

SURGICAL MANAGEMENT OF THE PATIENTS WITH MODERATE RHEUMATIC MITRAL AND AORTIC VALVE DISEASE

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Whether to perform double valve replacement in surgical management of moderate mitral and aortic valve disease is controversial. To investigate the long-term mortality and morbidity of combined valve repair and valve replacement, we analyzed the results obtained in 48 mitral-aortic reconstruction and in 45 mitral-aortic mechanical prostheses replacement.

48 patients with moderate rheumatic mitral and aortic valve disease (36 female and 12 male, mean age 32.6 ± 5.8 years) underwent mitral and aortic valve reconstruction in association with tricuspid valve repair in 23 of them (Group A) and 45 patients with rheumatic valve disease (27 female and 18 male, mean age 48.8 ± 7.3 years) underwent double valve replacement in association with tricuspid valve repair in 14 of them (Group B). The valve findings determined the type of reparative procedures. All mechanical valves were bileaflet prostheses. Patients with an aortic regurgitation over moderate level were excluded. Preoperatively, in Group A, 75% of the patients were in NYHA class II-III and in Group B, 80% of the patients were in NYHA class II-III.

Hospital mortality rate was 2.1% (1 patient) in Group A and 2.2% (1 patient) in Group B. The overall valve-related morbidity included 9 events (re-operation) out of 48 patients in Group A and 12 events (prosthetic valve endocarditis and/or paravalvular leak, thromboembolism, bleeding) out of 45 patients in Group B. At the last follow-up, 87% of the survivors were in NYHA class I-II in Group A and 86% of the survivors were in NYHA class I-II in Group B. The cumulative survival rate was $92.77\pm 4.03\%$ in Group A, and $88.65\pm 6.40\%$ in Group B in 7 years (log-rank; $p=0.98$). Actuarial freedom from valve-related morbidity was $75.12\pm 7.32\%$ in Group A, $82.84\pm 7.53\%$ in Group B in 6 years (log-rank; $p=0.24$). Actuarial freedom from re-operation was $92.57\pm 4.14\%$ in Group A, and $88.65\pm 6.40\%$ in Group B in 7 years (log-rank; $p=0.94$). There were not any significant differences between cumulative survival actuarial freedom from

Table 3: Mortality and valve-related morbidity

	Reconstruction	Replacement
Hospital mortality	1 (2.1%)	1 (2.2%)
Morbidity	9 (18.7%)	6 (13.3%)
Structural deterioration	9 (18.7%)	-
Nonstructural deterioration	-	3 (6.7%)
Thromboembolism	-	1 (2.2%)
Bleeding	-	1 (2.2%)
Prosthetic valve endocarditis	-	3 (6.7%)
Re-operation	9 (18.7%)	4 (8.9%)
Late mortality	2 (4.2%)	3 (6.7%)

stroke in one patient in the second postoperative month and anticoagulant-related bleeding in one who was receiving irregular anticoagulant therapy in the third postoperative year. The linearized rates for thromboembolism and bleeding were 0.49% pt-yr and 0.50% pt-yr, respectively.

Nonstructural dysfunction occurred in 3 patients. One patient presented with moderate mitral paravalvular leak (PVL) and one patient presented with severe aortic PVL, while the third one presented with mitral PVL which was diagnosed as a technical failure during the operation. The linearized rate for nonstructural dysfunction was 1.45% pt-yr.

No cases of early PVE was present but late PVE developed in 3 patients. The agents of PVE were identified as *Staphylococcus aureus* in 2 patients, but in the third one, the culture was negative. All patients received an 8-week course of antibiotic therapy. The linearized rate for prosthetic valve endocarditis was 1.48% pt-yr.

Nine patients required re-operation in Group A due to increasing insufficiency and/or restenosis and 4 patients required re-operation due to PVL and/or PVE with vegetation in Group B. Variables of the both groups are listed in Table 4. Re-operation was necessary

