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doi:10.1016/j.jtcvs.2009.04.034

Reply to the Editor:

We thank Dr Beghetti and colleagues for their thoughtful comments regarding the hemodynamic evaluation and further management of our recent case of atrial septal defect (ASD).¹ The management of patients with a degree of pulmonary vascular disease prior to shunt closure has been a matter of debate. In addition, recent studies demonstrating the efficacy of oral vasodilators in pulmonary vascular disease associated with congenital systemic-to-pulmonary shunts^{2,3} have fueled an uncertainty of vasodilator pretreatments prior to shunt closure.

Despite optimized medical treatment with diuretics, antibiotics, and oral anticoagulant over 4 months since the first medical contact, our patient was severely dyspneic, with elevated atrial pressures, a pro-brain natriuretic peptide serum level of above 4000 pg/mL, and a dramatically limited 6-minute walking distance (6-MWD) of 150 m. In fact, based on the hemodynamic assessment alone, the patient was admitted to the surgical ward for ASD closure. However, surgeons refused the operation based on the patient's overall clinical profile and frailty. A 10-month treatment with bosentan on top of supportive treatment with diuretics and anticoagulation effectively decreased shunt flow and lowered pulmonary vascular resistance by 140 dynes $\cdot$ s⁻¹ $\cdot$ cm⁻⁵ and markedly decreased atrial pressures, biomarkers, and 6-MWD in the presence of a mild arterial desaturation.

We do agree with the discussants that taking into account left atrial pres-

ures, pulmonary arteriolar resistance was about 3 Woods. In addition, the pulmonary-to-systemic resistance ratio under oxygen and nitric oxide was <0.33 (in the patient, this ratio was 0.11), a threshold pediatric cardiologists have labeled as a criterion conveying a good prognosis after closure of the shunt.⁴ Still, data in adult patients with congenital heart disease are lacking, and the criteria of a complete hemodynamic responder status in adults were not fulfilled in this case.⁵ Because hemodynamic testing is a routine procedure in adult pulmonary vascular centers, we do rely on these data in the absence of firm evidence indicating their uselessness in adults with congenital heart disease. Moreover, children are usually examined under general sedation/anesthesia. For these and other reasons, it is evident that the hemodynamic response pattern in children is different from that in adults⁶ and that hemodynamic criteria in children may not apply to elderly adults. Furthermore, later assessments after surgery in the patient under discussion illustrated a degree of persistent pulmonary vascular disease with a pulmonary arteriolar resistance of 530 dynes $\cdot$ s⁻¹ $\cdot$ cm⁻⁵, despite active treatment with bosentan.¹

The main value of this report is to provoke discussion, because due to its single case nature, surgery in the absence of bosentan cannot be repeated.

We submit that our invasive procedure was based on an integrative clinical and hemodynamic approach and guided by numbers, rather than the reverse. Controlled data to guide a "targeted treatment-and-repair" strategy in adult patients with congenital heart disease are needed.

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QUALITY OF LIFE IN PATIENTS WITH PROSTHESIS-PATIENT MISMATCH

To the Editor:

I read with interest the article by Moon and colleagues¹ and thank the authors for their contribution to the continued debate on the issue of prosthesis-patient mismatch (PPM).

PPM is an important topic in current cardiac surgery, and there are several discrepancies and contrasting publications about the effect of PPM on postoperative outcome.^{2,3} Some of these controversies are discussed in the accompanying counterpoint article by Dr Feindel.⁴ In their work Moon and colleagues¹ provide important insight into the management of aortic valve replacement (AVR) with bioprostheses in patients older than 70

years. In their study of 1399 patients undergoing AVR, PPM had a negative effect on late survival for patients younger than 70 years but did not influence late survival in patients older than 70 years.

Mohty and associates² similarly found that AVR, with either a bioprosthesis or a mechanical valve, does not increase late mortality in patients older than 70 years. As Moon and colleagues¹ outline in their discussion of the study's limitations, they do not address the effects on late functional state or left ventricular mass regression, and moreover, they do not mention quality of life (QOL).

In my opinion, it is very important to consider a good QOL as a goal for most operations. Especially in the elderly population, it is important to maintain or improve QOL in addition to prolonging life. Koch and coworkers⁵ found that factors other than prosthesis/patient size ratio influence functional QOL after AVR. Yamaguchi and colleagues⁶ suggested that improvement in QOL can be expected after heart valve replacement in patients older than 70 years. However, their study population was different from that of Moon and colleagues¹ and included mechanical and bioprosthetic valves placed in multiple positions; additionally, we do not know whether the PPM occurred in the AVRs in the series of Yamaguchi and colleagues.⁶

PPM affects left ventricular remodeling, surgical outcome, and late mortality, and therefore should be considered a diseased state.² It is important to know whether PPM in elderly patients influences recovery after AVR.

If Moon and colleagues¹ have data about the QOL of their 1399 patients, the information derived from these data could help us understand how PPM affects QOL and would be highly relevant in the care of elderly patients undergoing AVR.

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PROSTHESIS–PATIENT MISMATCH DOES NOT AFFECT SURVIVAL AND QUALITY OF LIFE IN THE ELDERLY HAVING BILEAFLET PROSTHESES IMPLANT

To the Editor:

We read with interest the article by Moon and colleagues evaluating the impact of prosthesis–patient mismatch (PPM) on the long-term outcomes for elderly patients having aortic valve replacement (AVR).¹ The study evidenced the lack of influence on survival by PPM after implantation of biologic prostheses in elderly people.

We would be interested to learn from the authors whether they evaluated the impact of PPM on incidence of bioprosthesis degeneration at follow-up.

We agree with authors' consideration, discussed in the Comment section, of the inopportunity of aortic root enlargement in this subset of patients, and we also support the isolated AVR for aortic stenosis.

We recently have published a series on the topic of PPM and reported comparable conclusions.^{2,3} However, we would like to share with the authors our different policy regarding the choice of mechanical prostheses, and we would like to receive their consideration about this.

In our view, the increased life expectancy has increased the risk of reoperation for structural degeneration of a bioprosthesis during long-term follow-up. Life expectancy in septuagenarians can be 14 to 15 years, and the durability of a bioprosthesis could be inferior despite the engineering improvements. To reduce the probability of reoperation in the eighth or ninth decade of life, we apply precise selective criteria to the choice of biologic or mechanical prosthesis.

As reported in our previous studies,^{4,5} the choice of prosthetic implants for old patients was fundamentally guided by the consideration of patient's biologic age and associated with the foreseeable life expectancy. We chose mechanical devices for elderly patients who reasonably had a life expectancy of more than 10 to 12 years. Moreover, patients already receiving long-term anticoagulation for chronic atrial fibrillation were offered a mechanical prosthesis. Biologic prostheses were preferred for those patients with contraindication to oral anticoagulation or those in whom general senescence status or associated multiple noncardiac comorbidities, or both, suggested a life expectancy of less than 10 years. The incidence of anticoagulation-related complications is very low, with a freedom from hemorrhagic event of 96.9% ± 0.013% at 10 years.

Our institution includes an outpatient clinic that monitors anticoagulation therapy in a number of elderly