mobilization of the ATL. To restore normal RV volume resection of hypertrophied trabecula was necessary in almost all patients. In the presence of a thick-walled PTL we created a bicuspid atrioventricular valve providing favorable functional results as well.

Rupture of the running fixation suture of the STLs and PTLs was a major complication and cause of reintervention after valvuloplasty at the beginning of our series, probably caused by increased tension of the tricuspid annulus when normal work was imposed. After changing our technique by performing an additional reinforcement of the running suture using some single pledgeted sutures we did not observe any recurrent right atrioventricular valve regurgitation caused by the rupture of the running suture.

Certain limitations of the presented study have to be mentioned: larger cohorts are required and assessment of exercise capacity would have been helpful to objectify postoperative functional status of our patients. We did not perform magnetic resonance angiography in our patients, which would allow determining RV volumes and ejection fraction after surgical repair. Additionally the presented method of Ebstein's anomaly repair has its technical limitation in the presence of a small ATL and PTL or in Carpentier type D disease that prevents the creation of a monocuspid valve, necessitating prosthetic TV replacement in 5 out of 29 patients presenting with Ebstein's anomaly at our institution.

In summary we present a concept of Ebstein's anomaly repair based on the reintegration of the former atrialized chamber into the RV by valvuloplasty in combination with ventricularization. We conclude that this technique resulted in favorable restoration of RV geometry and function in almost all patients, which was confirmed by regular echocardiographic examinations. There was a considerable improvement of TV function compared with preoperative data. In light of these findings we recommend this operative technique for all patients presenting with Ebstein's anomaly and important with regard to TVR early in its course when the RV might be more suitable to recondition. This technique can be performed at low risk with excellent functional and clinical results even with a high abnormal pathology.

We cordially thank Jutta von Bergmann (Department of Surgery, Graphics, University of Heidelberg, Heidelberg, Germany) for the illustrations.

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INVITED COMMENTARY

Ullmann and colleagues present a novel approach to the repair of the tricuspid valve in Ebstein's anomaly. The essence of their technique involves ventricularization of the atrialized chamber by detachment of the displaced septal leaflet and reattachment to the true annulus. The anterior leaflet, mobilized as necessary according to the specific anatomic findings, then functions as a monocusp closing against the barrier made by the repositioned

0003-4975/04/$30.00
doi:10.1016/j.athoracsur.2004.03.056

septal leaflet. Their series includes 23 patients undergoing operation over a 10-year span but, importantly, excludes 5 patients whose anatomy was judged too severe for valvuloplasty. However, despite the generally favorable anatomy in their patients, 3 had valve dehiscence with 1 death and 1 underwent conversion to a Fontan procedure. The survivors have generally done well, and only 2 have more than moderate residual tricuspid valve regurgitation at late follow-up.

The concept that the atrialized portion of the right ventricle need not be plicated but may be simply left as part of the right ventricle (ventricularization) is not new but goes against most currently employed techniques that involve reduction or plication of this chamber. The authors have demonstrated that good results are possible with their approach, raising the question of whether patients with Ebstein's anomaly should undergo valve repair earlier in life with the expectation that the atrialized portion of the right ventricle will recondition more easily to ventricular workloads. Perhaps the most surprising finding in this series is the lack of heart block after reattachment of the septal leaflet to the true or anatomic annulus of the tricuspid valve. The penetrating bundle passes unguarded in this region, and the authors appropriately emphasize that superficial sutures must be taken. It should be emphasized, however, that their approach resulted in valve dehiscence in 3 patients, so this technique is not without potential problems. The main purported advantage, according to the authors, is the "favorable restoration of right ventricular geometry and function." Unfortunately, few supporting data are presented to substantiate that claim. Perhaps additional studies, including magnetic resonance and radionuclide imaging, would strengthen their conclusion by examining regional wall motion. Nonetheless, the authors should be congratulated for presenting this novel technique, which provides additional support to the notion that these patients may be better served by earlier repair.

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