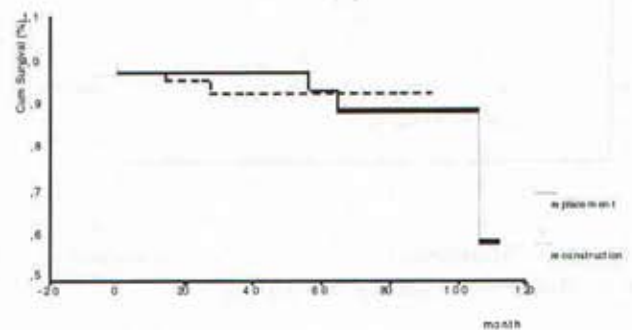
Table 4: Re-operation variables

	Reconstruction	Replacement
Total	9 (18.7%)	4 (8.9%)
Re-ope. interval	2.3 years	6.2 years
Emergency re-ope.	-	2 (50%)
Early re-ope.	1 (2.1%)	0
Late mortality	2 (22.2%)	3 (75%)
Morbidity	2 (22.2%)	2 (50%)

because of predominant mitral valve dysfunction in 1 patient, predominant aortic valve dysfunction in 5 patients, and double valve dysfunction in 3 patients. Predominant aortic regurgitation was the cause of re-operation in 8 patients out of nine. Of all of the 9 patients re-operated because of structural deterioration, none of patients were re-operated within the first postoperative year. In all re-operations, double prosthetic valve replacement was performed. The linearized rate for re-operation was 4.93% pt-yr in Group A and 1.93% pt-yr in Group B. Actuarial freedom from re-operation was 92.57±4.14% in Group A, 88.65±6.40% in Group B in 7 years [log-rank; p=0.94] (Figure 3).

Overall valve-related morbidity included 9 events (re-operation) in Group A and 12 events (prosthetic valve endocarditis and/or paravalvular leak, thromboembolism, bleeding) in Group B.

Overall, 9 patients had 9 valve-related events and subsequently 9 patients were re-operated for structural deterioration in Group A. 6 patients had 12 valve-related events and subsequently 4 patients were re-operated for nonstructural dysfunction in Group B. The linearized rate for valve-related morbidity was 4.93% pt-yr in Group

**Figure 2.** Cumulative survival (log-rank p=0,98).

A and 6.12% pt-yr in Group B. Actuarial freedom from valve-related morbidity was $75.12 \pm 7.32\%$ in Group A, $82.84\% \pm 7.53\%$ in Group B in 6 years [log-rank; $p=0.24$] (Figure 4).

Late mortality rate was 4.2% (2 patients) in Group A, 4.4% (3 patients) in Group B. Late mortality occurred after re-operation, caused by delayed cardiopulmonary bypass time and multiorgan failure in 2 patients in Group A, and low cardiac output in 1 patient, sepsis and multiorgan failure in 1 and cerebral embolus in 1 in Group B. Hospital mortality for valve-related re-operation was 22.2% (2 of 9) in Group A and 75% (3 of 4) in Group B.

DISCUSSION

Despite many significant improvements in cardiac surgical techniques, the operative risk for combined mitral and aortic valve surgery remains over 5% (2).

The use of any mechanical valve exposes the patient to an incremental risk of thromboembolism and anticoagulant-related complications. In addition, in moderate valve disease associated with predominant other valve disease, prophylactic valve replacement does not seem logical (5). Among valve-related complications, thromboembolism and bleeding were reported as most frequent complications. Overall linearized rate for embolism in the published series has been

ranging from 0.5% to 3.5 (6-8). It was reported that late mortality and morbidity in combined mitral and aortic valve surgery continued to have cardiac causes or were related to anticoagulant therapy (9).

In young patients and particularly in women of child-bearing age, prosthetic valve replacement still presents a serious problem in terms of anticoagulation (10). Bioprosthetic heart valves have a lower risk of thromboembolism and thus a limited requirement for anticoagulation, but they suffer from predictable structural deterioration as an age-related phenomenon (11-12). In the present study, the reconstruction group consisted of predominantly young females.

Valvuloplasty has clear advantages over prosthetic replacement. All repair procedures carry a low operative risk (13). The advantages of mitral reconstruction with the reduced need for an anticoagulant regimen could well outweigh considerations based on the low durability of valvuloplasty in patients with rheumatic mitral-aortic valve disease (14-15).

The presence of severe left ventricular dysfunction did not preclude valvuloplasty where subvalvular mechanism is preserved (16). Most patients undergoing double valve replacement have reduced myocardial capacity. On the other hand, poor left ventricular function increases the likelihood of embolism from the prosthetic valve (17-18).

