Management of Tricuspid Regurgitation

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Does Tricuspid Regurgitation have any effect on survival?
Impact of tricuspid regurgitation on long-term survival

Kaplan-Meier survival curves for all patients with tricuspid regurgitation (TR)

Kaplan-Meier survival curves for (A) patients with tricuspid regurgitation (TR) and high pulmonary artery systolic pressure (≥40 mm Hg) and (B) patients with TR and normal pulmonary artery systolic pressure.
Kaplan-Meier survival curve for (A) patients with tricuspid regurgitation (TR) and a low left ventricular ejection fraction and (B) TR and normal LVEF (>= 50%)
Impact of tricuspid regurgitation on long-term survival

pts with moderate or greater TR have worse survival than patients with mild or less TR, regardless of pulmonary artery pressure and LVEF

Kaplan-Meier survival curve for (A) patients with tricuspid regurgitation (TR) and a low left ventricular ejection fraction

Impact of functional tricuspid regurgiation on heart failure and death in patients with functional mitral regurgitation and left ventricular dysfunction

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Aims The prognostic role of tricuspid regurgitation (TR) associated with organic left-sided valvular heart disease is well known. However, no data are available regarding the prognostic value of functional TR (FTR) in patients with functional mitral regurgitation (FMR) and left ventricular (LV) dysfunction. The purpose of this study was to evaluate the prognostic role of FTR for occurrence of heart failure (HF) and mortality in patients with FMR.

Methods and results We enrolled 373 consecutive patients (mean age 68 ±11 years) with LV dysfunction and at least mild FMR and with or without FTR, both quantitated by echocardiography. The median follow-up was 32 months (range 1–120 months); 132 (35.4%) and 97 patients developed HF or died, respectively. The incidence of HF at 3 and 6 years was 36 ±2% and 55 ±4%, respectively. Moderate to severe FTR [hazard ratio (HR) 1.4, 95% confidence interval (CI) 1.1–2.1, P = 0.01] was an independent determinant of HF. The incidence of HF was 41 ±5, 46 ±7, 57 ±7, and 65 ±8% for patients without, and with mild, moderate, and severe FTR respectively (P = 0.03). At 3 and 6 years the survival free of all-cause mortality was 77.5 ±2% and 60 ±3%, respectively. Moderate to severe FTR (HR 1.6, 95% CI 1.2–2.1, P = 0.01) was an independent determinant of overall mortality. At 6 years, survival free of all-cause mortality was 69 ±2.5, 67 ±2.1, 51 ±2.5, and 40 ±4.8% for patients without, and with mild, moderate, and severe FTR, respectively (P = 0.004).

Conclusions Moderate or more FTR is independently associated with worse survival and a high incidence of HF episodes in patients with FMR.
What are the guidelines on the treatment of TR?
Guidelines on the management of valvular heart disease

The Task Force on the Management of Valvular Heart Disease of the European Society of Cardiology

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<table>
<thead>
<tr>
<th>Indications for intervention in tricuspid valve disease</th>
<th>Class</th>
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<tbody>
<tr>
<td>Severe TR in a patient undergoing left-sided valve surgery</td>
<td>IC</td>
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<tr>
<td>Severe primary TR and symptoms despite medical therapy without severe right ventricular dysfunction</td>
<td>IC</td>
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<tr>
<td>Severe TS (± TR), with symptoms despite medical therapy&lt;sup&gt;a&lt;/sup&gt;</td>
<td>IC</td>
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<tr>
<td>Severe TS (± TR) in a patient undergoing left-sided valve intervention&lt;sup&gt;a&lt;/sup&gt;</td>
<td>IC</td>
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<tr>
<td>Moderate organic TR in a patient undergoing left-sided valve surgery</td>
<td>IIAc</td>
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<tr>
<td>Moderate secondary TR with dilated annulus (&gt;40 mm) in a patient undergoing left-sided valve surgery</td>
<td>IIAc</td>
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<tr>
<td>Severe TR and symptoms, after left-sided valve surgery, in the absence of left-sided myocardial, valve, or right ventricular dysfunction and without severe pulmonary hypertension (systolic pulmonary artery pressure &gt; 60 mmHg)</td>
<td>IIAc</td>
</tr>
<tr>
<td>Severe isolated TR with mild or no symptoms and progressive dilation or deterioration of right ventricular function</td>
<td>IIbC</td>
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Apart from TR, should we also treat Tricuspid Dilatation?
TR increased by more than two grades in 48% of the patients in the non TV repaired group and in only 2% of the patients in the repaired group (p < 0.001)
Pathological process of tricuspid annular dilatation
Pathological process of tricuspid annular dilatation

