Valvular Heart Disease: Assessment and Timing of Intervention

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Matt Shun-Shin
Nilesh Sutaria
Ben Ariff
20% of EEGC questions

Valvular
Endocarditis
Myocardial Disease
Heart Failure

+ Overlap with imaging (another 14%)
+ Overlap with general (another 20%)
Useful guidelines and (my favourite) papers

https://tinyurl.com/bjca-core-valves
Aims

Principles of assessment
AS, AR, MR, MS
Interpreting data
Management according to guidelines
High yield or challenging areas
New developments

All via “best of five” questions
AS

Commonest valve disease in UK
¼ over 65s have valve thickening, 3% over 75s have severe AS
Chest pain / breathlessness / dizziness or syncope
Systolic murmur, soft S2, slow rising pulse
Normal aortic valve
Natural history

- Latent Period (Increasing Obstruction, Myocardial Overload)
- 1% p.a
- 3-4%
- 7-12%
- Onset Severe Symptoms
- Average Death Age

Ross, Braunwald Circ 1968
A 71 year-old man with hypertension was referred to outpatients because of a murmur. He is asymptomatic, being able to run 5k.

An echocardiogram revealed good biventricular systolic function. IVSd was 10mm. The aortic valve was trileaflet and calcified with peak velocity 3.6m/s, velocity ratio 0.3, AVA 1.2cm².

What is the most appropriate strategy?

A. No follow up needed
B. Follow up in 3 months
C. Follow up in 6 months
D. Follow up in 1 year
E. Refer for SAVR/TAVR
<table>
<thead>
<tr>
<th></th>
<th>Aortic sclerosis</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak velocity (m/s)</td>
<td>&lt;2.5 m/s</td>
<td>2.6–2.9</td>
<td>3.0–4.0</td>
<td>≥4.0</td>
</tr>
<tr>
<td>Mean gradient (mmHg)</td>
<td>–</td>
<td>&lt;20</td>
<td>20–40</td>
<td>≥40</td>
</tr>
<tr>
<td>AVA (cm$^2$)</td>
<td>–</td>
<td>&gt; 1.5</td>
<td>1.0–1.5</td>
<td>&lt;1.0</td>
</tr>
<tr>
<td>Indexed AVA (cm$^2$/m$^2$)</td>
<td>–</td>
<td>&gt;0.85</td>
<td>0.60–0.85</td>
<td>&lt;0.6</td>
</tr>
<tr>
<td>Velocity ratio</td>
<td>–</td>
<td>&gt; 0.50</td>
<td>0.25–0.50</td>
<td>&lt;0.25</td>
</tr>
</tbody>
</table>
Asymptomatic severe aortic stenosis should be re-evaluated at least every 6 months for the occurrence of symptoms (change in exercise tolerance, ideally using exercise testing if symptoms are doubtful) and change in echocardiographic parameters. Measurement of natriuretic peptides should be considered.

In the presence of significant calcification, mild and moderate aortic stenosis should be re-evaluated yearly. In younger patients with mild aortic stenosis and no significant calcification, intervals may be extended to 2–3 years.

- Asymptomatic severe
- Mild or moderate
- Mild (no calcification) and young

6 months 12 months 2-3 years
A 79 year-old man with hypertension was referred to outpatients because of a murmur. He had no symptoms.

An echocardiogram showed LVEF 55%. The aortic valve was trileaflet and calcified with peak velocity 4.3m/s, velocity ratio 0.23, AVA 0.9cm$^2$. BNP was 100pg/ml. He managed 4 minutes of ETT before stopping due to chest pain and fatigue.

What is the most appropriate strategy?

A. Refer for SAVR/TAVR because of ETT findings
B. Refer for SAVR/TAVR because LVEF <60%
C. Refer for SAVR/TAVR because of BNP result
D. Follow up in 6 months
E. Follow up in 1 year
A 62 year-old man with hypertension and diabetes was referred to outpatients with fatigue and a murmur. He was unable to ETT satisfactorily due to a previous leg injury.

An echocardiogram showed LVEF 60%. The aortic valve was trileaflet and calcified with peak velocity 5.8m/s, velocity ratio 0.17, AVA 0.6cm$^2$. BNP was 115pg/ml. What is the most appropriate strategy?

