Response to the Letter to the Editor by Yang et al

To the Editor:

We thank Yang et al for their interest in our recent study.[1] We reviewed their comments and offer the following reply. The authors expressed concern that our study only measured serum cardiac troponin I (cTnI) level at 24 hours and 48 hours after surgery but not at the end of surgery. This time window was chosen because it takes 24 hours for cTnI to reach its peak serum level.[2] Croal and Hillis[3] measured serum cTnI level at 2 hours and 24 hours after surgery. The cTnI levels frequently are elevated after cardiac surgery. However, only cTnI levels at 24 hours remain independent predictors of short-, medium-, and long-term outcome.[3] In addition, the highest postoperative peak release of cTnI significantly affects mid-term survival after off-pump coronary artery bypass.[4] The myocardial damage biomarkers, serum cTnI and CK-MB, were reduced after continuous administration of dexmedetomidine in our study despite the fact that the mechanism was not identified. The authors recommended that the dosage regimen of dexmedetomidine assure adrenergic blockade at least for 72 hours postoperatively and preferably longer. However, it may be inappropriate. The United States Food and Drug Administration has advised that dexmedetomidine only be used for short-term sedation (< 24 h) because of adverse effects such as tachyphylaxis, complications of respiratory failure, and acute respiratory distress syndrome.[5] It also should be noted that long-time administration of dexmedetomidine increased the propensity toward hypotension, which may deteriorate organ perfusion. Meanwhile, administration of dexmedetomidine will prolong both extubation time and length of intensive care unit stay and increase the total cost of hospitalization.[1] Thus, we need to weigh the pros and cons before a definite conclusion about dexmedetomidine cardioprotection can be reached.We agree with the authors that large-scale clinical trials and long-term follow-up are required to substantiate whether high-dose dexmedetomidine benefits postoperative cardiovascular morbidity and mortality. We are participating in a prospective, multicenter randomized, double-blind and parallel control study in China to investigate dexmedetomidine and outcomes of cardiac surgery.

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Procedural Management of Patients With Advanced Heart Failure Undergoing MitraClip Implantation (From the GRASP Registry)

To the Editor:

We read with great interest the article by Essandoh[1] focusing on afterload mismatch (AM) in patients undergoing percutaneous mitral valve repair with the MitraClip system (Abbott Vascular, Santa Clara, CA). AM, defined as an acute deterioration of left ventricular (LV) performance leading to postoperative low cardiac output, represents one of the most feared complications of mitral valve repair. Hemodynamic consequences of AM could be of particular concern in the setting of patients with advanced heart failure undergoing MitraClip implantation. Despite the potential detrimental effects, AM incidence and pharmacologic preventive strategies in this clinical context have been investigated poorly. In an attempt to fill this gap, we aim to report briefly on safety, acute-term, and long-term outcomes of a procedural management strategy based on dobutamine infusion in patients with severe LV dysfunction (defined as LV ejection fraction $\leq 30\%$) undergoing MitraClip implantation at our institution.

All patients were included prospectively in the GRASP (Getting Reduction of mitrAl inSufficiency by Percutaneous clip implantation) registry, whose patients' selection criteria and procedural details previously have been reported.[2,3] Patients underwent MitraClip implantation in the catheterization laboratory with upstream infusion of dobutamine left to the operator and anesthesiologist's discretion. Infusion was performed at a low dosage (3-6 μg/kg/min) to support cardiac output and blood pressure while avoiding tachycardia. Weaning from inotropic support was achieved after the procedure in the catheterization laboratory or in the cardiac intensive care unit. LV function was assessed by echocardiography before and within 12-to-24 hours after the procedure. Based on Melisurgo et al,[4] AM was defined as a drop in ejection fraction (EF) of at least 28% on the immediate postprocedural echocardiography as compared to early preprocedural EF value. Blood samples were collected before and 24 hours after the procedure to evaluate changes in high-sensitive cardiac troponin values (delta cTn). Patients were followed up through periodic clinical and echocardiographic visits.

