Abstract: P1371

Large beat-to-beat variability of mitral annulus dimensions in atrial fibrillation: implications for interventional therapy

Authors:
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Topic(s):
3D Echocardiography

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Background
With the rapid evolution of transcatheter mitral therapies, assessment of mitral annular (MA) dimensions and geometry is becoming increasingly important. 3D transesophageal echocardiography (3D-TEE) has enabled accurate estimation of MA size and dynamics. Despite the frequent association between mitral valve disease and atrial fibrillation (AFib), little is known about the dynamic MA dimensions in patients with AFib.

Objective
We sought to determine beat-to-beat variability in MA circumference and area in patients with AFib and compare these findings with those of control subjects in sinus rhythm (SR).

Methods
Images were obtained from patients undergoing routine 3D TEE. Patients with paced rhythms, prosthetic heart valves, severe mitral annular calcification and poor image quality were excluded. Single-beat volume loops (to avoid stitch artifact) were acquired for 6 consecutive heart cycles in each patient and analyzed offline with a commercially available software package. MA was automatically tracked throughout each cardiac cycle, and maximal per-cycle MA area/circumference was measured for each of the 6 beats. The absolute difference (largest maximal MA area/circumference of the 6 cycles - smallest maximal MA area/circumference of the 6 cycles) and relative difference (absolute difference / smallest maximal MA area/circumference) were calculated.

Results
A total of 70 patients were included: 35 with AFib and 35 with SR. Largest MA area/circumference were usually recorded at end-systole in each cardiac cycle. Afib patients showed significantly larger differences in both maximal MA area and circumference than patients in SR (Table 1).

Conclusion
Maximal MA area and circumference show intra-individual variability when recorded over 6 heart cycles. Intercycle difference in maximal MA area is more pronounced than Intercycle difference in maximal MA circumference. Variability in atrial fibrillation is substantial. Our findings have implication for procedural planning in patients considered for percutaneous mitral interventions.

<table>
<thead>
<tr>
<th></th>
<th>Differences in maximal MA area over 6 cycles</th>
<th>Differences in maximal MA circumference over 6 cycles</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Absolute median (range)</td>
<td>Relative median (range)</td>
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<tr>
<td>Afib (N=35)</td>
<td>2.0* (0.5-5.2) cm2</td>
<td>15.8* (3.0-129.0)%</td>
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<tr>
<td>Sinus rhythm</td>
<td>1.0 (0.5-1.2) cm2</td>
<td>7.2 (3.8-7.9)%</td>
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<td>1.0* (0.2-1.9) cm</td>
<td>7.7* (1.4-113.0)%</td>
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