

UHDB Guidelines for the use/interpretation of Echocardiography

Ref No: CG-CARDIO/2254/014

Based 2021 ESC & 2020 BSE guidelines and expanded by the Consultant Cardiologists at Derby & Burton Teaching Hospitals.

All suggested management sections are looking at the echo abnormality in isolation with no change in patient symptoms – if any other parameters change in conjunction with the echo abnormality (ie dilated LV, Pulmonary hypertension) then the patients treatment pathway must reflect this and cardiology review should be considered.

Echo abnormality	Interpretation	Suggested management
Aortic Regurgitation	Mild aortic regurgitation is not uncommonly seen with hypertension or dilatation of the aortic root. Moderate AR is also quite common in the elderly but can be underestimated on echo. Severe aortic regurgitation requires further assessment.	If the patient is symptomatic to any degree, consider referral to cardiology. If Moderate or severe aortic regurgitation or the aortic root is dilated (see below) suggest referral to cardiology. If the patient is not suitable for intervention, serial assessments are not required. If suitable for intervention: Trace/Mild; with normal valve and root does not usually require echo surveillance Mild/Moderate, rescan 2 yrs Moderate: 1- 2 yrs Severe every 6 – 12 months-unless otherwise indicated
Aortic Stenosis	Severity of aortic stenosis is normally assessed by measuring the peak velocity. >4m/s suggests severe aortic stenosis, 3.0-3.9m/s moderate, < 2.9m/s mild. The gradient may underestimate the degree of stenosis in patients with reduced LV function in which case other measurements (eg ZVA, planimetry) may be used to estimate the valve	If the patient is symptomatic with severe AS (SOB, chest pain, dizziness or syncope) consider urgent cardiology discussion or admission. Findings of moderate or severe aortic stenosis including asymptomatic patients with aortic stenosis should be considered for referral to cardiology for clinical/echocardiographic follow up. Aortic stenosis in a patient who would not be a candidate for valve intervention (TAVI or AVR) does not

	area and severity of stenosis.	require rescans or referral – refer for an opinion if unsure. Cont'd If suitable for intervention: Mild rescan 2-3 yrs Moderate rescan 1 yr Severe 6 months (on cardiology advice)
Cardiac masses	Cardiac masses - including thrombus, vegetations, benign and malignant cardiac tumours	Any patient with suspected cardiac mass should be referred for cardiology assessment
Dilated aortic root	Usually associated with aortic valve disease or hypertension, if acute history of chest /back pain consider aortic dissection	If significantly dilated (>4.0 cm) or If there are is any dilatation or loss of geometry of the root - along with features or a family history of Marfan syndrome, bicuspid AV or aortic dissection, suggest referral to cardiology. If acute dissection is suspected admit to ED. Ensure hypertension is optimally controlled. In patients > 65 yrs of age, an aortic root diameter of < 4 cm is not of significant concern and do not require follow up
Dilated left atrium	When associated with atrial fibrillation it indicates an increased risk for thrombo-embolism. Also associated with mitral disease, hypertension ischaemic heart disease and cardiomyopathy	Consider AF and if present assess for anticoagulation. (Please refer to AF guidelines) Ensure optimal control of BP
Dilated right heart	Associated with pulmonary hypertension, left to right shunts and AVRC (<i>arrhythmogenic right ventricular cardiomyopathy</i>). Report will usually give an estimate of likelihood of pulmonary hypertension.	In the absence of significant lung disease, a dilated right heart with or without pulmonary hypertension requires cardiology referral for further investigation e.g. primary pulmonary hypertension, shunts, cardiomyopathy, heart failure. If pulmonary hypertension and chronic lung disease consider refer to a respiratory physician
Left ventricular aneurysm	Usually the results of coronary artery disease with previous myocardial infarction. May contain	Suggest referral to cardiology unless previously known and investigated

