

Pierre-Benoit Pagès, MD, PhD
Alain Bernard, MD, PhD

Department of Thoracic and Cardiovascular Surgery
CHU Dijon Bocage Hospital
14 rue Gaffarel, BP 77908 21079
Dijon, France
email: pierrebenoit.pages@chu-dijon.fr

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Minimal Extracorporeal Circulation and Minimally Invasive Valve Operations: Should They Be the Right Combination in the Future?

To the Editor:

Surgical treatment of aortic or mitral valve diseases using the combination of minimal extracorporeal circulation (MECC) and minimally invasive surgery (MIS) is achieving favorable opinions in centers that are familiar with these surgical techniques.

We read with great interest the article by Baumbach and colleagues [1], who conducted a randomized clinical trial of patients with valvular disease allocating 103 patients to the MECC group and 99 patients to the conventional extracorporeal circulation (CECC) group. In their analysis, the authors reported a better neurologic outcome, a reduced systemic inflammatory response syndrome (SIRS), and a minor rate of transfusion in patients who received MECC. The excellent reported results still deserve some comments.

The authors studied the effect of MECC in modulating the SIRS, analyzing some cytokines (tumor necrosis factor- α , interleukin [IL]-6, IL-8, IL-10). The time course was similar in both groups, demonstrating that MECC can reduce the SIRS during the first hours after cardiopulmonary bypass, but the SIRS tended to vanish in both groups at 48 hours. One of the main concerns is that it is almost impossible to find a direct correlation between the SIRS and the clinical outcome, because the majority of articles included few numbers of low-risk patients and analyzed different cytokines and other inflammatory biomarkers at different time points, leading to heterogeneous results. We reported that MECC can reduce the SIRS in the same way that off-pump coronary artery bypass grafting can [2], and at 48 hours no differences were observed when comparing off-pump and on-pump surgical procedures [3].

The authors reported a higher priming blood volume in CECC compared with MECC. This caused an increased transfusion rate in the CECC group. They did not specify if retrograde autologous priming was performed before starting cardiopulmonary bypass. With this technique, the priming volume and the postoperative transfusion rate can be reduced in patients undergoing CECC by 40% and 25%, respectively.

It should be very interesting to investigate if MECC in combination with MIS can reduce the SIRS to encourage the use of this technique. Toward this aim, randomized controlled trials

comparing MIS and a standard surgical approach are mandatory.

In conclusion, Baumbach and colleagues [1] ought to be congratulated, because by demonstrating the safety and benefits of MECC and MIS in low-risk patients with valvular disease, they can open the way for a wider application of this combination in the near future.

Francesco Formica, MD

Cardiac Surgery Unit
San Gerardo Hospital
Department of Medicine and Surgery
University of Milano-Bicocca
Via G.B. Pergolesi 66
20052, Monza (MI), Italy
email: francesco_formica@fastwebnet.it

Francesco Broccolo, MD
Maria Grazia Cerrito, MD, PhD

Department of Medicine and Surgery
University of Milano-Bicocca, Italy
Via Cadore 48
20052, Monza (MI), Italy

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Reply

To the Editor:

We appreciate the comments of Dr Formica and colleagues [1] on our study [2], in which we investigated the influence of a minimized extracorporeal circulation in minimally invasive heart valve surgery compared with a conventional one.

We agree that the differences in cytokines dissolve 48 hours after extracorporeal circulation. However, as the aim of our study was to evaluate the perioperative course, we did not examine the further time-course of the cytokines, because the half-life of cytokines is very short (usually less than 10 minutes) [3, 4]. We agree that there are few data existing to evaluate the correlation of elevated inflammatory cytokines, systemic inflammatory response syndrome, complications and outcome, as it is already shown in a review of the literature [5]. Apart from this, it was not our aim and the design of this study was not appropriate to proof a possible statistical correlation between the course of inflammatory cytokines and clinical outcomes. Because we could demonstrate lower cytokine levels and shorter times of postoperative ventilation and intensive care unit stay in the minimally invasive extracorporeal circulation (MiECC) group, an assumption of a possible correlation with positive outcomes is feasible.