Beyond all the recognized benefits of valve

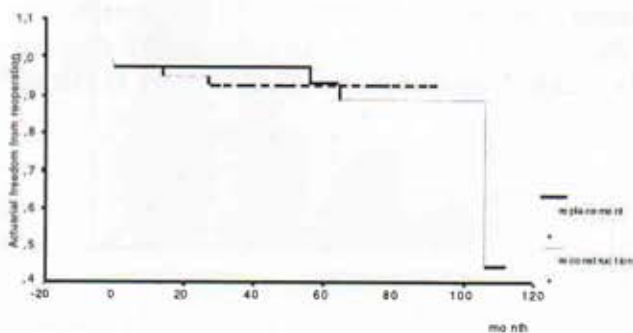


Figure 3. Actuarial freedom from reoperation (log-rank $p=0.94$).

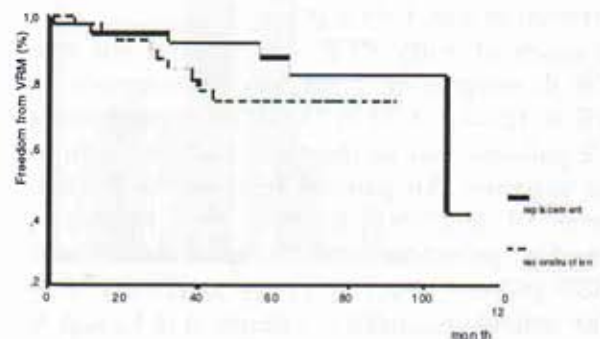


Figure 4. Actuarial freedom from valve-related complications (log-rank $p=0.24$).

reconstruction, the economic advantage of valvuloplasty for patients and payers was pointed out as well (19). Being cost-effective is an important factor for the countries that import prosthetic heart valve for replacement. The total cost of double mechanical valve replacement was approximately \$8,000 in Turkey. Although no significant differences were observed between the two groups in preoperative variables that have been known to affect cost and resource utilization, it was calculated that the reconstruction group's cost was 50% less than that of the double valve replacement group.

Numerous long-term studies have substantiated the durability and freedom from structural degeneration and valve-related complications provided by mitral and aortic valve reconstruction (20-25). The incidence of failure in valvuloplasty and its causes vary according to the cause of valve disease. Prior reports have documented that patients with isolated rheumatic mitral or aortic disease do not obtain as much long-term benefit from reconstruction as patients with non-rheumatic disease (26-29). Rheumatic valve disease possesses special problems due to deformity of the valve, presence of combined lesions and restricted valve mobility (1). The persistence or recurrence of rheumatic activity distorts the valve structures resulting in regurgitation. The progression of disease is the most important risk factor for re-operation. Early failure of valvuloplasty is probably due to technical factors.

The repair procedures in rheumatic valvular disease are technically more difficult and less stable than those in degenerative lesions due to the complex nature of the rheumatic valve disease which involves all the parts of the valve structures (14, 21, 22, 30). It was reported in different series that the possibility of successful repair in rheumatic valve disease did not exceed 85% (10, 24). But some results on mitral repair in rheumatic valve disease have been encouraging with an acceptable re-operation rate (5.98%) (14). The long-term effects of double valve repair in patients with combined rheumatic aortic and mitral valve disease have not been reported previously.

Our institution is a reference cardiovascular

surgery center throughout Turkey in performing reconstructive and minimally invasive valve surgery. Koşuyolu Heart and Research Hospital has reported preliminary data on mitral valvuloplasty in 1991 (31). In later years, more mitral valvuloplasty results were reported with the application of fundamental reconstruction techniques (32, 33). The mitral-aortic valve reconstruction results of our clinic showed that double valve reconstruction can be performed as a safe alternative for surgical replacement strategy in rheumatic valve disease. We found no statistically significant difference in early and late mortality rates between the two groups. Overall linearized rates for thromboembolism, bleeding events, prosthetic valve endocarditis was almost nil in the reconstruction group. There was not any statistically significant difference between cumulative survival and actuarial freedom from re-operation rates.

As for the major limitations of the present study, the most of the information was collected retrospectively and contact with patients was not achieved completely. We cannot be certain that all patients undergoing re-operation have returned to our clinic. Another limitation was the inclusion of patients who have undergone different reparatory procedures according to various valve findings.

CONCLUSION

The results suggested that in patients with moderate rheumatic mitral and aortic valve disease, repair procedures offered better freedom from valve-related complications and cost effectiveness with good long-term results. Reconstructive valve surgery should be considered for patients in whom the appropriate techniques were able to be applied in accordance with the intraoperative findings. We concluded that valve repair for rheumatic mitral-aortic valve disease is associated with the same long-term survival and freedom from re-operation rates with double valve replacement with the mechanical prostheses, as well as having lower valve-related complications and being cost-effective.

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