Out of 301 patients who underwent MitraClip implantation, 119 subjects had severe LV dysfunction. Of these, inotropic

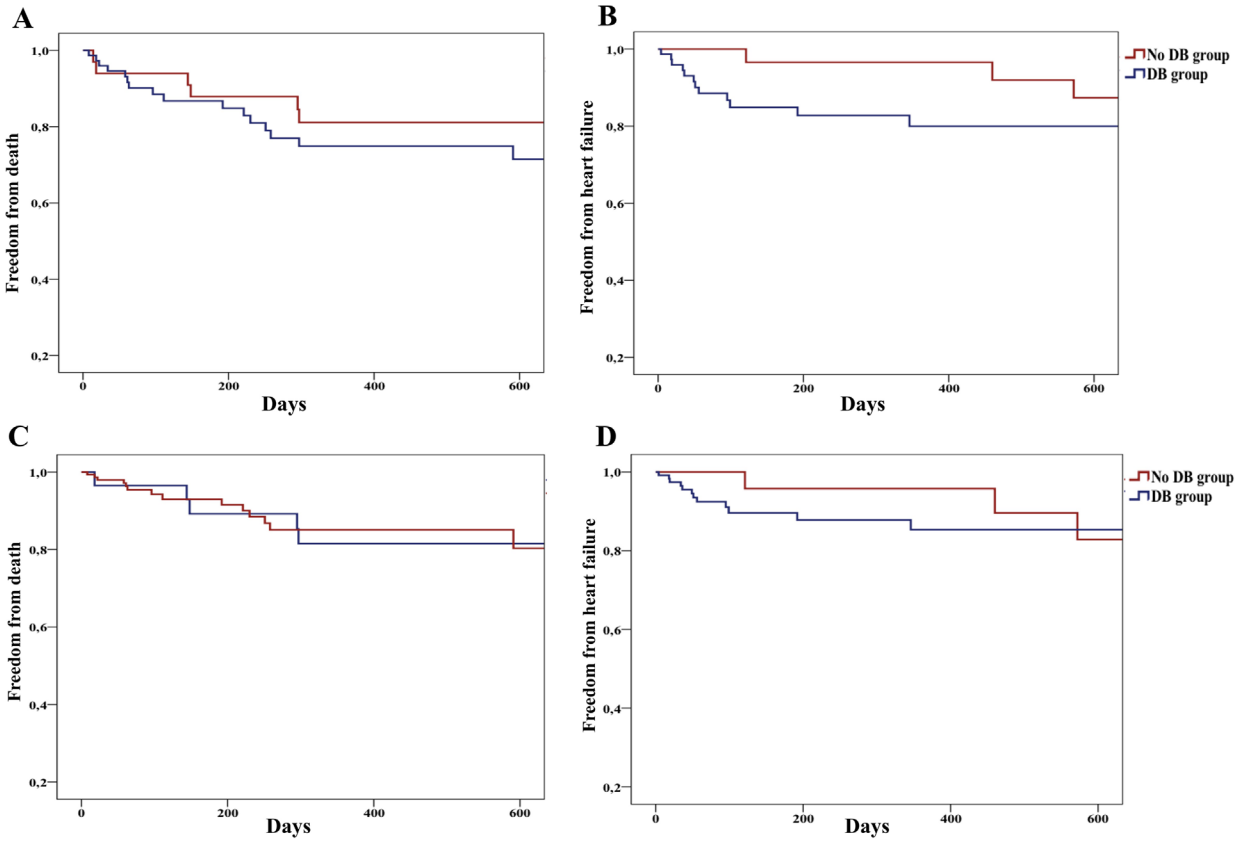

Fig 1. A and B, unadjusted survival curves in the DB and no-DB group. C and D, multivariate-adjusted survival curves in the 2 groups.

support was used in 84 (DB group) patients (mean age of 69.2 ± 8.5 years and preprocedural mean EF of 25.3% ± 3.8%). In the DB group, there was 1 case of in-hospital mortality and AM. One patient required intra-aortic balloon counterpulsation due to worsening of LV function. One patient experienced an episode of ventricular tachycardia 24 hours after the procedure that was treated effectively with antitachycardia pacing delivered by a previously implanted defibrillator. There were no other significant arrhythmias. There was no difference in delta cTn between patients in the DB group and patients not receiving dobutamine infusion (58.2 *v* 57.9 ng/L in the DB and no-DB group, respectively, p = 0.499). A univariate Cox proportional hazard model indicated that inotropic use did not affect significantly mortality (hazard ratio [HR] = 1.63, 95% confidence interval [CI] = 0.70-3.79, p = 0.25) and rehospitalization for HF (HR = 1.98, 95% CI = 0.70-5.61, p = 0.20) at the longest available follow-up. These findings were confirmed after multivariate adjustment for variables with a p value < 0.10 on univariate analysis, including sex, N-terminal prohormone of brain natriuretic peptide (NT-proBNP) levels, systolic blood pressure, and glomerular filtration rate (HR = 0.99, 95% CI = 0.30-3.19, p = 0.98 and HR = 1.76, 95% CI = 0.42-7.44, p = 0.44 for all-cause death and rehospitalization for HF, respectively). Figure 1 shows unadjusted and multivariate-adjusted survival curves.

