CRT-715

Comparative Calcification of Valve Leaflet Materials: Lotus Valve Material Compared to a Surgical Valve Control
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Background: Comparative assessment of calcification of leaflet materials in the rat subcutaneous model allows assessment of processes of tissue treatment of leaflet materials. Calcification is the leading cause of long-term failure of pericardial valves. We report the results of comparison of the Lotus valve leaflet tissue to that of the approved Mitroflow valve.

Methods: 18 animals were implanted for 30 (N=5), 60 (6) or 90 (5) days. Each animal was implanted subcutaneously with 6 tissue disks per animal (3 test disks/3 control disks). Following euthanasia, the implant sites were fixed, processed, and stained with hematoxylin and eosin (MEDSTAR&E), Masson’s Trichrome (MT) and von Kossa (VK) for light microscopy. A subset of samples were analyzed for calcium content and reported as ug/mg dry tissue weight. (Table)

Results: Of the 108 total tissue disks implanted, 75 were analyzed for calcium content, (Table), with remainder for histologic analysis. No microscopically detectable calcification was observed in the Lotus disk at 30, 60 or 90 days. The Control disks showed mild to severe calcification at 30, 60 and 90 days.

Conclusion: Implantation of the Lotus and Control articles showed a lack of calcification in the Lotus group at all time points whereas the Controls showed mild to severe calcification at 30, 60 and 90 days. Average calcium content was lower for the Lotus valve. The Lotus valve tissue has less potential to calcify compared to the Control material.

Table. Biochemical Analysis of Tissue Calcium Content

<table>
<thead>
<tr>
<th>Timepoint</th>
<th>Sample Size</th>
<th>Average ± SD</th>
<th>Max</th>
<th>Min</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 Day</td>
<td>20</td>
<td>1.09 ± 0.13</td>
<td>1.30</td>
<td>0.93</td>
</tr>
<tr>
<td>Lotus</td>
<td>9</td>
<td>64.95 ± 30.18</td>
<td>121.00</td>
<td>27.70</td>
</tr>
<tr>
<td>Mitroflow (control)</td>
<td>11</td>
<td>12.04 ± 5.69</td>
<td>2.05</td>
<td>1.14</td>
</tr>
<tr>
<td>60 Days</td>
<td>32</td>
<td>1.14 ± 0.12</td>
<td>1.51</td>
<td>0.98</td>
</tr>
<tr>
<td>Lotus</td>
<td>20</td>
<td>109.66 ± 57.51</td>
<td>169.00</td>
<td>2.30</td>
</tr>
<tr>
<td>Mitroflow (control)</td>
<td>12</td>
<td>170.25 ± 20.35</td>
<td>204.00</td>
<td>145.00</td>
</tr>
</tbody>
</table>

Total Samples 75

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Echocardiographic Right Ventricular Function Assessment Before and After Successful Percutaneous Mitral Commissurotomy
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Background: Rheumatic fever and rheumatic heart disease continue to be the major health problem in all developing countries including Bangladesh. Mitral stenosis (MS) affects right ventricular (RV) function as a result of myocardial and hemodynamic factors. Functional analysis of the right ventricle cannot be reliably evaluated by conventional echocardiography, because of its complex geometry and load dependence of ejection phase indices.

Aims: To assess right ventricular function before and after successful percutaneous mitral commissurotomy.

Method: A prospective study was done in NICVD, Dhaka, Bangladesh during the period of August 2007 to May 2011. 225 patients with rheumatic mitral stenosis who underwent PTMC were evaluated by Doppler echocardiography during and 24-48 hours after procedure to assess right ventricular function. A group of 30 healthy age and gender-matched subjects served as controls. Multiple parameters of global and longitudinal RV function were assessed by conventional and tissue Doppler imaging echocardiography. The RV function was evaluated using the Tricuspid Annular Plane Excursion (TAPSE), the RV Tei index, and systolic myocardial velocities by Doppler tissue imaging peak isovolumic contraction (DTI(VIC)) and peak systolic (DTI(S)) at the lateral tricuspid annulus.