antero-septal to antero-posterior diameter of $> 7$cm during surgery corresponds to $> 4$cm TAd on echo

Mitral Valve Surgery for Functional Mitral Regurgitation: Should Moderate-or-More Tricuspid Regurgitation Be Treated? A Propensity Score Analysis

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Background. The aim of this retrospective study was to evaluate the clinical outcome of treating or not treating moderate-or-more functional tricuspid regurgitation in patients with functional mitral regurgitation undergoing mitral valve surgery.

Methods. From January 1988 to March 2003, 110 patients with functional mitral regurgitation undergoing mitral valve surgery showed moderate-or-more functional tricuspid regurgitation, which was treated (group T) in 51 and untreated in 59 (group UT) patients. Propensity score was used to adjust midterm results. The tricuspid valve was always repaired using the DeVega technique. The mitral valve was repaired in 84 and replaced in 26 patients; no residual moderate-or-more functional mitral regurgitation was assessed at hospital discharge.

Results. Thirty-day mortality was 5.5% (8.5% for group UT versus 2% for group T; \( p = 0.245 \)). Adjusted 5-year survival was 45.0% ± 6.1% in group UT and 74.5% ± 5.1% in group T (\( p = 0.004 \)), whereas the possibility to be alive in New York Heart Association class I or II was 39.8% ± 6.0% in group UT versus 60.0% ± 6.5% in group T (\( p = 0.044 \)). Proportional Cox analysis, forcing propensity score into the model, demonstrated that untreated moderate-or-more tricuspid regurgitation was a risk factor for lower midterm survival (hazard ratio, 2.7; 95% confidence interval, 1.3 to 5.4) and survival in New York Heart Association class I or II (hazard ratio, 1.9; 95% confidence interval, 1.1 to 3.4). Follow-up functional tricuspid regurgitation progression rate (3+/4+) was 5% in group T versus 40% in group UT (\( p < 0.001 \)). The progression of functional tricuspid regurgitation grade at follow-up was a risk factor for worse survival and the possibility to be alive in New York Heart Association class I or II.

Conclusions. Tricuspid annuloplasty is an easy and safe procedure, mandatory in case of at least moderate functional tricuspid regurgitation to achieve better midterm outcome in patients with functional mitral regurgitation undergoing mitral valve surgery.

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Mitral Valve Surgery for Functional Mitral Regurgitation: Should Moderate-or-More Tricuspid Regurgitation Be Treated? A Propensity Score Analysis

Adjusted 5-year survival stratified by groups

Adjusted 5-year possibility to be alive in I-II New York Heart Association class stratified by groups

What sort of repair?

• De Vega
• band
• flexible ring
• rigid ring
Tricuspid regurgitation grades 3+ and 4+ postoperatively for each annuloplasty technique.
leaflet extension
for severe
leaflet tethering
papillary muscle rupture
papillary muscle rupture
papillary muscle reimplantation
post papillary muscle reimplantation
post papillary muscle reimplantation
pectus exvacatum

50%
pectus repair
Conclusions:

• even moderate TR appears to be an independent risk factor for survival
• moderate tricuspid regurgitation or tricuspid annular dilatation (>= 40mm) should be repaired at the time of mitral procedure
• the operative risk of an additional tricuspid repair is minimal and therefore an aggressive approach towards repair is recommended