Reconstruction of the regurgitant mitral valve has been an established and accepted therapeutic approach for several decades. It has been shown that a repaired mitral valve is associated with a lower incidence of valve-related complications compared to valve replacement, and it has even been found that valve repair (rather than replacement) normalizes life expectancy [1].

The idea of repairing regurgitant aortic valves is not new [2–6]. Reconstruction has been performed more systematically and with increasing enthusiasm only over the past 10 to 15 years [7–12]. Procedures were designed for patients whose valve dysfunction was only due to aortic dilatation in the presence of normal cusps [7–9], and good functional results reported [7–10]. Further experience demonstrated that primary cusp pathology could also be treated by repair rather than valve replacement [11–13] and the combination of root and cusp procedures was not only shown to be feasible, but also yield very satisfactory results [14, 15].

Mixed messages have come across regarding repair stability, i.e., freedom from recurrence of regurgitation and freedom from reoperation [16–24]. It seems, however, that with increasing experience results have improved and repair has become a possible alternative to aortic valve replacement, at least in the hands of some groups. Still, the quality of repair appears to depend on the subjective judgement of the individual surgeon, and a number of operative aspects will have to be defined and standardized before aortic valve repair becomes part of surgical routine.

At this time we should not only be satisfied with the fact that aortic valves can indeed be repaired, but also begin to focus on the clinical implications of aortic valve repair, i.e., freedom from valve-related complications. In addition, the function of the repaired aortic valve needs to be compared with that of prosthetic replacement, and the possible clinical implications will have to be investigated.

The current manuscript deals with this particular aspect and provides new information. Satisfactory valve function could be achieved in most patients and left ventricular dimensions improved postoperatively. At the same time the manuscript raises several points that may be the subject of controversial discussion.

The question of relative stenosis of bicuspid anatomy continues to be a subject of debate despite the fact that resting echocardiographic studies have demonstrated low and essentially physiologic systolic gradients. Schmidtke and co-authors now convincingly show that this almost normal systolic function of the repaired bicuspid valve can also be found during conditions of exercise, which is much more representative of daily life condition of these young individuals. The gradients are superior to those seen with most current heart valve substitutes and thus point out a potential physiologic advantage of aortic valve repair.

In presenting functional data of repaired valves with bicuspid anatomy the authors are in disagreement with an old clinical paradigm, i.e. that bicuspid valves are abnormal, stenotic and will always calcify [25, 26]. Clinical observations, however, indicate that bicuspid valves may take very different clinical courses. Possibly related to differences in

Reconstruction of bicuspid aortic valves
Surgical tool or toy?
valve morphology, bicuspid valves seem to either develop predominant stenosis or regurgitation [27–29]. In addition, bicuspid aortic valves have been observed with either no relevant dysfunction or isolated regurgitation up to the seventh decade of life [30, 31]. Our own experience parallels the published data in that we have seen bicuspid anatomy of the aortic valve with pliable cusp tissue, variable degree of regurgitation and no stenosis in septuagenarians. In addition, we have not yet seen increasing systolic gradients, save hemodynamically relevant stenosis during a follow-up of repaired bicuspid valves reaching up to 10 years [32].

Thus repair of bicuspid valves appears reasonable, if adequate freedom from recurrent regurgitation and/or reoperation can be achieved. The data presented by Schmidtke and co-authors unfortunately are too limited to shed light on this crucial aspect. Systematic and longer follow-up analyzed in actuarial fashion would be necessary, which is not part of the current publication. Nevertheless, there is information from other groups suggesting that stability of the repaired bicuspid aortic valve is at least equivalent if not superior to the results obtained with tricuspid aortic valves [32, 33].

Current follow-up information, however, is at best mid-term, and for true long-term results observations will have to be continued for 15 to 20 years postoperatively.

More information will also be necessary to determine whether the risk of endocarditis following reconstruction will continue to be lower than that of aortic valve replacement [33]. At this time it seems premature to modify the well-established prognostic criteria for surgical treatment of aortic regurgitation, while in mitral surgery, the possibility of repair procedure has already lead to earlier recommendations for surgery [34, 35]. It is also unclear whether reconstructive surgery is justified in mild to moderate regurgitation when cardiac surgery is necessary for other reasons, i.e., coronary surgery.

At this time aortic valve repair seems to be a good option in pediatric patients and young adults, in whom the durability of any bioprosthesis is unsatisfactory [36, 37]. A mechanical valve substitute with the necessary anticoagulation, however, may be incompatible with their lifestyle. In these patients any solution with a 90% freedom from reoperation at 10 years seems attractive. In this context, some data indicate that aortic repair is indeed a useful option, and current results are not inferior to those of the pulmonary autograft [38–40].

Reconstruction of the regurgitant aortic valve is a new and fascinating option which deserves more attention in the future.

References