Does Jet Direction on Doppler Echocardiography Predict Need for Concomitant Mitral Valve Procedure in Patients Undergoing Septal Myectomy for Obstructive Hypertrophic Cardiomyopathy?  

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Introduction

• Mitral valve regurgitation (MR) mediated by systolic anterior motion (SAM) is an important cause of symptoms in pts with obstructive hypertrophic cardiomyopathy (HCM).

• SAM-mediated MR has been characterized on Doppler echocardiography by a posteriorly-directed regurgitant jet. A central or anterior jet is considered indicative of intrinsic mitral valve disease (IMVD), possibly leading to mitral valve intervention.

• We have observed in many pts with central or anterior jets that MR is eliminated by adequate septal myectomy for relief of LVOT obstruction alone (Figure 1), that SAM is the underlying etiology of MR rather than IMVD.

• We analyzed preoperative transthoracic (TTE) and intraoperative pre-bypass transesophageal (TEE) echocardiograms to calculate sensitivity, specificity, positive predictive value , and negative predictive value of a posteriorly directed jet in identifying SAM-mediated MR.

• Reviewed HCM pts from August 2012 to December 2015 with >2+ MR who underwent septal myectomy. Pt were stratified as having SAM-mediated MR or IMVD.

• Recorded jet direction, posterior, non-posterior (central or anterior), or indeterminate from preop TTE and intraop pre-bypass TEE to calculate sensitivity, specificity, positive predictive value, and negative predictive value of a posteriorly directed jet in identifying SAM-mediated MR.

• Pre- and postoperative LVOT gradients were obtained from the respective transthoracic echocardiograms.

Patients and Methods

709 pts underwent septal myectomy

382 pts with more than mild MR

301 pts with SAM

30 pts with IMVD

330 pts in study sample

327 pts excluded for <= mild MR or no consent

52 pts excluded for radio, previous AV/IMV procedure, no subaortic obstruction

Results

• Patients with indeterminate jet directions were not used in calculations of statistical measures of diagnostic performance.

<table>
<thead>
<tr>
<th>Jet Direction</th>
<th>SAM</th>
<th>IMVD</th>
<th>Total</th>
<th>PPV</th>
<th>NPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posterior</td>
<td>168</td>
<td>9</td>
<td>177</td>
<td>94.9%</td>
<td>17.4%</td>
</tr>
<tr>
<td>Non-posterior</td>
<td>90</td>
<td>19</td>
<td>109</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>258</td>
<td>28</td>
<td>286</td>
<td></td>
<td></td>
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</tbody>
</table>

Table 1. Measures of performance for a posterior jet in identifying SAM-mediated MR for a preoperative TTE

• 91% of SAM pts and 93% of IMVD pts had mild or less MR postoperatively.

• LVOT gradients were reduced postoperatively to a median (25th, 75th percentiles) of 0 (0,0) mmHg in both pts groups.

Conclusions

• A posteriorly directed MR jet is almost always due to SAM of the mitral valve (TTE PPV = 94.9%)

• However, many pts with central or anterior jets will have improvement in MR with myectomy alone, indicating SAM rather than IMVD as the underlying etiology of MR (TTE NPV = 17.4%)

• A combination of both intraoperative TEE and direct observation should be used to determine need for mitral valve intervention at time of myectomy.

• An adequate extended septal myectomy alone corrects MR mediated by SAM with no IMVD.

Acknowledgements

• This study was supported by the Paul and Ruby Tsai Family, as well as CTSA Grant UL1 TR000135 from the National Center for Advancing Translational Sciences (NCATS), a component of the National Institutes of Health (NIH). Its contents are solely the responsibility of the authors and do not necessarily represent the official view of NIH.

Fig 1. Panel A demonstrates a large central jet in a patient with purely SAM-mediated MR, as demonstrated by resolution of MR in Panel B after myectomy alone.

Fig 2. Possible mechanism by which different posterior leaflet lengths can contribute to a central jet by redirecting the gap between leaflets.

Table 2. Measures of performance for a posterior jet in identifying SAM-mediated MR for an intraoperative pre-bypass TEE

• 91% of SAM pts and 93% of IMVD pts had mild or less MR postoperatively.

• LVOT gradients were reduced postoperatively to a median (25th, 75th percentiles) of 0 (0,0) mmHg in both pts groups.