A. Refer for SAVR/TAVR because of hypertension & diabetes
B. Refer for SAVR/TAVR because of peak velocity
C. Refer for SAVR/TAVR because of BNP result
D. Follow up in 6 months
E. Follow up in 1 year
"Excuses" for intervention in patients with asymptomatic severe AS with LVEF >50% who can’t exercise

Peak >5.5m/s
Progression >0.3m/s/year
Neurohormones >3 x ULN
PASP > 60mmHg

\[^b\]Surgery should be considered ([IIa C]) if one of the following is present: peak velocity >5.5 m/s; severe valve calcification + peak velocity progression >0.3 m/s per year; markedly elevated neurohormones (>threefold age- and sex-corrected normal range) without other explanation; severe pulmonary hypertension (systolic pulmonary artery pressure >60 mmHg).
An 84 year-old woman with a long history of hypertension is seen with exertional breathlessness. Please review her echo images. Her indexed stroke volume is 29ml/m$^2$.

What is the most likely diagnosis?

A. High gradient AS  
B. Low-flow low-gradient AS with reduced ejection fraction  
C. Low-flow low-gradient AS with preserved ejection fraction  
D. Moderate AS  
E. Hypertrophic cardiomyopathy
Be aware of (!)
Cardiac CT to clarify low-flow low-gradient AS

Pseudo-severe

Severe

AVC >2000 males
AVC >1200 females
A 77 year-old woman with diabetes, peripheral vascular disease and previous breast cancer treated with radiotherapy many years ago is found to have symptomatic severe AS. She had a PPCI to LAD two years ago. Echocardiography shows, in addition to severe AS, moderately impaired LV function with anteroapical akinesis and an apical thrombus. Coronary angiography shows the stent is widely patent with non-obstructive atheroma only.

All of the following favour TAVR over SAVR except:

A. Age
B. Previous radiotherapy
C. Apical thrombus
D. Euroscore II of 6%
E. Porcelain aorta
# TAVR vs SAVR

## Clinical characteristics

<table>
<thead>
<tr>
<th></th>
<th>Favours TAVI</th>
<th>Favours SAVR</th>
</tr>
</thead>
<tbody>
<tr>
<td>STS/EuroSCORE II &lt;4% (logistic EuroSCORE I &lt;10%)*</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>STS/EuroSCORE II ≥4% (logistic EuroSCORE I ≥10%)*</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>Presence of severe comorbidity (not adequately reflected by scores)</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Age &lt;75 years</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>Age ≥75 years</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Previous cardiac surgery</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Frailty*</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Restricted mobility and conditions that may affect the rehabilitation process after the procedure</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Suspicion of endocarditis</td>
<td></td>
<td>+</td>
</tr>
</tbody>
</table>

## Anatomical and technical aspects

<table>
<thead>
<tr>
<th></th>
<th>Favours TAVI</th>
<th>Favours SAVR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Favourable access for transfemoral TAVI</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Unfavourable access (any) for TAVI</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>Sequence of chest radiation</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Porcelain aorta</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>Presence of intact coronary bypass grafts at risk when sternotomy is performed</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Expected patient–prosthesis mismatch</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Severe chest deformation or scoliosis</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Short distance between coronary ostia and aortic valve annulus</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>Size of aortic valve annulus out of range for TAVI</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Aortic root morphology unfavourable for TAVI</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>Valve morphology (bicuspid, degree of calcification, calcification pattern) unfavourable for TAVI</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Presence of thrombi in aorta or LV</td>
<td></td>
<td>+</td>
</tr>
</tbody>
</table>

## Cardiac conditions in addition to aortic stenosis that require consideration for concomitant intervention

<table>
<thead>
<tr>
<th>condition</th>
<th>TAVR</th>
<th>SAVR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe CAD requiring revascularization by CABG</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Severe primary mitral valve disease, which could be treated surgically</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Severe tricuspid valve disease</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Aneurysm of the ascending aorta</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Septal hypertrophy requiring myectomy</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Valvular Disease</td>
<td>Aortic Root Dilatation</td>
<td></td>
</tr>
<tr>
<td>-----------------</td>
<td>--------------------------------</td>
<td></td>
</tr>
<tr>
<td>Bicuspid valve</td>
<td>Aneurysm of AA or aortic root</td>
<td></td>
</tr>
<tr>
<td>Sclerosis</td>
<td>Annuloaortic ectasia</td>
<td></td>
</tr>
<tr>
<td>Rheumatic</td>
<td>Dissection</td>
<td></td>
</tr>
<tr>
<td>Degenerative</td>
<td>Hypertension</td>
<td></td>
</tr>
<tr>
<td>Endocarditis</td>
<td>Marfans</td>
<td></td>
</tr>
</tbody>
</table>
A 39 year-old woman who originally lived in Africa but came to the UK 5 years ago is noted by her GP to have a murmur. Please review the echocardiogram.

