

Guidelines in review: Comparison of ESC and AHA guidance for the diagnosis and management of infective endocarditis in adults

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Over recent years, new evidence has led a rethinking of the available guidance on the diagnosis and management of infective endocarditis (IE). This review compares the most recently available guidance provided by the American Heart Association (AHA) IE Writing Committee, and the Task Force for the management of IE of the European Society of Cardiology (ESC). This represents the sixth of a new series of comparative guidelines review published in the Journal. (J Nucl Cardiol 2019;26:303–8.)

Key Words: Infection • image-guided application • multimodality

Abbreviations			
CTCA	Computed tomographic coronary angiography	MRI	Magnetic resonance imaging
CDRIE	Cardiac device-related infective endocarditis	MRA	Magnetic resonance angiography
DSA	Digital subtraction angiography	NSER	No specific equivalent recommendation
¹⁸ F-FDG	18-fluorodeoxyglucose	PET/CT	Positron emission tomography/computed tomography
IE	Infective endocarditis	TEE	Transesophageal echocardiography
LOE	Level of evidence	TTE	Transthoracic echocardiography

See related editorial, pp. 309–312; pp. 313–315

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Over recent years, new evidence has led to a rethink of the available guidance on the diagnosis and management of infective endocarditis (IE). This review compares the most recently available recommendations provided by the American Heart Association (AHA) IE Writing Committee, and the Task Force for the management of IE of the European Society of Cardiology (ESC).^{1,2} Class (I, II or III) and level of evidence (A, B

or C) are provided for each recommendation where given by the guidelines (Tables 1, 2, 3; Figures 1, 2). As in previous comparative guidelines reviews published in

the Journal,³⁻⁷ this review focuses on the role of imaging in the evaluation and management of patients with suspected IE.

Table 1. Indications for echocardiography in patients with suspected infective endocarditis

Recommendation	ESC		AHA	
	Class	LOE	Class	LOE
<i>Diagnosis</i>				
Echocardiography is recommended as the first-line imaging test in all cases of suspected IE, and it should be performed as soon as possible (<12 hours after initial evaluation)*	I	B	I	A, B
TEE should be performed if initial TTE is negative or non-diagnostic in patients for whom there is an ongoing suspicion for IE	I	B	I	B
TEE is recommended if there is concern for intracardiac complications in patients with an initial positive TTE	NSER		I	B
TEE is recommended in patients with clinical suspicion of IE when a prosthetic heart valve or an intracardiac device is present	I	B	NSER†	
Repeat TEE is recommended within 3-7 days, ‡ or sooner if clinical findings change, in patients for whom there is a high suspicion of IE despite an initial negative TEE	I	C	I	B
TEE should be considered even in patients with positive TTE, except in isolated right-sided native valve IE with good quality TTE and unequivocal echocardiographic findings	IIa	C	NSER	
Echocardiography should be considered in <i>Staphylococcus aureus</i> bacteraemia	IIa	B	NSER	
<i>Intraoperative echocardiography</i>				
Intraoperative echocardiography is recommended in all cases of IE undergoing surgery	I	B	NSER	
<i>Follow-up</i>				
Repeat TEE should be performed after an initially positive TEE if clinical suspicion of a new complication of IE arises (e.g. persistent fever, changes in cardiac murmurs, heart failure, embolism, new atrioventricular block, or arrhythmia)	I	B	I	B
Repeat TTE and/or TEE is recommended during follow-up of uncomplicated IE to detect new silent complications and monitor vegetation size [§]	IIa	B	NSER	
TTE is recommended at the time of antimicrobial therapy completion to evaluate cardiac and valve morphology and function	I	C	IIa	C

*According to the AHA scientific statement, TEE is preferred over TTE, but the latter should be performed if TEE is not immediately available. TTE may be sufficient in small children

†AHA statement also suggests TEE as first-line test in patients with a prosthetic valve and suspected IE

‡In this clinical scenario, the AHA statement recommends repeating the TEE in 3 to 5 days or sooner

§ESC guidelines stipulate that the timing and mode (TTE or TEE) of repeat test depend on initial findings, microorganism type, and initial response to therapy

Table 2. indications for non-invasive imaging in cardiac device-related infective endocarditis (CDREI)

Recommendation	ESC		AHA	
	Class	LOE	Class	LOE
TEE is recommended in patients with suspected CDREI with positive or negative blood cultures, independent of TTE results, to evaluate lead-related IE and heart valve infection	I	C	NSER	
Intracardiac echocardiography may be considered in patients with suspected CDREI, positive blood cultures and negative TTE and TEE results.	IIb	C	NSER	
Radiolabelled leucocyte scintigraphy and ¹⁸ F-FDG PET/CT imaging may be considered additional tools in patients with suspected CDREI, positive blood cultures and negative echocardiography	IIb	C	NSER	

