

Recommendations for the practice of echocardiography in infective endocarditis

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IE: new guidelines EAE 2010

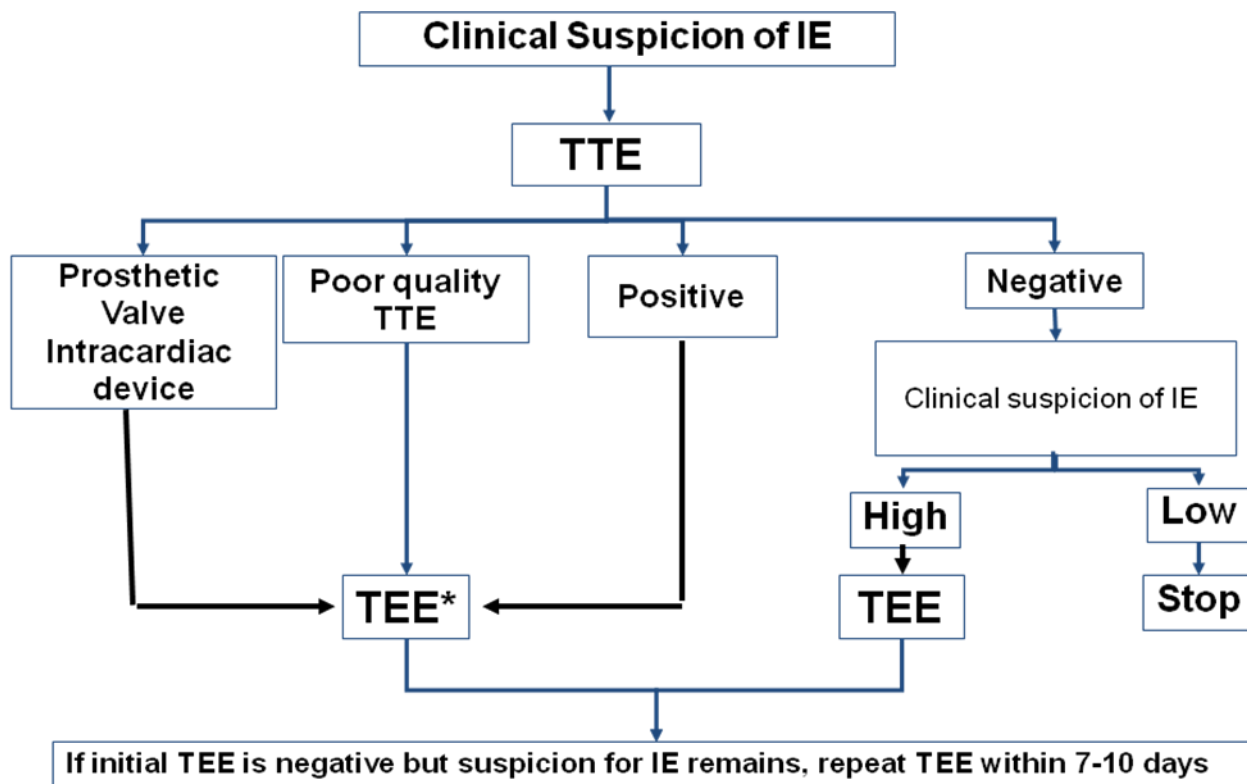
- 1. diagnosis**
- 2. management of complications**
- 3. prognostic assessment / follow-up**
- 4. intraoperative echocardiography**
- 5. specific situations**

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Anatomic and echo definitions

	Surgery/necropsy	Echocardiography
Vegetation	Infected mass attached to an endocardial structure, or on implanted intracardiac material	Oscillating or non oscillating intracardiac mass on valve or other endocardial structures, or on implanted intracardiac material
Abscess	Perivalvular cavity with necrosis and purulent material not communicating with the cardiovascular lumen	Thickened, non-homogeneous perivalvular area with echodense or echolucent appearance
Pseudoaneurysm	Perivalvular cavity communicating with the cardiovascular lumen	Pulsatile perivalvular echo-free space, with colour-Doppler flow detected
Perforation	Interruption of endocardial tissue continuity	Interruption of endocardial tissue continuity traversed by colour-Doppler flow
Fistula	Communication between 2 neighbouring cavities through a perforation	Colour-Doppler communication between 2 neighbouring cavities through a perforation
Valve aneurysm	Saccular outpouching of valvular tissue	Saccular bulging of valvular tissue
Dehiscence of a prosthetic valve	Dehiscence of the prosthesis	Paravalvular regurgitation identified by TTE/TEE, with or without rocking motion of the prosthesis



**TEE is not mandatory in isolated right-sided native valve IE with good quality TTE examination and unequivocal echocardiographic findings.*