What is the most likely aetiology of her aortic regurgitation?

A. Marfans
B. Infective endocarditis
C. Rheumatic
D. Degenerative
E. Dilated aortic root
A 73 year-old woman with hypertension was noted to have a murmur. She had no symptoms. Her aortic valve is trileaflet.

Which LV measurements would be an indication for intervention?

A. LVEF 53%, LVEDD 65mm, LVESD 49mm
B. LVEF 70%, LVEDD 72mm, LVESD 45mm
C. LVEF 51%, LVEDD 60mm, LVESD 45mm
D. The LV size isn’t an indication
E. It doesn’t matter because the AR isn’t severe
## Echocardiographic criteria for the definition of severe valve regurgitation: an integrative approach

<table>
<thead>
<tr>
<th></th>
<th>Aortic regurgitation</th>
<th>Mitral regurgitation</th>
<th>Tricuspid regurgitation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Qualitative</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valve morphology</td>
<td>Abnormal/flail/large</td>
<td>Flail leaflet/ruptured papillary muscle/large coaptation defect</td>
<td>Abnormal/flail/large coaptation defect</td>
</tr>
<tr>
<td></td>
<td>coaptation defect</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colour flow regurgitant jet</td>
<td>Large in central jets, variable in eccentric jets</td>
<td>Very large central jet or eccentric jet adhering, swirling, and reaching the posterior wall of the left atrium</td>
<td>Very large central jet or eccentric wall impinging jet</td>
</tr>
<tr>
<td>CW signal of regurgitant jet</td>
<td>Dense</td>
<td>Dense/triangular</td>
<td>Dense/triangular with early peaking (peak vel &lt; 2 m/s in massive TR)</td>
</tr>
<tr>
<td>Other</td>
<td>Holodiastolic flow reversal in descending aorta (EDV &gt; 20 cm/s)</td>
<td>Large flow convergence zone</td>
<td>-</td>
</tr>
</tbody>
</table>
**Echocardiographic criteria for the definition of severe valve regurgitation: an integrative approach**

<table>
<thead>
<tr>
<th></th>
<th>Aortic regurgitation</th>
<th>Mitral regurgitation</th>
<th>Tricuspid regurgitation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Semiquantitative</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vena contracta width (mm)</td>
<td>&gt; 6</td>
<td>≥ 7 (&gt; 8 for biplane)</td>
<td>≥ 7</td>
</tr>
<tr>
<td>Upstream vein flow</td>
<td>–</td>
<td>Systolic pulmonary vein flow reversal</td>
<td>Systolic hepatic vein flow reversal</td>
</tr>
<tr>
<td>Inflow</td>
<td>–</td>
<td>E-wave dominant ≥ 1.5 m/s</td>
<td>E-wave dominant ≥ 1 m/s</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pressure half-time &lt; 200 ms</td>
<td></td>
<td>TVI mitral/TVI aortic &gt; 1.4</td>
<td>PISA radius &gt; 9 mm</td>
</tr>
<tr>
<td><strong>Quantitative</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EROA (mm²)</td>
<td>≥ 30</td>
<td>≥ 40</td>
<td>≥ 20</td>
</tr>
<tr>
<td>R Vol (ml/beat)</td>
<td>≥ 60</td>
<td>≥ 60</td>
<td>≥ 30</td>
</tr>
<tr>
<td>+ enlargement of cardiac chambers/vessels</td>
<td>LV</td>
<td>LV, LA</td>
<td>RV, RA, inferior vena cava</td>
</tr>
</tbody>
</table>
Definitely learn

LVEF <50%

LVEDD > 70mm

LVESD > 50mm
The same lady is found to have an indication for an AVR. What is the threshold for the maximum size of her aorta above which aortic root replacement should also be considered?