Table 3. Role of CT, MRI, radionuclide imaging and angiography in the assessment of IE patients

Established and proposed indications for advanced imaging in IE	ESC		AHA	
	Class	LOE	Class	LOE
<i>CT</i>				
Cardiac CT may be used in cases in which definitive evidence of IE and its complications is not secured with TEE			Y*	
CTCA can be used as an alternative to invasive coronary angiography in patients with IE	Y*		Y*	
Cardiac CT can be used to detect abscesses/pseudoaneurysms in native valve IE, and to assess the extent of any perivalvular complication	Y*			
CT may help surgical planning in aortic IE	Y*		Y*	
CT can be used to identify pulmonary abscesses and infarcts in right-sided IE	Y*			
Cerebral CTA is reasonable as an initial imaging test for the detection of intracranial mycotic aneurysms	IIa	B	IIa	B
Cerebrovascular imaging (in general) may be considered in all patients with left-sided IE who have no CNS signs or symptoms	NSER		IIb	C
Cerebral CTA may be used instead of MRA to diagnose cerebral mycotic aneurysms in critically ill patients	Y*		Y*	
CT/CTA can be used to detect splenic and other systemic abscesses, as well as IE-related peripheral vascular complications [†]	NSER [‡]		I	B
<i>MRI</i>				
Cerebral MRA may be considered as first line for the detection of cerebral mycotic aneurysms	IIa	B	IIa	B
Cerebral MRI may be considered for better lesion characterisation in IE patients with neurological symptoms	Y*			
<i>Angiography</i>				
Digital subtraction angiography (DSA) is reasonable as an initial diagnostic test in patients with suspected cerebral mycotic aneurysms	NSER		IIa	B
Conventional angiography may be considered for the detection of intracranial mycotic aneurysms in patients with negative CTA, MRA or DSA	IIa	B	IIa	B
<i>Radionuclide Imaging</i>				
¹⁸ F-FDG PET/CT and radiolabelled leucocyte scintigraphy may help reduce the number of misdiagnosed IE classified in the “possible IE” category of the Duke criteria	Y*		Y [§]	
¹⁸ F-FDG PET/CT or radiolabelled leucocyte scintigraphy may help visualize peripheral emboli and metastatic infectious events	Y*			
¹⁸ F-FDG PET/CT must be interpreted with caution in patients who have undergone cardiac surgery within 3 months, as false positives may occur due to post-operative inflammation	Y*			

*These proposed indications are discussed in the guidelines but neither the ESC guidelines nor the AHA scientific statement give specific or formal recommendation

[†]The AHA statement recommends that, in IE patients with suspected metastatic foci of infection, the choice of diagnostic technique (ultrasonography, CT or MRI) should be individualised for each patient (Class I; LOE, C)

[‡]Although there is no specific recommendation, the ESC guidelines state that patients with suspected splenic complications should be evaluated by CT, MRI or ultrasound

[§]The AHA statement recognises that more studies are needed to determine the role of ¹⁸F-FDG PET/CT imaging in the diagnosis and management of patients with IE, and highlights evidence on the usefulness of this technique for the detection of peripheral emboli and other extracardiac complications

