

Guidelines for the Use of Echocardiography in the Evaluation of a Cardiac Source of Embolism

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Embolism from the heart or the thoracic aorta often leads to clinically significant morbidity and mortality due to transient ischemic attack, stroke or occlusion of peripheral arteries. Transthoracic and transesophageal echocardiography are the key diagnostic modalities for evaluation, diagnosis, and management of stroke, systemic and pulmonary embolism. This document provides comprehensive American Society of Echocardiography guidelines on the use of echocardiography for evaluation of cardiac sources of embolism.

It describes general mechanisms of stroke and systemic embolism; the specific role of cardiac and aortic sources in stroke, and systemic and pulmonary embolism; the role of echocardiography in evaluation, diagnosis, and management of cardiac and aortic sources of emboli including the incremental value of contrast and 3D echocardiography; and a brief description of alternative imaging techniques and their role in the evaluation of cardiac sources of emboli.

Specific guidelines are provided for each category of embolic sources including the left atrium and left atrial appendage, left ventricle, heart valves, cardiac tumors, and thoracic aorta. In addition, there are recommendation regarding pulmonary embolism, and embolism related to cardiovascular surgery and percutaneous procedures. The guidelines also include a dedicated section on cardiac sources of embolism in pediatric populations. (J Am Soc Echocardiogr 2016;29:1-42.)

Keywords: Cardioembolism, Cryptogenic stroke, Cardiac mass, Cardiac tumor, Cardiac shunt, Vegetation, Prosthetic valve, Aortic atherosclerosis, Intracardiac thrombus

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Abbreviations	
2D = Two-dimensional	Prevention and Treatment 4
3D = Three-dimensional	Role of Echocardiography in Evaluation of Sources of Embolism 4
ASA = Atrial septal aneurysm	Appropriate Use Criteria for Echocardiography in Evaluation of Cardiac Sources of Emboli 4
ASD = Atrial septal defect	Appropriate Use: Transthoracic Echocardiography (TTE) 4
ASE = American Society of Echocardiography	Appropriate Use: TEE 4
ATS = Aortic thromboembolism syndrome	Uncertain Indication for Use: TEE 5
AVM = Arteriovenous malformation	Inappropriate Use: TTE 5
CES = Cholesterol emboli syndrome	Inappropriate Use: TEE 5
CT = Computed tomography	A Practical Perspective: Echocardiographic Techniques for Evaluation of Cardiac Sources of Embolism 5
IE = Infective endocarditis	Two-Dimensional High-Frequency and Fundamental Imaging 5
LA = Left atrium	Three-Dimensional and Multiplane Imaging 5
LAA = Left atrial appendage	Saline and Transpulmonary Contrast 5
LV = Left ventricle	Color Doppler, Off-Axis and Nonstandard Views and Sweeps 5
MAC = Mitral annular calcification	TTE versus TEE 5
MRI = Magnetic resonance imaging	Recommendations for Performance of Echocardiography in Patients with Potential Cardiac Source of Embolism 8
MV = Mitral valve	Echocardiography Recommended 8
NBTE = Nonbacterial thrombotic endocarditis	Echocardiography Potentially Useful 8
PE = Pulmonary embolism	Echocardiography Not Recommended 8
PFE = Papillary fibroelastoma	TTE versus TEE 8
PFO = Patent foramen ovale	Alternatives to Echocardiography in Imaging Cardiac Sources of Embolism 8
PLAX = Parasternal long-axis	Computed Tomographic or Magnetic Resonance Neuroimaging 8
PSAX = Parasternal short axis	Transcranial Doppler (TCD) 8
RA = Right atrium	Nuclear Cardiology 9
RV = Right ventricle	Chest CT 9
SEC = Spontaneous echocardiographic contrast	Chest MRI 9
TAVR = Transcatheter aortic valve replacement	Recommendation for Alternative Imaging Techniques in Evaluation of Cardiac Sources of Embolism 10
TCD = Transcranial Doppler	Alternative Imaging Recommended 10
TEE = Transesophageal echocardiography	Alternative Imaging Not Recommended 10
TIA = Transient ischemic attack	Thromboembolism from the Left Atrium and LAA 10
TTE = Transthoracic echocardiography	Pathogenesis of Atrial Thrombogenesis and Thromboembolism 10
VSD = ventricular septal defect	Echocardiographic Evaluation of the Left Atrium and LAA 13
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