A. 40mm
B. 45mm
C. 50mm
D. 55mm
E. 60mm
Learn

>45mm Marfan and “risk factors”

>50mm all Marfan

>50mm bicuspid with coarctation or “risk factors”

>55mm all others

(>45mm if needs surgery for aortic valve)
A 45 year-old woman is seen with shortness of breath on exertion and is noted to have an enlarged aorta on CXR.

Please review her CMR images.

What is the best strategy?

A. Refer for AVR + root replacement
B. Refer for AVR only
C. Refer for root replacement only
D. Follow up 6 months
E. No follow up required
Learn

>45mm Marfan and “risk factors”

>50mm all Marfan

>50mm bicuspid with coarctation or “risk factors”

>55mm all others

(>45mm if needs surgery for aortic valve)

B. Aortic root or tubular ascending aortic aneurysm (irrespective of the severity of aortic regurgitation)

<table>
<thead>
<tr>
<th>Aortic valve repair, using the reimplantation or remodelling with aortic annuloplasty technique, is recommended in young patients with aortic root dilation and tricuspid aortic valves, when performed by experienced surgeons.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgery is indicated in patients with Marfan syndrome who have aortic root disease with a maximal ascending aortic diameter ≥50 mm.</td>
</tr>
<tr>
<td>Surgery should be considered in patients who have aortic root disease with maximal ascending aortic diameter:</td>
</tr>
<tr>
<td>≥45 mm in the presence of Marfan syndrome and additional risk factors or patients with a TGFBR1 or TGFBR2 mutation (including Loes–Dietz syndrome).</td>
</tr>
<tr>
<td>≥50 mm in the presence of a bicuspid valve with additional risk factors or coarctation.</td>
</tr>
<tr>
<td>≥55 mm for all other patients.</td>
</tr>
<tr>
<td>When surgery is primarily indicated for the aortic valve, replacement of the aortic root or tubular ascending aorta should be considered when ≥45 mm, particularly in the presence of a bicuspid valve.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>I</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>IIa</td>
<td>C</td>
</tr>
<tr>
<td>IIa</td>
<td>C</td>
</tr>
<tr>
<td>IIa</td>
<td>C</td>
</tr>
</tbody>
</table>
A 65 year-old man presents is seen with shortness of breath and chest tightness on exertion. His GP (and cardiologist) thought his echo would show severe AS. Peak velocity was 3.5m/s, but velocity index was 0.6 and valve morphology wasn’t consistent with severe AS. What is the explanation?

A. The AS was underestimated and is definitely severe
B. He has hypertrophic cardiomyopathy
C. He has as subaortic membrane
D. He has an ASD
E. He also has a coarctation
Complex
Keep perspective
Main question – is it primary (i.e. a valve problem) or secondary to LV issue?
Distinguish between primary and secondary MR

<table>
<thead>
<tr>
<th>Condition</th>
<th>Example</th>
<th>Pathology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary valve</td>
<td>Mitral valve prolapse</td>
<td>Myxomatous degeneration</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Redundant leaflet tissue</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ruptured chordae</td>
</tr>
<tr>
<td>Rheumatic heart disease</td>
<td></td>
<td>Leaflet thickening and restriction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Commissural fusion</td>
</tr>
<tr>
<td>Endocarditis</td>
<td></td>
<td>Leaflet destruction</td>
</tr>
<tr>
<td>Papillary muscle rupture</td>
<td></td>
<td>Myocardial infarction</td>
</tr>
<tr>
<td>Congenital</td>
<td></td>
<td>Cleft mitral valve</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td></td>
<td>Double orifice mitral valve</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Drugs (e.g. fenfluramine)</td>
</tr>
<tr>
<td>Functional mitral</td>
<td>Mitral annular dilatation</td>
<td>Dilated cardiomyopathy</td>
</tr>
<tr>
<td></td>
<td>Left ventricular wall motion abnormality</td>
<td>Myocardial ischaemia/infarction</td>
</tr>
</tbody>
</table>
A 58 year old man is seen with a murmur but no symptoms. His echocardiogram is shown below. All of the following are indications for intervention except?

A. LVEF 55%
B. LVESD 46mm
C. Recent diagnosis of AF
D. PASP 52mmHg
E. LVEDD 63mm
Learn

PRIMARY

Essentially
Symptoms as long as not heart failure

If asymptomatic, “find an excuse”
- LVEF <60%
- LVESD > 45mm
- New AF
- SPAP > 50mmHg
- Fudge factors (risk vs benefit)
Spectrum of degenerative mitral valve disease (Reproduced, with permission, from Castillo et al 15).

