British Society of Echocardiography

Endorsed by

British Heart Valve Society
For Education and Best Practice in Heart Valve Disease

Clinical Indications and Triage of Echocardiography

Heart valve disease

Authors: Daniel Augustine, Benoy Shah, Shaun Robinson, John Chambers, Norman Briffa, Brian Campbell, Sanjeev Bhattacharyya, Liam Ring, Cathy West, Radwa Bedair, Martin Stout, Keith Pearce, Tom Ingram, Claire Colebourn

Introduction

The importance of triage

1. Accurate triage is an effective tool to release resources to patients who need it.
2. The process of triage may differ between departments according to workflows and skill sets.
3. We advocate that appropriate clinical time is devoted to triage. This is of even greater importance under high demand/reduced capacity settings: national experience suggests that clinical focus on triage releases both time and capacity for scanning.

How this document works

Where follow up is recommended over a period of time (e.g. 1-2 years), the decision as to the time frame for surveillance should be made depending on the severity present. For example low moderate disease should have less frequent follow up than moderate disease which is approaching cut off values for severe categorisation.

1. Native valve disease:
   - Recommendations for the follow up for isolated stenosis or regurgitation
   - Echo alerts: highlighting echocardiographic features at the time of the scan that should prompt cardiology review in the context of severe valve disease
   - Other alerts: Clinical features which should prompt cardiology review in the context of severe valve disease
2. Prosthetic valve follow up:
   - Recommendations for the follow up of biological and mechanical valves
   - Recommendations for aorta follow up post aortic root replacement and post bicuspid aortic valve surgery
   - Alerts for repeat echocardiogram and clinical discussion

Stress testing

Exercise stress echocardiography can be useful in the management of patients with valve disease. We recommend an individualised approach depending on local expertise and infrastructure.

Complex scan follow up

A number of patients will have more complex disease e.g. ≥ moderate multi valve disease; post operative regurgitation with ventricular dysfunction; post operative paravalvular regurgitation etc. For these patients an individualised approach is essential and discussion amongst the clinical team to advise on the surveillance scan period is recommended.

Severe valve disease *Moderate valve disease* *Mild valve disease*

HEART VALVE DISEASE

AORTIC STENOSIS

- V max ≥4.0m/s
- Valve area <1cm²
- Echo every 6 months
- Cardiology review

- Vmax 3.5-3.9m/s echo every 12-18 months
- Vmax 3.0-3.4m/s echo every 18-24 months
- Valve area 1-1.5cm²
- Cardiology review

- V max 2.6-2.9m/s
- Echo every 3-5 years
- Cardiology review if symptomatic

Echo Alerts: Urgent Cardiology Review
- LV ejection fraction <50% or reduced flow.
- Cardiology discussion advised if severe AS and reducing EF on sequential scans in range 50-60%
- V max >5.0m/s
- Rapid progression of V max >0.3m/s per year
- Dilated aortic root (≥45mm Marfans; ≥50mm bicuspid aortic valve; ≥55mm for all other patients)

Other Alerts: Cardiology Review
- Development of symptoms: breathlessness; chest pain; presyncope; syncope

Echo follow up for bicuspid aortic valves:
- Bicuspid with no AS and no more than mild AR: 3-5 years
- Bicuspid with valve thickening and mild AS: 2 years

Aortic sclerosis
- Valve thickening and peak velocity ≤2.5m/s: echo every 5 years (no follow up usually needed in those >80yrs unless restricted cusp excursion)

AORTIC REGURGITATION

- Echo every 6-12 months
- Cardiology review

- Echo every 1-2 years
- Cardiology review

- *Mild-moderate – echo every 3-5 years
- Cardiology discussion if aortic root dilated

Echo Alerts: Urgent Cardiology Review
- LV ejection fraction <50%
- Cardiology discussion advised if severe AR and reducing EF on sequential scans in range 50-60%
- LV systolic diameter approaching 50mm; LV diastolic diameter approaching 70mm or severe LV volume dilatation
- Dilated aortic root (≥45mm Marfans; ≥50mm bicuspid aortic valve; ≥55mm for all other patients)

Other Alerts: Cardiology Review
- Development of symptoms
- *Trace-mild AR associated with normal aortic valve morphology, normal aortic root and normal ascending aorta does not usually require echo surveillance

MITRAL STENOSIS

- Valve area <1.0cm²
- Echo every 6-12 months
- Cardiology review

- Valve area 1.0-1.5cm²
- Echo every 1-2 years
- Cardiology review

- Valve area >1.5cm²
- Echo every 3-5 years

NB: MVA <1.5cm² = Clinically significant mitral stenosis where valve intervention can be considered if patient is symptomatic or asymptomatic with high risk of embolism/ decompensation or positive stress test

