass. The practice of cardiac surgery is growing more diverse than ever before, with more surgeries performed with minimally invasive or percutaneous approaches; development of multidisciplinary teams, such as the concept of the "heart team"; and the addition of more options for mechanical support. A significant part of the success of implementation of resuscitation practices, such as advanced cardiac life support, is the use of reproducible algorithms and predictable actions with clear roles and responsibilities of the different components of the care team. The major changes of advanced cardiac life support during the last 2 decades have been the adoption of simpler algorithms that enable clear goals without intricate complexities and the development of appropriate training programs with specific intervals. The intent of the expert review and commentary on resuscitation practices in cardiac surgery published last year in the *Journal*^{1,2} was to reinforce the importance of the process and standardization of resuscitation in this highly complex set of patients with a great window of opportunity for recovery as well as a call to create a

standard from which post-cardiac surgery resuscitation can evolve.

The focus on etiology is of key importance during every event requiring resuscitation. With the diverse life-threatening problems that face the modern cardiac surgical patient who develops cardiac arrest, there is an urgent need to establish a standard approach with emphasis on maintenance of perfusion and defining the appropriate time for re sternotomy and extracorporeal support. Because of the promising results of the described technique, it would be advisable to reproduce these findings in a broader cardiac surgical population with an emphasis in postoperative care.

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DO EMERGENT AORTIC DISSECTION OPERATIONS INCREASE POSTOPERATIVE NEUROLOGIC COMPLICATIONS?

To the Editor:

We congratulate Shi and colleagues¹ for their report. Although it has been reported that some of the patients in the study had acute aortic dissection,

no statement was made on how many of the operations of these patients were performed on an emergency basis. We wonder whether differences were present between the emergency and elective operations in terms of postoperative neurologic complication rates, because in a limited number of studies it has been reported that the risk of development of postoperative neurologic accident in patients undergoing surgery for aortic dissection is greater in emergency procedures.^{2,3} If any data regarding this is available in the study by Shi and colleagues,¹ we believe that sharing this information would contribute to both their own study and the published data.

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REPAIR OR REPLACE THE AORTIC VALVE? MORE QUESTIONS, NO ANSWERS To the Editor:

We read with interest the article by de Meester and colleagues¹ on outcomes after aortic valve (AV) repair versus AV replacement. This report comes from a center of excellence concerning the treatment of AV disease.

In their study, de Meester and colleagues¹ observed a survival advantage in the AV repair group. The question that naturally comes to mind is whether this survival advantage should be attributed to the AV repair itself. Although the tenor of the article seems to be in favor of repair, we believe that the answer to this question might not be that simple. A significant proportion of deaths might not have anything to do with the AV, because 5 deaths in the replacement group were classified as of miscellaneous or noncardiovascular causes. Should these events serve in the comparison of the 2 groups, and do these noncardiovascular deaths provide evidence of a survival advantage? The adjusted death hazard in the replacement group seems to be 10 times (95% confidence interval, 2.8-33.3) that of the repair group, an enormous effect size! Could this be a false-positive finding with an extreme tendency² related to the small sample size? Why should patients undergoing AV repair have better survival than matched patients receiving the “standard of care” with AV replacement? Perhaps the morbidity attributable to the prosthetic valve or the superior AV repair hemodynamics can drive a potential survival benefit. This difference must translate into measurable clinical outcomes, however, and the cardiovascular event-free survival and the cardiovascular event rate were more or less comparable between the 2 groups.¹

Another way to look at the same data is to ask why the patients with AV replacement fared worse. In the

time course of 6 to 8 years, survival with a prosthetic valve was about 60%. The absolute and relative survivals seem to be much lower than expected.³ Is the survival of this cohort representative of the outcomes that should be expected after AV replacement in patients with few comorbidities and a mean age of 63 years? Should this matched cohort serve as a benchmark for judging AV repair procedures? The average age in the total Brussels AV repair cohort is approximately 50 years,⁴ which poses the question of whether the expected AV repair benefits should be the same across all age groups.

Despite the excellent results of the AV repair reported by de Meester and colleagues,¹ no definite answer can be provided regarding the effect of AV repair versus AV replacement on long-term patient survival. To evaluate a cause and effect relationship, a prospective, randomized, multicenter study is needed. There have been many calls for randomized, controlled trials in the field of heart valve surgery, but very few such studies have been conducted because of a variety of barriers, such as high costs, long follow-up duration, limited generalizability, and, most importantly, surgeon and patient preferences. This is certainly true for AV repair, which is still considered complex surgery and is mainly practiced in dedicated centers of expertise, such as that of the Brussels group. The way to move forward is through inclusive international collaborative efforts, such as the recently initiated Aortic Valve Insufficiency and Ascending Aorta Aneurysm International Registry (AVIATOR) initiative, which is aimed to prospectively evaluate surgical outcomes of patients with aortic regurgitation, aortic root dilatation, or both. In this effort we can embed a preference randomized, controlled trial⁵ that will help us find the holy grail.