+ rarely found
++ frequently found
+++ most frequently found.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>FD</th>
<th>Advanced FD</th>
<th>Forme fruste</th>
<th>Barlow’s disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at diagnosis</td>
<td>&gt;60 years</td>
<td>&gt;60 years</td>
<td>Variable</td>
<td>&lt;60 years</td>
</tr>
<tr>
<td>History of MR</td>
<td>&lt;5 years</td>
<td>&lt;5 years</td>
<td>Variable</td>
<td>&gt;10 year</td>
</tr>
<tr>
<td>Leaflet tissue</td>
<td>Normal/Translucent</td>
<td>++</td>
<td>++++/++++</td>
<td>+++</td>
</tr>
<tr>
<td>Anterior leaflet tissue</td>
<td>+</td>
<td>+</td>
<td>++</td>
<td>+++</td>
</tr>
<tr>
<td>Posterior leaflet tissue</td>
<td>++</td>
<td>++</td>
<td>++++/++++</td>
<td>+++</td>
</tr>
<tr>
<td>Segments affected</td>
<td>Single segment (P2)</td>
<td>Single segment (P2)</td>
<td>Multisegment</td>
<td>Multisegment</td>
</tr>
<tr>
<td>Chordae tendineae</td>
<td>Thin and ruptured</td>
<td>Thin and ruptured</td>
<td>Variable</td>
<td>Thickened and elongated</td>
</tr>
<tr>
<td>Annular dilatation</td>
<td>Ninguna (≤32 mm)</td>
<td>↑ (≤32 mm)</td>
<td>↑↑ (32-36 mm)</td>
<td>↑↑↑ (≥ 36 mm)</td>
</tr>
<tr>
<td>Calcification</td>
<td>None</td>
<td>+</td>
<td>+++/+</td>
<td>+++</td>
</tr>
</tbody>
</table>
61 year old female with long-standing murmur and increasing breathlessness
A 61-year-old woman with severe MR due to degenerative valvular disease is referred for mitral valve surgery.

Which of the following makes a successful repair (avoiding replacement) more likely?

A. Severe annular dilatation (55mm)
B. Large central jet of MR
C. Minimal excess tissue
D. P2 rather than A2 prolapse
E. Extensive calcification
Table 6  Probability of successful mitral valve repair in MR based on echo findings

<table>
<thead>
<tr>
<th>Aetiology</th>
<th>Dysfunction</th>
<th>Calcification</th>
<th>Mitral annulus dilatation</th>
<th>Probability of repair</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degenerative</td>
<td>II: Localized prolapse (P2 and/or A2)</td>
<td>No/localized</td>
<td>Mild/moderate</td>
<td>Feasible</td>
</tr>
<tr>
<td>Secondary</td>
<td>I or IIb</td>
<td>No</td>
<td>Moderate</td>
<td>Feasible</td>
</tr>
<tr>
<td>Barlow</td>
<td>II: Extensive prolapse (≥3 scallops, posterior commissure)</td>
<td>Localized (annulus)</td>
<td>Moderate</td>
<td>Difficult</td>
</tr>
<tr>
<td>Rheumatic</td>
<td>IIIa but pliable anterior leaflet</td>
<td>Localized</td>
<td>Moderate</td>
<td>Difficult</td>
</tr>
<tr>
<td>Severe barlow</td>
<td>II: Extensive prolapse (≥3 scallops, anterior commissure)</td>
<td>Extensive (annulus+leaflets)</td>
<td>Severe</td>
<td>Unlikely</td>
</tr>
<tr>
<td>Endocarditis</td>
<td>II: Prolapse but destructive lesions</td>
<td>No</td>
<td>No/mild</td>
<td>Unlikely</td>
</tr>
<tr>
<td>Rheumatic</td>
<td>IIIa but stiff anterior leaflet</td>
<td>Extensive (annulus+leaflets)</td>
<td>Moderate/severe</td>
<td>Unlikely</td>
</tr>
<tr>
<td>Secondary</td>
<td>IIIb but severe valvular deformation</td>
<td>No</td>
<td>No or severe</td>
<td>Unlikely</td>
</tr>
</tbody>
</table>
A 52 year-old man with diabetes presents with shortness of breath and is noted to have a murmur. Review the echocardiogram images below. What is the most likely cause of his mitral regurgitation?

