Mitral Valve Repair Strategies Based on Pathological Characteristics of Chinese Rheumatic Patients

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Abstract

OBJECTIVES: We aimed to clarify and define the pathological characteristics of rheumatic mitral valve disease in Chinese individuals and to determine an appropriate rheumatic mitral valve repair strategy.

METHODS: We obtained detailed statistics regarding the pathological characteristics of patients who underwent mitral valve repair or replacement for rheumatic disease during the past year at our centre. Different repair techniques were compared. Multivariate logistic regression analyses were used to identify predictive factors for successful rheumatic mitral valve repair.

RESULTS: Between August 2015 and August 2016, 163 patients underwent rheumatic mitral valve repair (77 cases) or replacement (61 cases) at our centre. Although there was a high percentage of pathological lesions, there was a low percentage of severe lesions in the leaflet. In contrast, ratios of severe lesions in the commissure and subvalvular apparatus were all more than one-third. Commissurotomy (97.40%) and leaflet thinning (84.42%) were performed most frequently. Pathological score $>17.5$ (odd ratio [OR] $=0.049$, $P=0.000$), preoperative severe regurgitation (OR=4.897, $P=0.026$), and preoperative mixed lesions (OR=0.186; $P=0.011$) were significant predictors of successful rheumatic mitral valve repair according to multivariate logistic regression analyses.

CONCLUSIONS: Lesions of the commissure and subvalvular apparatus are the main pathological features of Chinese patients with rheumatic mitral valve disease. The commissure processing technique is beneficial in most of these patients.

Figure legends

Figure 1a. Distributive tendency of typical morphological changes of the mitral valve in 163 patients.

Figure 1b. Distributive tendency of severe pathological lesions of the mitral valve in 163 patients.

AMV, anterior mitral valve; PMV, posterior mitral valve; CT, chordae tendineae; AC, anterior commissural; PC, posterior commissural.

Table 1. Pathological grading system of rheumatic mitral valve lesion (PGSMVL)

<table>
<thead>
<tr>
<th>Severity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>Less than one-third of leaflet and commissures are thickened and stiff</td>
</tr>
<tr>
<td>Moderate</td>
<td>More than one-third of leaflet and commissures are thickened and stiff</td>
</tr>
<tr>
<td>Severe</td>
<td>Almost all leaflet and commissures are thickened and stiff</td>
</tr>
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</table>

Figure 2a. Repair rates of different preoperative echocardiographic pathological types. All cases were divided into groups according to preoperative echocardiography.

Figure 2b. Changes in MVOA at the end of the follow-up depending on the different preoperative echocardiographic pathological types.

Seventy-seven patients who underwent rheumatic mitral valve repair were divided into groups according to preoperative echocardiography.

Severe regurgitation was indicated by the ratio of the MRA to the left atrial area $\leq 0.4$ or MRA $\geq 10$ cm$^2$. Severe stenosis was indicated by MVOA $\leq 1$ cm$^2$ or MVOA/BSA $\leq 0.6$. Mixed lesion was indicated by moderate regurgitation (the ratio of MRA to left atrial area $0.4$) and moderate stenosis (1 cm$^2$ $\leq$ MVOA $\leq 1.5$ cm$^2$).

BSA, body surface area; MRA, mitral regurgitation area; MVOA, mitral valve orifice area; mVMP, rheumatic mitral valve repair in the surgery.

Figure 3. Typical commissure processing technique.

a. Pathological features of the mitral valve were detected.
b. Thickening and calcification of the commissure and leaflet were resolved by thinning.
c. D. Commisurotomy for anterior and posterior fused commissures.
d. The mitral valve recovered a "smile" shape and showed no regurgitation during the water test.
e. The mitral valve orifice area was sufficient after rheumatic mitral valve repair.

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