Echo Alerts: Urgent Cardiology Review
- PA systolic pressure >50mmHg
- RV dysfunction
- Dense spontaneous contrast in left atrium

Other Alerts: Cardiology Review
- Development of symptoms
- New atrial fibrillation
- TIA or stroke

MITRAL REGURGITATION

- Echo every 6-12 months
- Cardiology review at 6 months

- Echo every 1-2 years
- Cardiology review

- Echo every 3-5 years if mild prolapse
- No follow up usually required if normal mitral valve appearance

Echo Alerts: Urgent Cardiology Review
- LV ejection fraction ≤60%
- LV systolic diameter approaching 45mm
- Severe LV volume dilatation
- Mitral regurgitation due to flail leaflet
- PA systolic pressure >50mmHg
- Severe MR with LA volume ≥60ml/m² (in sinus rhythm)

Other Alerts: Cardiology Review
- Development of symptoms
- New atrial fibrillation

TRICUSPID/PULMONARY REGURGITATION

- Echo every 1 year
- Cardiology review

- With abnormal valve or RV
- Echo every 2 years
- Cardiology review

- No follow up usually needed if mild or moderate TR and normal valve and RV

Echo Alerts: Urgent Cardiology Review
- RV dysfunction
- RV dilatation

Other Alerts: Cardiology Review
- Development of symptoms

PULMONARY STENOSIS

- Vmax >4m/s
- Echo every 1 year
- Cardiology review

- Vmax 3.0-4.0m/s
- Echo every 2 years
- Cardiology review

- Vmax <3m/s Echo every 3-5 years

Echo Alerts: Urgent Cardiology Review
- RV dysfunction
- RV dilatation

Other Alerts: Cardiology Review
- Development of symptoms

PROSTHETIC VALVE REPLACEMENTS

Mechanical
- Baseline post operatively: 4-6 weeks post op
- Baseline TTE normal & no alerts: no routine surveillance
- If regurgitation, review by native valve criteria; consider TOE

Biological (surgical)
- Baseline post operatively: 4-6 weeks post op
- MV/TV or AV <60yrs (unless alerts): Annual TTE from 5 years post implant (for new valves with no durability data annual from implantation)
- AV >60yrs and AV with proven longevity: Annual surveillance TTE from 10 years post implant unless alerts
- If regurgitation, review by native valve criteria

TAVI
- Post implant echo 4-6 weeks or as directed by operator. Then annual surveillance post implant. If stable then increase surveillance interval to 2 yearly.
- If other native valve stenosis/regurgitation, review by native valve criteria. Complex cases with ventricular dysfunction or multi native valve disease: individualised approach.

Mitral valve repair (surgical)
- Competent: Baseline, 1 year post op and then 2-3 yearly
- Incompetent: Individualised plan

Mitral valve repair (transcatheter)
- Competent: Baseline then annually
- Incompetent: Individualised plan

Aortic root surveillance post bicuspid aortic valve surgery
- If normal diameter by TTE: re image every 3-5 years
- If aortic dilatation: Individualised approach based on degree of dilatation and rate of progression on sequential scans.
- If dilatation on TTE not reproducible with CT/MR (>2mm difference):interval imaging with CT or MR

AVR and aortic root replacement
- Ongoing assessment of the aortic root: individualised based on clinical, anatomical and surgical features. Reasonable default: 2 yearly cross sectional imaging

Alerts for echo/clinical discussion
- New or worsening prosthetic valve regurgitation
- Gradient/effective orifice area outside of expected parameters
- New LV dilatation or systolic dysfunction
- Aortic root dilatation. Urgent review if ≥45mm Marfans; ≥50mm bicuspid aortic valve; ≥55mm for all other patients
- Suggestion of endocarditis or previous medically treated prosthetic valve endocarditis.
- Worsening symptoms or other sonographer concerns

Adapted from: 2017 ESC/EACTS Guidelines for the management of valvular heart disease. Eur Heart J. 2017 Sep 21;38(36):2739-2791. Appropriateness criteria for the use of cardiovascular imaging in heart valve disease in adults: a European Association of Cardiovascular Imaging report of literature review and current practice. Eur Heart J Cardiovasc Imaging. 2017 May 1;18(5):489-498. Indications for echocardiography of replacement heart valves: a joint statement from the British Heart Valve Society and British Society of Echocardiography, Echo Research and Practice, 6(1), G9-G15.The American Association for Thoracic Surgery consensus guidelines on bicuspid aortic valve-related aortopathy: Executive summary. J Thorac Cardiovasc Surg. 2018 Aug;156(2):473-480 and 2020 ACC/AHA Guideline for the Management of Patients With Valvular Heart Disease: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. https://doi.org/10.1161/CIR.0000000000000923