Journal of the American College of Cardiology
© 2008 by the American College of Cardiology Foundation
Published by Elsevier Inc.

Vol. 51, No. 12, 2008
ISSN 0735-1097/08/$34.00
doi:10.1016/j.jacc.2007.08.071

EDITORIAL COMMENT

# Thromboembolic Complications After Surgical Correction of Mitral Regurgitation

## Finding a Balance*

Robert A. Dion, MD, PHD

*Genk, Leuven, Belgium*

In this issue of the *Journal,* Russo et al. (1) report on thromboembolic complications after surgical correction of mitral regurgitation (MR). The authors present a retrospective analysis of the risk of thromboembolic and hemorrhagic complications in 1,344 patients operated on for pure MR between January 1980 and December 1995. They have achieved a remarkably complete follow-up (98.2%) and have observed the timing of these complications in 3 phases: up to 30 days, between 30 and 180 days, and from 180 days to 10 years. They have also compared the results between mitral valve repair (Mrep) (n = 897), mitral valve replacement with a bioprosthesis (MVRb) (n = 216), and mitral valve replacement with a mechanical valve (MVRm) (n = 231). Concomitant CABG was accepted in the inclusion criteria and was evenly distributed over the different groups.

See page 1203

Of more concern is the inclusion of 76 endocarditis cases, which by themselves might have exerted a significant influence on the thromboembolic events. Another and greater concern is the conduct of anticoagulation beyond discharge: "the subsequent intensity and duration of anticoagulation was determined by patients' physicians. . ." We know how much anticoagulation regimens can vary among physicians without speaking of the inconstant discipline of the patients themselves. On the other hand, the authors might answer that the results presented illustrate anticoagulation in the real life of a large population of patients.

Obvious differences existed in the baseline pre-operative characteristics of the patients undergoing the 3 types of procedures, including age, the percentage with organic MR, and the percentage with atrial fibrillation (AF). Therefore, the authors compared the incidence of stroke after these procedures with the expected incidence of stroke in an Olmsted County population with similar characteristics.

As mentioned by the authors, the general results bring good news and bad news. The good news is that the excess risk of stroke and thromboembolic complications disappears beyond 6 months after MRep and MVRb. The bad news is that the incidence of stroke is approximately 40× higher than in the control population during the first 30 post-operative days and was independent of the procedure. Between 1 and 6 months after the operation, the excess risk of stroke was variable: 2.1 for MRep, 1.5 for MVRb, and 10.4 for MVRm. The authors found that systemic hypertension, age, and MVRm were independent predictors of ischemic stroke during intermediate follow-up, and age and MVRm also at long-term follow-up, which is not unexpected. The observation that AF was not an independent predictor was a great surprise. However, the influence of AF is masked by the MVRm group. After exclusion of these patients, AF becomes a definite independent predictor of stroke. This is an important issue because no less than 544 patients (41%) had pre-operative chronic AF and 168 patients (12.5%) developed AF during the follow-up period. Besides, we know that brief or paroxysmal AF occurs in the early post-operative course in up to 25% of patients. However, the medical, interventional, and surgical treatments of AF have spectacularly evolved since 1995, which is not taken into account here. Nowadays, in experienced centers, concomitant AF is addressed by ablation lines in both atria and exclusion of the left appendage, particularly after MRep or MVRb, with a maximum success rate of 80% to 90% at follow-up.

One of the Russo et al. (1) most definite conclusions is that "MVRm is the least desirable mode of correction of MR." The long-term risk of ischemic stroke was 3× higher and the risk of bleeding 2.5× higher than in MVRb. Also the linearized rate of "all embolic events" is much higher in MVRm than in MVRb (4.3 vs. 2.8 per 100 patient-years). The authors nearly conclude that MVRm should be banned from the surgical armamentarium. I do not share this extreme attitude, and the comparison of outcome between mechanical and biologic prosthesis in the literature, even in aortic position and in the elderly, surprisingly does not lead to overwhelming evidence of the superiority of MVRb. The influence of thromboembolic and hemorrhagic events needs to be balanced against the degeneration of the bioprosthesis, and the incidence of bioprosthetic degeneration seems higher in the mitral position than in the aortic position. In addition, up to 30% of patients with a bioprosthetic valve receive anticoagulation for various reasons, which, according to the data of the authors, yields a risk ratio of 1.52. If the valve cannot be preserved, the type of prosthetic device should still be adapted case by case, taking into account the

*Editorials published in the *Journal of the American College of Cardiology* reflect the views of the authors and do not necessarily represent the views of *JACC* or the American College of Cardiology.