	thrombus	
Left Ventricular hypertrophy/Relative wall thickening	<p>Can be due to hypertension or aortic valve disease. If no obvious cause present then it may be due to hypertrophic cardiomyopathy or infiltration (amyloid, fabrys disease)</p> <p>Relative wall thickness/Mass looks at the LV wall thickness compared to LV size and relative to BSA (Body Surface Area)</p>	<p>If the patient is hypertensive (controlled or not), moderate- severe hypertrophy requires a review of therapy/referral, if there is no obvious cause for hypertrophy, or reports indicates hypertrophic cardiomyopathy, refer to cardiology for investigation. “mild concentric LVH” is common, particularly in the elderly and generally just requires BP control.</p> <p>A sub aortic bulge (sigmoid septum) is common in the elderly and may cause a murmur</p> <p>Concentric remodelling – a precursor to LVH, ensure good BP control.</p> <p>Eccentric hypertrophy other than sigmoid septum need cardiology review</p>
Left ventricular systolic impairment	This can be asymptomatic but is more commonly associated with signs and symptoms of heart failure	<p>Review local guidelines for heart failure management. Patients with LVEF < 45% left ventricular dysfunction (LVSD) generally should be reviewed by cardiology. Patients with known chronic severe LVSD do not require further echo’s unless a new intervention is being considered or the patients symptoms change significantly.</p> <p>It should be remembered that estimations of LV function are highly operator dependant and small changes should not be over interpreted.</p>
Left ventricular diastolic dysfunction	This can be asymptomatic but is more commonly associated with signs and symptoms of heart failure	<p>Grade 1 diastolic dysfunction (reversed mitral E to A ratio) is essentially a normal variant in > 65 yrs of age and does not require any action or monitoring (beyond BP control)</p> <p>Symptomatic grade 2 &3 heart failure (even with normal systolic LV function) should be treated in line with the local heart failure policy.</p>

Mitral regurgitation	Commonly secondary to left ventricular enlargement (dilated annulus) or due to intrinsic mitral pathology (valve reported as abnormal)	If moderate or severe mitral regurgitation is present suggest referral to cardiology. If heart failure and mild mitral regurgitation - optimise heart failure therapy. Cont'd If the mitral valve appears normal mild MR does not usually require review unless associated with mitral valve prolapse then review 3 – 5 yrs. If the patient is not suitable for intervention, serial assessments are not required. Moderate MR rescan 1-2 yrs (more frequently if underlying cause is ischemia) Severe MR refer to cardiology and rescan as advised by cardiology (usually 6 months) unless not a candidate for mitral surgery
Mitral stenosis	Mainly due to rheumatic heart disease. Severity is assessed by Mitral valve area. Severe < 1.5 cm ² , moderate =1.5cm ² , mild 1.6 – 2cm ² . Valve gradients are also assessed	Suggest referral to cardiology for further assessment if moderate/severe. If in AF the patient will have a high risk of thromboemboli and so warfarin should be prescribed (in the absence of contra indications). If the patient is not suitable for intervention, serial assessments are not required Mild rescan 3 – 5 yrs Moderate rescan 2 - 3 yrs Severe 12 months
Pericardial effusion	Initiate investigations to determine cause	If moderate/large pericardial effusion – suggest referral to cardiology, if evidence of tamponade suggest immediate admission. Trivial pericardial fluid especially localised around only the right atrium is unlikely to be of any clinical importance.
Slight valvular thickening	Commonly seen in the elderly particularly the aortic valve cusps	If no reported stenosis/regurgitation or signs and symptoms of heart failure, then no further action is required. If < 80 yrs of age rescan 5 yrs
Thrombus	Always significant. If reported as mobile, high risk	Will usually indicate the need for anticoagulation, although adherent