In conclusion, procedural dobutamine infusion in patients undergoing MitraClip implantation is reasonably safe, leading to low rates of AM, and is not associated with induced ischemia, increased mortality, and rehospitalization for heart failure at follow-up. Larger studies are needed to confirm our findings and to identify the optimal management strategy in this group of patients.

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Response to Letter About the Procedural Management of Patients With Advanced Heart Failure Undergoing MitraClip Implantation (From the GRASP Registry)

To the Editor:

My thanks to Dr. Buccheri and colleagues for commenting on my recently published article, "Afterload Mismatch after MitraClip Implantation: The Potential Impact of Pharmacologic Support."[1] It was valuable seeing no concerns were raised by these authors regarding the pathophysiology, prevention, diagnosis, and treatment of afterload mismatch and MitraClip usage (Abbott Vascular, Santa Clara, CA).[2] They highlighted findings of another study describing the hemodynamic management of patients with advanced heart failure who underwent percutaneous mitral valve repair with the MitraClip system.[2] The study investigated the safety and efficacy of perioperative dobutamine for afterload mismatch management, using the GRASP registry (Getting Reduction of mitrAl inSufficiency by Percutaneous clip implantation).[2,3] They discovered low-dose infusion of dobutamine in high-risk patients (left ventricular ejection fraction $\leq 30\%$) was associated with a significantly low rate of afterload mismatch and tachyarrhythmia, with no significant effect on myocardial ischemia, death, or rehospitalization for heart failure.[2] Despite being a single-center, nonrandomized, observational study, these findings are important to clinicians using the MitraClip system.

Patients with pre-existing left ventricular systolic dysfunction, however, may be at prohibitive risk for afterload mismatch after mitral regurgitation correction with the MitraClip system.[1,4,5] Therefore, it may be beneficial to provide inotropy prophylactically, and concurrently reduce the afterload of the left ventricle, before MitraClip deployment.[1,4,5] Considering the aforementioned are pharmacodynamic properties of dobutamine, its administration may be useful.[2,4,5] Dobutamine may cause tachyarrhythmias, but low-dose infusion should have minimal impact.[2] Nevertheless, further research is necessary for the best strategy in the prevention, diagnosis, and management of afterload mismatch during MitraClip implantation.

References

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Effects of On-Pump and Off-Pump Coronary Artery Bypass Surgery on Metabolic Profiles in the Early Postoperative Period

To the Editor:

We read, with great interest, the recent article from the *Journal of Cardiothoracic and Vascular Anesthesia* comparing metabolic profiles following on-pump and off-pump coronary artery bypass surgery.[1] Despite large randomized controlled trials demonstrating similar outcomes for both techniques,[2,3] the debate between proponents of each technique seems to rage on.

While we found the results to be interesting, especially the fractionally higher use of vasopressors after off-pump coronary artery bypass graft, we have some concerns about the lack of intraoperative data available to the authors. This study aimed to compare metabolic profiles of patients in the immediate postoperative period, and we believe that the intraoperative management of such patients could be relevant over the following 24 hours.

The readers are provided with a brief recipe of a typical anesthetic from the institution. However, we feel the lack of further details limits the strength of the study. Isoflurane is known to have a role in myocardial ischemic preconditioning[4,5]; therefore, the relative use of isoflurane or propofol infusion for the maintenance of anesthesia may be relevant. Use of intraoperative vasopressors or inotropes also can have a marked influence on the postoperative period. For example, a loading dose of enoximone could affect both myocardial contractility and vasopressor requirement dramatically in the