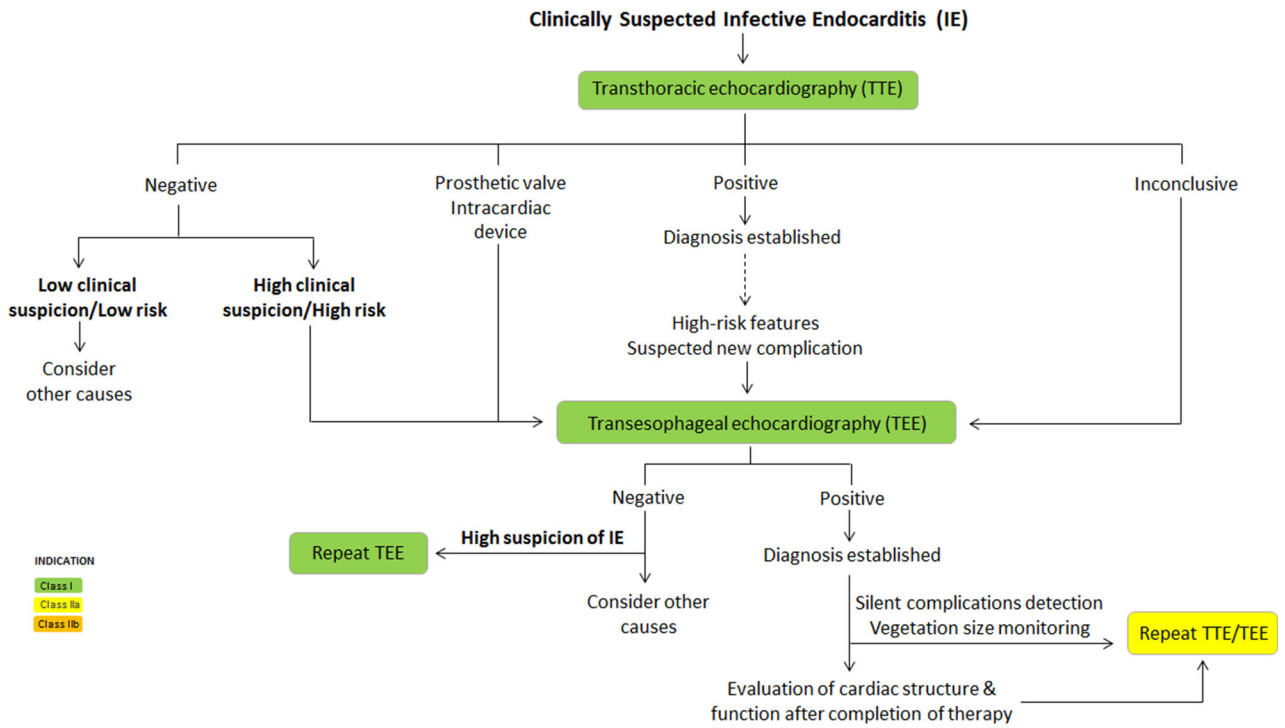


Figure 1. ESC and AHA recommendations for the initial assessment of patients with clinically suspected infective endocarditis using echocardiography.

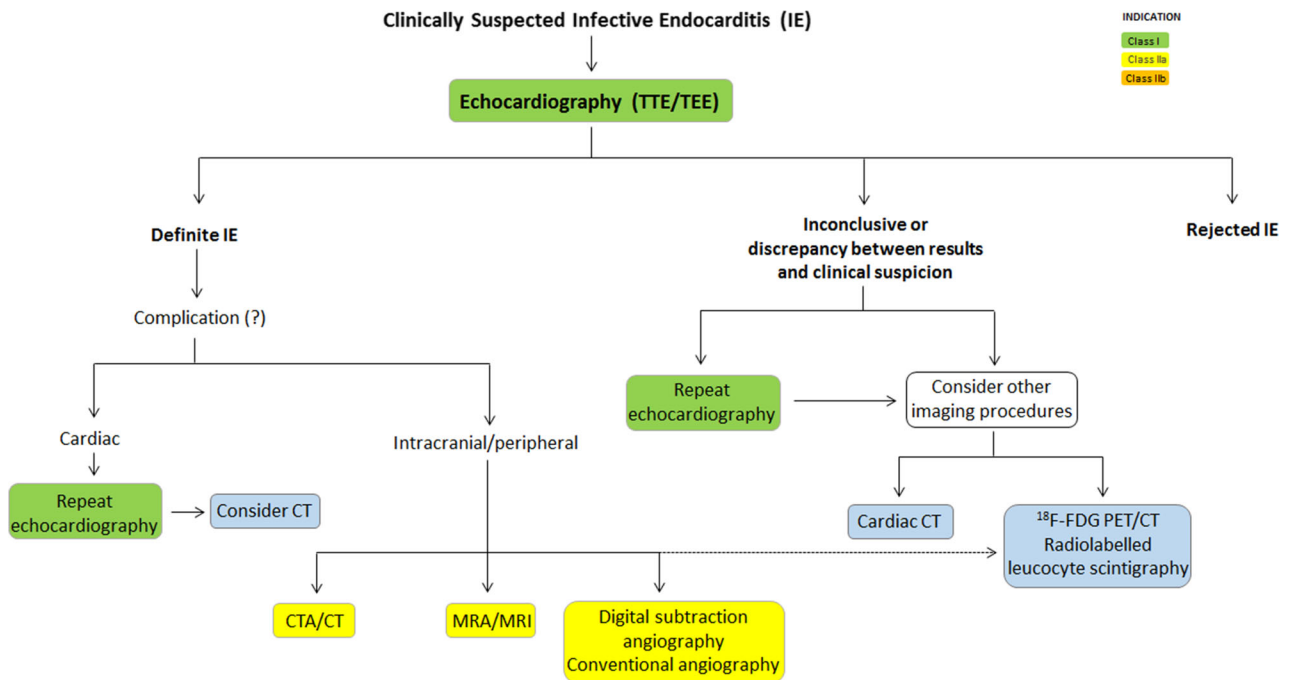


Figure 2. Role of advanced imaging in the assessment of patients with infective endocarditis. CTA, computed tomographic angiography; ¹⁸F-FDG, 18-fluorodeoxyglucose; MRA, magnetic resonance angiography; MRI, magnetic resonance imaging; TEE, transesophageal echocardiography; TTE, transthoracic echocardiography.

Disclosure

All authors have nothing to disclose.

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