	of thromboembolism	thrombus late after infarction may not need anticoagulation. Suggest referral to cardiology
Pulmonary/Tricuspid regurgitation	Common findings during echocardiography. Allows assessment of pulmonary artery pressure non-invasively using Doppler.	Mild pulmonary and/or tricuspid regurgitation associated with normal chamber sizes and normal pulmonary artery pressure is a normal finding and no action is required. If pulmonary artery pressure is raised, consider respiratory disease, left heart disease, or primary pulmonary hypertension, consider cardiac review. Severe TR requires further review
Tricuspid/Pulmonary stenosis	Rare findings, pulmonary stenosis usually associated with a congenital abnormality	Mild pulmonary stenosis, if congenital cause normally remains unchanged in adult life but rescan 3 – 5 yrs if indicated Moderate or severe tricuspid or pulmonary stenosis should be referred to cardiology
Vegetations on cardiac valve	Rare finding on normal valves usually a sign of infective endocarditis	Suggest urgent referral to cardiology. Patients can get chronic vegetations after treatment for SBE
Wall thinning of left ventricular segment	Usually due to chronic coronary artery disease/previous MI or with some cardiomyopathies.	If previously documented myocardial infarction in the affected region, then the finding is compatible with this conclusion
Prosthetic valve & TAVI	replacements TAVI MV Repair	A baseline study should have been performed at the surgical centre 4 – 6 weeks post implant, repeat echo only if change in clinical assessment or 5 yearly. Full details of valve make/size should be given on referral As Above. Consider discharge if the candidate is not suitable for further intervention. A Baseline study should be performed 4-6 weeks at surgical centre. Then rescan 1 yr, if > 65yrs discharge if stable, if < 65 yrs rescan a 2 nd 1 yr interval then discharge if stable. Any unknown residual regurgitation

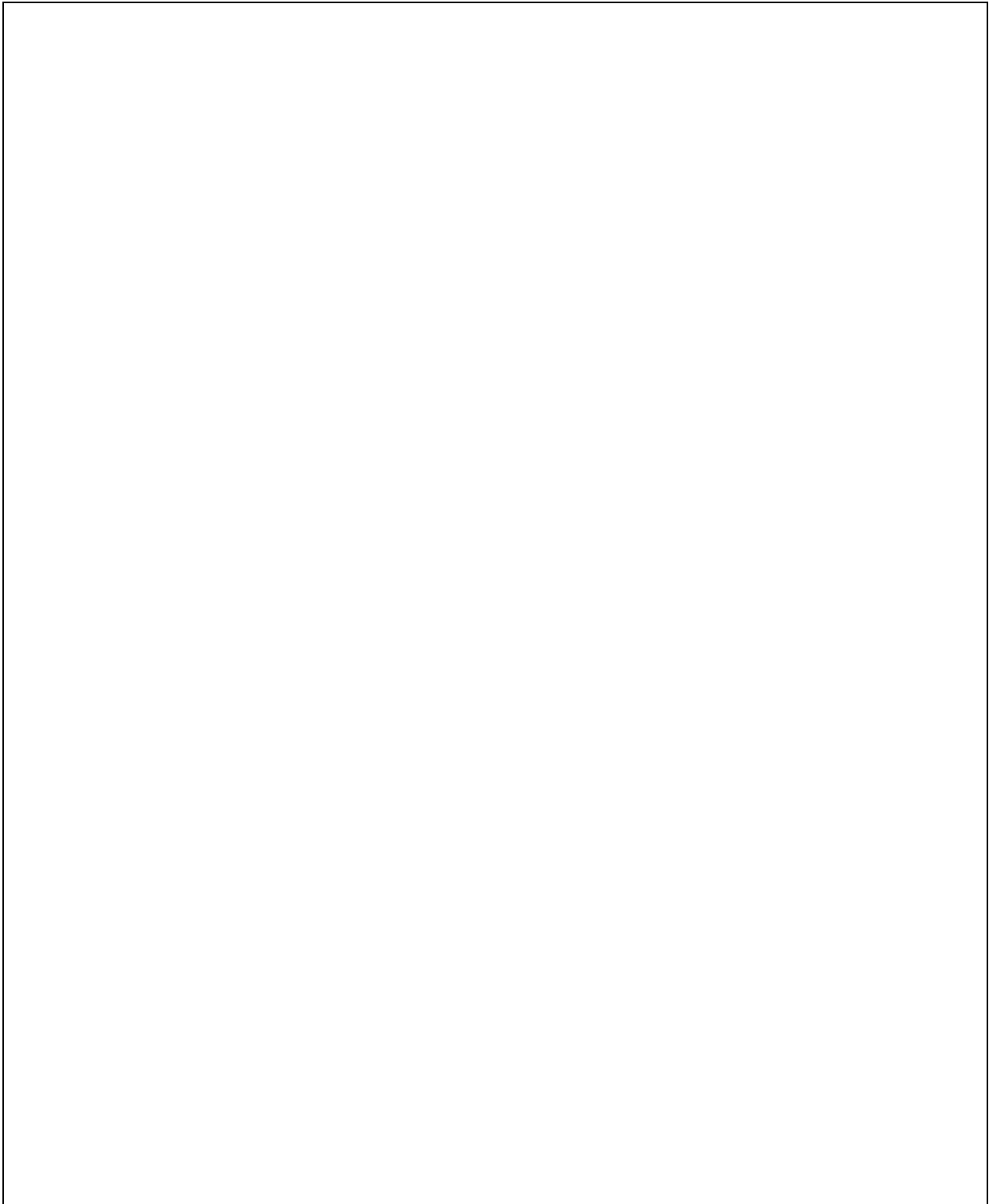
		or stenosis should be discussed with cardiology
Congenital cardiac abnormalities	Wide range of abnormalities and possible surgical outcomes Bicuspid valve	Minor abnormalities where the patient was discharged (childhood murmurs) do not require follow up if no change in clinical assessment. All other patients treatment pathway should be discussed with the Adult Congenital Heart Clinic. Bicuspid valves with no AS, no aortic root dilatation and no more than mild AR 3 –5 yearly scan. Bicuspid valve with thickening and mild AS rescan at one year and 2 yearly thereafter if no changes noted on the repeat scan . Bicuspid valves with moderate or severe AS require cardiology review.
Atrial Septal Defect (ASD)/Patent Foramen Ovale (PFO)	Often difficult to visualise - abnormalities and flows associated with the intra atrial septum.	All patients with an atrial septal defect (usually associated with right heart dilation) should be referred to cardiology. An atrial septal aneurysm or incidental patent foramen ovale in the absence of relevant clinical history (TIA or stroke, peripheral embolism, diving) is not significant and can be found in up to 20% of people.
BNP Values		Pt with suspected heart failure and BNP level of 400 pg/ml (116 pmol/litre) or an NTproBNP level above 2000 pg/ml (236 pmol/litre) echo within 2 weeks unless known severe LV systolic dysfunction. BNP level between 100 and 400 pg/ml (29-116 pmol/litre) or an NTproBNP level between 400 and 2000 pg/ml (47 – 236 pmol/litre) echo within 6 weeks unless known severe LV systolic dysfunction Be aware that high levels can have causes other than heart failure, including left ventricular hypertrophy, ischaemia, tachycardia, right ventricular overload, hypoxia

