

Introduction

The importance of triage

- Accurate triage is an effective tool to release resources to patients who need it.
- The process of triage may differ between departments according to workflows and skill sets.
- 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.

Determining follow up interval*

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.

How this documents works

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.

Pregnancy

Recommend specialist advice for those with valvular heart disease and / or aortopathy

■ Severe valve disease ■ Moderate valve disease ■ Mild valve disease

HEART VALVE DISEASE

AORTIC STENOSIS

Severe AS:	GP advice: cardiology referral (see red-flags for urgent referral criteria) Echo surveillance interval if asymptomatic: 6 months
Moderate AS:	GP advice: routine cardiology referral indicated Echo surveillance interval if asymptomatic: 12 - 24 months*
Mild AS:	GP advice: cardiology referral indicated if bicuspid AV/post-inflammatory process/previous radiotherapy Echo surveillance interval: if clinically indicated, echo in 3 years
BICUSPID AORTIC VALVE:	GP advice: Cardiology referral recommended Echo surveillance interval bicuspid aortic valve: <ul style="list-style-type: none"> • If no AS and no more than mild AR: 3 years • If valve thickening and mild AS: 2 years • If aortopathy individualised approach: 12 months surveillance default
RED FLAGS REQUIRING URGENT CARDIOLOGY (WITHIN 2 WEEKS) REVIEW:	Symptoms <ul style="list-style-type: none"> • Breathlessness; chest pain or heart failure signs require urgent cardiology review • Presyncope; syncope: consider in-patient admission • Consider advanced imaging if symptoms associated with moderate valve disease Impaired LV <ul style="list-style-type: none"> • New LV dysfunction (LVEF <55% without other cause) Reducing LV ejection fraction <ul style="list-style-type: none"> • Reducing LVEF on sequential scans (where EF falling < 60%) Aortic dimensions <ul style="list-style-type: none"> • Aortic root surgery can be considered in those undergoing valve replacement when aortic root >45mm • Bicuspid aortic valve with Ao root >50 mm • Tricuspid aortic valve with Ao root >55 mm *Cardiology referral is not indicated when valve intervention is highly unlikely to alter prognosis or quality of life (e.g. terminal illness, significant frailty)

AORTIC REGURGITATION

Severe AR:	GP advice: cardiology referral (see red-flags for urgent referral criteria) Echo surveillance interval if asymptomatic: 6 - 12 months*
Moderate AR:	GP advice: routine cardiology referral indicated Echo surveillance interval if asymptomatic: 12 - 24 months*
Mild AR:	GP advice: routine cardiology referral indicated if aortic root ≥40 mm or valve anatomically abnormal Echo surveillance interval: <ul style="list-style-type: none"> • Ao root <40 mm and anatomically normal valve - no routine follow-up • Ao root ≥40 mm or anatomically abnormal valve - echo in 3 - 5 years* for AR surveillance. Individualised approach for monitoring of aortic root
BICUSPID AORTIC VALVE:	• See AS section
RED FLAGS REQUIRING URGENT CARDIOLOGY REVIEW:	Symptoms <ul style="list-style-type: none"> • Consider advanced imaging if symptoms associated with moderate valve disease Left ventricular size and systolic function <ul style="list-style-type: none"> • LV dilatation • LV impairment (LVEF <55% without other cause) • An increase in LV size or decrease in systolic function but remaining within normal limits Aortic dimensions <ul style="list-style-type: none"> • Aortic root surgery can be considered in those undergoing valve replacement when aortic root >45mm • Marfan syndrome with Ao root >45 mm (or ≥40 mm in women with low BSA) • Bicuspid valve with Ao root >50 mm • Tricuspid valve with Ao root >55 mm *Cardiology referral is not indicated when valve intervention is highly unlikely to alter prognosis or quality of life (eg, terminal illness, significant frailty)