Results: After PTMC Mitral Valve Area increased from 0.82 +/- 0.11 cm² to 1.75 +/- 0.27 cm² (p < 0.01). LA size decreased from 48.27 +/-0.76 mm to 30.25 +/-0.52mm (p < 0.05) and Mitral Valve Gradient (MVG) reduced from 26.23 +/-5.69 mm Hg to 11.73 +/- 4.25 mm Hg (p <0.01). RV outflow tract fractional shortening (RVOTs) increased from 35 +/-13% to 71 +/- 13% (p = 0.002). There was a significant decrease in systolic pulmonary artery pressure from 47.8 +/- 22.5 mmHg to 23.1 +/-11.4 mmHg (P = 0.02), in the RV Tei index from 0.42/0.026 to 0.27/+0.011 (P = 0.021), in myocardial acceleration during isovolumic contraction (IVA) at the lateral tricuspid annulus from 0.35/0.12 m/s² to 0.24/+0.08 m/s² (P = 0.022), and in isovolumic contraction velocities at the lateral tricuspid annulus from 12.06 +/-2.67 cm/s to 9.42/-2.93 cm/s (P=0.033). In contrast, tissue Doppler velocities at the septal tricuspid annulus remained unchanged.

Conclusion: Immediately after successful PTMC, significant decrease in RV contractility as assessed by IVA was observed whereas other parameters of infundibular and global RV function as assessed by RVOTs and Tei index showed significant improvement.

Immediate Echocardiographic and In-Hospital Results of Percutaneous Transvenous Mitral Commissurotomy in Juvenile Rheumatic Mitral Stenosis
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Background: Percutaneous Transvenous mitral Commissurotomy (PTMC) is an established non-surgical modality for the treatment of severe rheumatic mitral valve stenosis. Until the mid-1980s, surgical closed or open commissurotomy was the only available treatment. However, mitral valve surgery in children and adolescents, in addition to its acute risks, has the added disadvantage that because the initial surgery is performed at an early age, reintervention may be necessary. So, aim of this study was to evaluate the safety, efficacy and in-hospital results of percutaneous transvenous mitral commissurotomy in young patients with severe rheumatic mitral stenosis.

Materials and Methods: The study group included 360 consecutive patients who underwent PTMC at the National Institute of Cardiovascular Diseases (NICVD), Dhaka and Al-Helal Heart Institute, Mirpur, Euro-Bangla Heart Hospital, Lal-matia, Dhaka between May 2003 and December 2012. Safety, efficacy and in-hospital results of percutaneous transvenous mitral commissurotomy were analyzed in 48 patients 20 years old or younger (group 1) and compared with 312 those of adults (group 2).

Results: Young patients were less frequently in atrial fibrillation (5.9% vs. 32.4%, P<0.001) and had less mitral valve deformities, echo score: >8 (14.6% vs. 32.4%, P<0.0001). Mitral valve area index by 2D-echo was of 0.62±0.18cm²/m² group 1 and 0.61±0.19cm²/m² group 2 (P<ns) and was larger in group 1 (1.54±0.6 cm²/m² vs. 1.29±0.5 cm²/m²) after the procedure (P<0.001). Procedural success was obtained in 47 (97.9%) patients of group 1 vs. 284 (91.02%) patients of group 2 (P<0.001). There was no procedural death in both groups. There are 2 (0.64 %) in hospital death in group-2 and no death in group-1. In group-2, 1 patient died from massive CVD after PTMC and 1 patient died from renal failure and electrolyte imbalance.

Conclusion: Percutaneous transvenous mitral commissurotomy is safe and effective procedure in young with rheumatic mitral stenosis and provides better immediate echocardiographic and in-hospital results than in adults.