Dilated Mid Ascending Aorta in Hypertrophic Cardiomyopathy is Associated with Dynamic Left Ventricular Outflow Tract Obstruction

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PROBLEM

• Prior studies have shown that Hypertrophic Cardiomyopathy is associated with Dilated Aorta.
• However, whether this dilatation is due to post-stenotic dilatation from dynamic left ventricular outflow tract (LVOT) obstruction or yet undefined genetic abnormalities has not been clearly demarcated.
• As HCM is an inherited disease, we hypothesized that DA in HCM will be associated more strongly with cardiac sarcomere genetic abnormalities as compared to hemodynamics of dynamic LVOT obstruction.

BACKGROUND

• A prior study conducted by our group has shown that Hypertrophic Cardiomyopathy (HCM) is associated with dilated aorta (DA).
• In the same study, out of 201 patients, 18 patients had DA and 13 out of those 18 patients had a higher prevalence of dynamic LVOT obstruction as compared to those HCM patients without DA (72 vs 52%, p=0.1).
• 12 patients with DA were also tested for sarcomere gene mutation, 4 of which tested positive (33.3%).
• In our study, we further analyzed 175 patients, by adding more information to the database, including measuring gradients (resting and induced, n=123), gene testing (n=124), and measuring mid ascending aorta and Sinus of Valsalva in all 175 patients.

OBJECTIVE

• To determine whether this aortic dilatation is due to post-stenotic dilatation from dynamic LVOT obstruction or yet undefined genetic abnormalities.

METHODS

Study Population

• We retrospectively reviewed the medical and echocardiography records of the 175 patients with HCM seen and characterized by AJT in a tertiary-care HCM center.
• Of these, 124 received genetic testing.
• The patients (n=175) were categorized to have significant LVOT obstruction if the baseline dynamic LVOT gradient was >20 mmHg.
• All the patients underwent measurement of the sinus of Valsalva (SV) and mid ascending aorta (mAA) with leading-edge-to-leading edge technique in diastole.
• The aorta was defined as dilated if it was >4 cm in the SV or mAA.

RESULTS

• Out of the 124 patients tested, 56 (45%) were found to be gene-positive.
• Out of all 175 patients, the mean LVOT gradient was 24±34 and a range of 0-160 mmHg, with 49 patients having a gradient >20 mmHg.
• The gene-negative patients had a higher mean dilated SV (3.39 cm vs 3.12 cm; P=0.038) and dilated mAA (3.3 cm vs 3 cm; P=0.005) than gene-positive patients (n=69).
• Gene-positive patients had a slightly lower prevalence of dilated SV (11% vs. 15%) and mAA (7% vs. 10%), which was not statistically significant.
• With a patients baseline LVOT gradient >20 mmHg had a 3 times higher prevalence (15.1% vs 4.9%) of dilated mAA (>4 cm) than those with LVOT gradient of <20 mmHg (OR: 3.41, 95% CI 1.12-10.88, P=0.03), whereas no significant relationship was seen with dilated SV (OR: 1.37, 95% CI 0.51-3.43, P=0.5).
• This association with dilated mAA persisted after adjusting for hypertensive, aortic stenosis, aortic regurgitation and aortic prosthesis in stratified and multivariate analyses.

Logistic Regression Analysis for increased Odds of Dilated mAA with Adjustment for risk factors of dilated mAA

<table>
<thead>
<tr>
<th>Odds Ratio</th>
<th>95% CI</th>
<th>P value</th>
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<tbody>
<tr>
<td>Baseline Median LVOT gradient &gt;20mmHg</td>
<td>5.10</td>
<td>1.22-20.88</td>
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<td>Adjusted Median LVOT gradient &gt;20mmHg Aortic Valve Replacement</td>
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<td>1.12-10.81</td>
</tr>
</tbody>
</table>

CONCLUSION

• The dilatation of mAA in patients with HCM appears to be more strongly associated with baseline dynamic LVOT obstruction than with genetic abnormalities.

REFERENCES


8. Auroral Health Care. Aurora HealthCare, Inc.