MITRAL STENOSIS

Severe MS:	GP advice: cardiology referral (see red-flags for urgent referral criteria) Echo surveillance interval if asymptomatic: 6 - 12 months*
Moderate MS:	GP advice: routine cardiology referral indicated Echo surveillance interval if asymptomatic: 12 - 24 months*
Mild MS:	GP advice: routine cardiology referral indicated if MS is secondary to rheumatic/post-inflammatory process / radiotherapy / parachute MV / congenital abnormality Echo surveillance interval: 3 - 5 years or sooner if symptoms develop*
RED FLAGS REQUIRING URGENT CARDIOLOGY REVIEW:	Symptoms Consider advanced imaging if symptoms associated with moderate valve disease Right heart <ul style="list-style-type: none"> • SPAP >50mmHg • RV impairment or dilatation Heart rhythm <ul style="list-style-type: none"> • New onset atrial fibrillation Stroke risk <ul style="list-style-type: none"> • Confirmed TIA or stroke • Dense spontaneous echo contrast seen within the LA *Cardiology referral is not indicated when valve intervention is highly unlikely to alter prognosis or quality of life (eg, terminal illness, significant frailty)

MITRAL REGURGITATION

Severe MR:	GP advice: cardiology referral (see red-flags for urgent referral criteria) Echo surveillance interval if asymptomatic: 6 months
Moderate MR:	GP advice: routine cardiology referral indicated Echo surveillance interval if asymptomatic: 12 - 24 months*
Mild MR:	GP advice: routine cardiology referral indicated if valve structurally abnormal Echo surveillance interval: 3 - 5 years* only if valve is anatomically abnormal, e.g. leaflet prolapse, rheumatic valve disease or other post-inflammatory appearance (previous endocarditis, connective-tissue disorder, autoimmune disorder, carcinoid, drug-induced, radiotherapy induced)
RED FLAGS REQUIRING URGENT CARDIOLOGY REVIEW:	Symptoms <ul style="list-style-type: none"> • Consider advanced imaging if symptoms associated with moderate valve disease Left ventricular size and systolic function <ul style="list-style-type: none"> • LV dilatation • LVEF <60% Right heart <ul style="list-style-type: none"> • SPAP >50mmHg Heart rhythm <ul style="list-style-type: none"> • New onset atrial fibrillation *Cardiology referral is not indicated when valve intervention is highly unlikely to alter prognosis or quality of life (e.g. terminal illness, significant frailty)

TRICUSPID REGURGITATION

Severe TR:	GP advice: cardiology referral (see red-flags for urgent referral criteria) Echo surveillance interval if asymptomatic: 6 - 12 months*
Moderate TR:	GP advice: cardiology review indicated if any of the below are present: <ul style="list-style-type: none"> • Tricuspid valve anatomically abnormal • RV impairment and/or dilatation • Severe RA dilatation • TR caused by RV pacing lead Echo surveillance interval: 12 - 24 months*
Mild TR:	GP advice: cardiology referral indicated if either of the below are present: <ul style="list-style-type: none"> • Tricuspid valve anatomically abnormal • RV impairment and/or dilatation Echo surveillance interval: 3 - 5 years* (if TV abnormal or RV impairment +/- dilatation) Normal valve anatomy and RV size and function - no routine follow-up required
RED FLAGS REQUIRING URGENT CARDIOLOGY REVIEW:	Symptoms Right heart <ul style="list-style-type: none"> • RV dilatation • RV impairment • Elevated SPAP *Cardiology referral is not indicated when valve intervention is highly unlikely to alter prognosis or quality of life (e.g. terminal illness, significant frailty)

PULMONARY REGURGITATION

Severe PR:	GP advice: cardiology referral (see red-flags for urgent referral criteria) Echo surveillance interval if asymptomatic: 12 months*
Moderate PR:	GP advice: Surveillance and cardiology referral are indicated if any one of the below are present: <ul style="list-style-type: none"> • Anatomically abnormal pulmonary valve • RV impairment and/or dilatation • Pulmonary artery dilatation • History of previous valvuloplasty Echo surveillance interval if asymptomatic: 12 - 24 months*
Mild PR:	GP advice: mild PR is extremely common and usually a normal finding. Surveillance and cardiology referral are only indicated if: <ul style="list-style-type: none"> • Anatomically abnormal pulmonary valve
RED FLAGS REQUIRING URGENT CARDIOLOGY REVIEW:	Symptoms Right heart <ul style="list-style-type: none"> • RV dilatation • RV impairment • Elevated SPAP *Cardiology referral is not indicated when valve intervention is highly unlikely to alter prognosis or quality of life (eg, terminal illness, significant frailty)