		(including pulmonary embolism), GFR less than 6- ml/minute, sepsis, COPD, diabetes, age greater than 70 and liver cirrhosis.
Pulmonary Hypertension	<p>4 main causes</p> <p>Pulmonary arterial hypertension (rare)</p> <p>Pulmonary hypertension caused by left heart disease (most common)</p> <p>Pulmonary hypertension caused by lung conditions</p> <p>Pulmonary hypertension due to PE</p>	<p>Pulmonary hypertension is now graded as a probability in order to prevent underestimation when right atrial pressure is high. Various calculations and measurements are needed to be able to grade PH accurately.</p> <p>Post PE usually scan 3/12 post PE (or follow respiratory guidance)</p> <p>Low and intermediate probability of pulmonary hypertension – no action required.</p> <p>High probability of pulmonary hypertension. Unless as an obvious result of an abnormality already under treatment (where the patient is already symptomatic) then the patient should have cardiology or respiratory review dependant on other clinical findings.</p>

Documentation Controls:

Development of Guideline	<p>V3.0.0</p> <p>Anne Bebington and Dr Vickram Singh (July 2022)</p> <p>Reviewed and amended by Kelly Barr, Sarah Dury (Principle Clinical Physiologists) and Dr Surojit Bose (Imaging Cardiology Consultant UHDB) (June 2024)</p>
Consultation with	Advanced Clinical Physiologists & Consultant Cardiologist United Hospitals of Derby and Burton Teaching Hospitals.
Approved By	Medicine Division - 18/7/2024
Review Date	July 2027
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Notes

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