Recommendation 1: diagnosis

- 1) TTE is recommended as the first imaging modality in suspected IE***
- 2) TEE is recommended in patients with high clinical suspicion of IE and a normal TTE***
- 3) TEE should be considered in the majority of patients with suspected IE, even in case with positive TTE***
- 4) Repeat TTE/TEE within 7-10 days is recommended in case of initially negative examination when clinical suspicion of IE remains high***
- 5) TEE is not indicated in patients with good-quality negative TTE and low clinical suspicion of IE***

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Recommendations: Indications for surgery	Timing*	Class ^a	Level ^b
A - HEART FAILURE			
Aortic or mitral IE with severe acute regurgitation or valve obstruction causing refractory pulmonary oedema or cardiogenic shock	Emergency	I	B
Aortic or mitral IE with fistula into a cardiac chamber or pericardium causing refractory pulmonary oedema or shock	Emergency	I	B
Aortic or mitral IE with severe acute regurgitation or valve obstruction and persisting heart failure or echocardiographic signs of poor haemodynamic tolerance (early mitral closure or pulmonary hypertension)	Urgent	I	B
Aortic or mitral IE with severe regurgitation and no HF	Elective	IIa	B
B - UNCONTROLLED INFECTION			
Locally uncontrolled infection (abscess, false aneurysm, fistula, enlarging vegetation)	Urgent	I	B
Persisting fever and positive blood cultures > 7-10 days	Urgent	I	B
Infection caused by fungi or multiresistant organisms	Urgent/elective	I	B
C - PREVENTION OF EMBOLISM			
Aortic or mitral IE with large vegetations (> 10 mm) following one or more embolic episodes despite appropriate antibiotic therapy	Urgent	I	B
Aortic or mitral IE with large vegetations (> 10 mm) and other predictors of complicated course (heart failure, persistent infection, abscess)	Urgent	I	C
Isolated very large vegetations (> 15 mm) [#]	Urgent	IIb	C

Recommendation 2: management of complications

- 1) Heart failure, perivalvular infection, and high embolic risk are the 3 main indications for early surgery***
- 2) Echocardiography plays a major role in decision-making when one of these situations occurs***
- 3) Echocardiography helps clinicians not only for taking the decision to operate or not, but also for choosing the optimal timing of surgery***
- 4) The presence of heart failure, abscess, or high embolic risk usually indicates urgent surgery***

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Echocardiographic prognostic markers

Echocardiographic findings

- Periannular complications
- Severe left-sided valve regurgitation
- Low left ventricular ejection fraction
- Pulmonary hypertension
- Large vegetations
- Severe prosthetic dysfunction
- Premature mitral valve closure and other signs of elevated diastolic pressures

Recommendation 3: follow-up

- 1) Repeat TTE and TEE are recommended as soon as a new complication of IE is suspected***
- 2) Repeat TTE and TEE should be considered during the follow-up of uncomplicated IE, in order to detect silent complication and monitor vegetation size.***
- 3) TTE is recommended before discharge for subsequent comparison***
- 4) Clinical and echocardiographic periodic follow-up is mandatory during the first year after the end of antibiotic treatment.***

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Recommendation 4: Intra-operative echocardiography

- 1) Intraoperative TEE provides useful data for the planning of surgery, is essential for the immediate control of the surgical procedure, has the potential to improve surgical results, and is a reference for future studies.***
- 2) The impact of intraoperative TEE leads to recommend its routine and systematic use, especially in cases of conservative valve surgery and other complex procedures.***
- 3) Intraoperative TEE is recommended in all patients with IE undergoing cardiac surgery.***

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IE: specific situations

- 1. *Prosthetic valve IE (PVE)***
- 2. *Cardiac device-related IE (CDRIE)***
- 3. *Right-sided IE***

Recommendation 5: PVE

- 1) Both TTE and TEE are recommended in suspected or definite PVE***
- 2) Perivalvular complications are frequent in PVE and are better assessed by TEE***
- 3) The sensitivity of echocardiography is lower in PVE than in NVE***
- 4) Perioperative and postoperative echocardiographic assessments of patients with PVE are recommended***
- 5) Repeat echocardiography after discharge is recommended in PVE treated by medical therapy alone because of the risk of late prosthetic dysfunction***

Recommendation 6: CDRIE

- 1) Although TTE is superior to TTE, both are mandatory in suspected or definite CDRIE***
- 2) The sensitivity of echocardiography is lower in CDRIE than in NVE***
- 3) Echocardiography is also useful for the measurement of vegetation size and should be repeated for follow-up after device explantation.***

Recommendation 7: right-sided IE

- 1) TEE is not mandatory in isolated right-sided native valve IE with good quality TTE examination and unequivocal echocardiographic findings.***
- 2) The size of the tricuspid vegetation and the severity of the tricuspid regurgitation must be evaluated by echocardiography, because these measurements have the potential to influence the therapeutic strategy.***

Conclusion: echocardiography in IE

1. key role of echocardiography, but diagnosis is still sometimes difficult
2. major role for prognostic assessment
 - ✦ hemodynamic risk
 - ✦ infectious risk
 - ✦ embolic risk
3. intraoperative echo in the majority of patients