PULMONARY STENOSIS

Severe PS:	GP advice: cardiology referral (see red-flags for urgent referral criteria) Echo surveillance interval if asymptomatic: 12 months
Moderate PS:	GP advice: typically congenitally abnormal valve - cardiology referral indicated Echo surveillance interval if asymptomatic: 12 - 24 months*
Mild PS:	GP advice: typically congenitally abnormal valve - cardiology referral indicated Echo surveillance interval: 3 - 5 years*
RED FLAGS REQUIRING URGENT CARDIOLOGY REVIEW:	Symptoms Right heart <ul style="list-style-type: none"> • RV dilatation • RV impairment • Elevated SPAP *Cardiology referral is not indicated when valve intervention is highly unlikely to alter prognosis or quality of life (eg, terminal illness, significant frailty)

REPAIRED AND REPLACED VALVES

Mechanical	Baseline echo: 6 - 8 weeks post op Surveillance: <ul style="list-style-type: none"> • Baseline TTE normal & no alerts - no routine surveillance required
Biological (surgical)	Baseline echo: 6 - 8 weeks post op Surveillance: <ul style="list-style-type: none"> • MVR/TVR or AVR in patient <60yrs (unless alerts) - annual TTE from 5 years post implant • For new valves with no durability data - annual from implantation • AVR with proven longevity in patient >60yrs - annual surveillance TTE from 10 years post implant unless alerts
TAVI	Baseline echo: 6 - 8 weeks post implant or as directed by operator Surveillance: <ul style="list-style-type: none"> • Annual if valve parameters are stable • Increase surveillance interval to 2 yearly if parameters remain stable (unless at stage where further intervention unlikely) • If other native valve stenosis/regurgitation, review by native valve criteria • Complex cases with ventricular dysfunction or multi native valve disease: individualised approach
Surgical mitral valve repair	Baseline echo: 6 - 8 weeks post op Surveillance: <ul style="list-style-type: none"> • One-year post op • Residual MR mild or less - repeat echo 2 - 3 yearly • Residual MR greater than mild - review by native valve criteria
Transcatheter mitral repair	Baseline echo: 6 - 8 weeks post procedure Surveillance: <ul style="list-style-type: none"> • Residual MR mild or less – annual echo • Residual MR greater than mild - review by native valve criteria/individualised surveillance
Aorta surveillance following bicuspid AV surgery	Baseline echo: According to implanted valve Surveillance: <ul style="list-style-type: none"> • Individualised approach by clinical team as cross sectional imaging may be preferred to echo for aorta surveillance. Factors such as aorta size and rate of dilatation progression should be considered • If discrepancy >2 mm between TTE and CT/MRI - interval imaging with CT or MRI
AVR and root replacement	Baseline echo: 6 - 8 weeks post op Surveillance: <ul style="list-style-type: none"> • According to implanted valve type
Alerts or echo/clinical discussion	<ul style="list-style-type: none"> • New or worsening prosthetic valve regurgitation: review by native valve criteria and consider TOE • Gradient or effective orifice area outside of expected parameters. • Mechanical prosthetic valves with INR subtherapeutic for extended period • New LV dilatation or systolic function impairment. Aortic root dilatation. Urgent review if: <ul style="list-style-type: none"> • Marfan's ≥45mm • Bicuspid aortic valve ≥50mm • All other patients ≥55mm • Rapid progression >3mm / year Clinical suspicion of endocarditis +/- high risk features.
Other considerations	<ul style="list-style-type: none"> • If other native valve disease, echo surveillance as per native valve criteria • Consider discharge from routine echo surveillance if patient would not be considered for re-intervention on account of frailty / co-morbidities • For bioprosthetic valve dysfunction individualised approach for surveillance frequency