Question 70

A 45-year old asymptomatic man returns for follow-up. He was diagnosed 10 years ago with aortic regurgitation due to a congenital bicuspid aortic valve. He has never had endocarditis.

Which one of the following echocardiographic profiles most strongly indicates the need for aortic valve replacement?

<table>
<thead>
<tr>
<th></th>
<th>LVEDD (mm) [35-55]</th>
<th>FS [0.30-0.40]</th>
<th>LA size (mm) [&lt;40]</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>70</td>
<td>0.30</td>
<td>60</td>
</tr>
<tr>
<td>B</td>
<td>75</td>
<td>0.40</td>
<td>40</td>
</tr>
<tr>
<td>C</td>
<td>70</td>
<td>0.25</td>
<td>45</td>
</tr>
<tr>
<td>D</td>
<td>65</td>
<td>0.45</td>
<td>50</td>
</tr>
<tr>
<td>E</td>
<td>75</td>
<td>0.35</td>
<td>55</td>
</tr>
</tbody>
</table>

LVEDD Left ventricular end-diastolic diameter
LVESD Left ventricular end-systolic diameter
FS Fractional shortening = (LVEDD – LVESD)/LVEDD
LA Left atrial

AORTIC REGURGITATION

- AR is never normal (as opposed to mild MR/TR which can be normal).

Severity of AR

Considered severe if one or more of the following:

- Regurgitant fraction ≥ 50%
- Vena contracta width > 6mm
- Regurgitant volume ≥ 60mL
- Central jet width ≥ 65% of LV outflow tract
- An effective regurgitant orifice area ≥ 0.30 cm²

Current guidelines re: AR and AVR:

- Recommend replacement when end-systolic dimension is > 55mm (in asymptomatic patients).

FS = (LVEDD – LVESD)/LVEDD

a) LVESD = 49
b) LVESD = 45
c) LVESD = 52.5
d) LVESD = 35.75
e) LVESD = 45

Therefore correct answer is C, where pt is approaching LVESD where AVR is recommended.

Causes of AR:
1) Chronic leaflet degeneration is most common cause (ie. Aortic sclerosis). Usually associated with hypertension and increasing age.

2) Rheumatic disease

3) Bicuspid aortic valve

4) Endocarditis causing acute, severe AR. 10% will also have MV disease.

5) Subaortic stenosis: high velocity of blood strikes stenotic aortic valve causing damage to valve and change in architecture.


7) Marfan’s syndrome: Associated with MV prolapse but AR not due to aortic root disease as in 6.

8) Aortic root disease (eg: proximal dissection, hypertensive dilation, sinus of valsalva aneurysm).

9) Aortic dissection causing severe, acute AR.

10) Sinus of valsalva aneurysm (this is a form of aortic root aneurysm) characterised by asymmetric dilatation of one of the sinuses.

11) Rheumatoid nodules (rare)

12) Leaflet fenestrations (commonly found post mortem)

13) VSD