A. Previous anterior MI
B. Previous posterior MI
C. Barlow’s
D. Perforated posterior leaflet
E. Dilated cardiomyopathy
A 52 year-old man with diabetes and previous PCI complains of worsening exertional breathlessness.

An echocardiogram shows LVEF 31% with posteriorly-directed MR with a dominant E-wave (1.6m/s) and evidence of systolic flow reversal in the pulmonary veins. Angiography shows atheromatous but unobstructed arteries with patent stents. ECG shows LBBB. BNP is 900. BP is 136/72. P 80/min and regular.

He takes ramipril 1.25mg od, bisoprolol 2.5mg od, aspirin 75mg od and furosemide 20mg od.

What is the most appropriate next step?

A. Uptitrate medical therapy  
B. Refer for CRT-D  
C. Refer for mitral valve surgery  
D. P2 rather than A2 prolapse  
E. Calcification
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SECONDARY

If having CABG

If LVEF <30% and needs revascularisation of viable territories

If LVEF >30% and “everything else has been done” and you can persuade a surgeon

If LVEF <30% and “everything else has been done” and you can really persuade a surgeon
For bonus points...
A 41-year-old woman who came to the UK six years ago complains of shortness of breath and chest pain on exertion. On examination her pulse is irregularly irregular with a rate of ~80/min.

Echocardiography shows MVA 1.4 cm², severe bicommissural calcification and mild aortic stenosis. There is no left atrial thrombus.

Which of the following is the best strategy and why?

A. PMC because MVA is >1 cm²
B. MVR because no LA thrombus
C. MVR because of age
D. MVR because of MV calcification
E. PMC because of AF
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Figure: Management of clinically significant mitral stenosis (MVA <1.5 cm²).

Table 8: Contra-indications for percutaneous mitral commissurotomy (PMC)

Contra-indications for PMC:
- Mitral valve area >1.5 cm²
- Left atrial thrombus
- More than mild mitral regurgitation
- Severe or bi-commissural calcification
- Absence of commissural fusion
- Severe concomitant aortic valve disease, or severe combined tricuspid stenosis and regurgitation requiring surgery
- Concomitant CAD requiring bypass surgery

Notes:
- PMC may be considered in patients with valve area >1.5 cm² with symptoms that cannot be explained by another cause and if the anatomy is favourable.
- CAD = coronary artery disease.
Management of aortic regurgitation

Significant enlargement of ascending aorta

No

Severe aortic regurgitation

No

Symptoms

LVEF ≤50% or LVEDD >70 mm or LVESD >50 mm (or >25 mm/m² BSA)

No

Follow-up

Yes

Surgery
Management of severe chronic primary mitral regurgitation

Symptoms

LVEF ≤60% or LVESD ≥45 mm

No

New onset of AF or SPAP >50 mmHg

No

High likelihood of durable repair, low surgical risk, and presence of risk factors

No

Follow-up

Yes

Extended HF treatment by percutaneous edge-to-edge repair

Yes

Surgery (repair whenever possible)

LVEF >30%

No

Refactory to medical therapy

No

Medical therapy

Yes

Durable valve repair is likely and low comorbidity

No

Extended HF treatment by percutaneous edge-to-edge repair

Yes

Surgery (repair whenever possible)
Management of clinically significant mitral stenosis (MVA < 1.5 cm²)

 Symptoms

 No

 High risk of embolism or haemodynamic decompensation

 No

 Exercise testing

 Symptoms

 No

 Follow-up

 No

 Cl to or unfavourable characteristics for PMC

 No

 PMC

 Yes

 Surgery

 Yes

 PMC

 Cl to PMC

 No

 Cl or high risk for surgery

 No

 PMC

 Yes

 Surgery

 Favourable anatomical characteristics

 No

 Favourable clinical characteristics

 No

 PMC
If you get stuck

Triggers for intervention

1. Severe lesion + symptoms
2. Moderate lesion + another reason for cardiac surgery
3. Severe lesion without symptoms + evidence of damage to rest of heart
Curriculum is huge
You’re all busy
You can’t learn absolutely everything
A little of everything is better than everything about only something
If you were setting questions – what would you write?

Learn the flow charts for interventions