From the Department of Cardiac Surgery, ZOL-Campus St-Jan, Genk, Leuven, Belgium.

baseline characteristics, quality of the social life, life expectancy, use of anticoagulation, and, last but not least, the preference of the patient and the findings of this study.

Another of the Russo et al. (1) major conclusions consists of a warm plea for MRep, "which results in long-term restoration, not only of life expectancy but also of the ischemic stroke risk." Mitral valve repair has even been found by the authors to be a *negative* independent predictive factor for ischemic stroke in the long term (risk ratio 0.5). It also provides the lowest long-term risk of bleeding and embolic events so that "it is unique in combining long-term morbidity to mortality benefit" (1). Here, despite the fact that the rate of MRep in our center amounts to 90% of all mitral valve surgery, I wish to introduce some nuances about this statement. At the latest meeting of the American Association for Thoracic Surgery in Washington, DC, the Cleveland Clinic colleagues presented an abstract entitled: "Is Survival Always Better After Valve Repair Than After Valve Replacement for Degenerative Mitral Valve Disease?" Their conclusion was that "in a subset of older, sicker patients with advanced heart disease, we were unable to identify a survival advantage of mitral repair versus replacement." The official discussant of this paper was Dr. Tirone David, one of the most experienced surgeons in MRep. He first admitted to having been shocked by the conclusions, but after analyzing his own results in this extreme end of the spectrum, he too became doubtful that there was a definite advantage of MRep. Another element is the durability of the repair in difficult cases. Willem Flameng first reported in *Circulation* in 2003 (2), and then again at the American Association for Thoracic Surgery meeting in Washington, DC, a linearized rate of recurrent MR class >II of 2.8% in the Barlow disease. Some other centers might claim better results, but there certainly is an attrition rate after MRep. This individual attrition rate should be ideally defined for each center that wants to be a reference for MRep, especially those centers contemplating treating the *asymptomatic* patient.

The indications for surgical repair of severe MR in an asymptomatic patient is currently a hot but controversial topic in the literature. It is well known that one should try to operate before the onset of AF and before the dilation of the left ventricle, but there is also the issue of the above-mentioned attrition rate and the fact that the risk for ischemic stroke is multiplied by 1.6 for the entire follow-up period and by as much as 31 during the first 30 days after the operation. In reality, it is only a real incidence of 1.5%, but it has to be taken into account. We do not really know the exact risk of ischemic stroke in the setting of asymptomatic patients, because the authors have calculated an overall risk for all of the patients with pure MR. It might well be that, in patients who are asymptomatic and therefore normally active, the risk of stroke would be less during the immediate post-operative course and at follow-up. It would be interesting to ask the authors of this study to recalculate the risk of ischemic stroke for patients who have a severe MR and are asymptomatic.

Finally, the authors consider the role of preventive anticoagulation in every patient after MRep or MVRb for the first 6 months to cover the increased risk of ischemic stroke. This is a quite difficult issue. There must be a balance between the risk of bleeding—which is multiplied by 1.52 after anticoagulation in this series—and the risk of ischemic stroke or peripheral embolic disease. I believe that only a prospective randomized trial with very specific guidelines for anticoagulation will bring the answers.

Nevertheless, this study is essential in demonstrating the excess risk incurred by patients undergoing MR surgery for certain post-operative phases and procedures and thus helps define candidates for future clinical trials.

**Reprint requests and correspondence:** Prof. Dr. Robert A. Dion, Head of the Department of Cardiac Surgery, ZOL–Campus St-Jan, Schiepse Bos 6, 3600 GENK, Belgium. E-mail: robert.dion@zol.be.

## REFERENCES

1. Russo A, Grigioni F, Avierinos J-F, et al. Thromboembolic complications after surgical correction of mitral regurgitation: incidence, predictors, and clinical implications. J Am Coll Cardiol 2008;51:1203–11.
2. Flameng W, Herijgers P, Bogaerts K. Recurrence of mitral valve regurgitation after mitral valve repair in degenerative valve disease. Circulation 2003;107:1609–13.