

# Adult Comprehensive Transthoracic Echocardiography (TTE) Protocol

## Content Applies To: All Mayo Clinic Echocardiography Laboratories

### Scope

This protocol is to be used as a guideline for Echo Lab Staff performing TTE procedures in all Mayo Clinic Echocardiography Laboratories.

### Purpose

This protocol is intended to provide the minimum components of a standard transthoracic echocardiogram. Practice guidelines for complete and/or focused exams for specific referral diagnoses or findings may be found on the Mayo Clinic Echo Lab web page.

### Protocol

Indications	
Standard Views/Guidelines	<p><b>The images do not need to be obtained in the order listed below.</b> The examination should be performed in a methodical fashion although the order of imaging plane acquisitions and Doppler may vary so as to answer the question at hand in an expeditious fashion.</p> <p>It is also recognized that imaging characteristics of individual patients may preclude certain views and measurements</p> <p>Contrast is indicated for use when two or more segments cannot be visualized adequately for the assessment of LV function (LVEF and regional wall motion assessment) and/or in settings in which the study indication requires accurate analysis of regional wall motion. If a contrast agent cannot be used for technical reasons or if contrast is contraindicated, the report must include a comment suggesting alternative imaging.</p>
Standard 2D Views	<ol style="list-style-type: none"><li>1. Parasternal long axis view</li><li>2. Parasternal short axis views (at the level of the aortic valve, left ventricle at the basal, mid and apical levels)</li><li>3. Ascending aorta view</li><li>4. Right ventricular inflow view</li><li>5. Right ventricular outflow view</li><li>6. Apical four-chamber view</li><li>7. Apical two-chamber view</li><li>8. Apical five-chamber view</li><li>9. Apical long axis view</li><li>10. Dedicated apical right ventricular view</li><li>11. Subcostal four chamber view</li><li>12. Subcostal short axis view (when indicated)</li><li>13. Subcostal IVC/hepatic vein view</li><li>14. Long and/or short-axis views of the abdominal aorta to the level</li></ol>

	of the bifurcation (when indicated) 15. Suprasternal notch view 16. Right parasternal view (when indicated)
2-D, 3D, or M-Mode measurements of the left heart	1. Left ventricular internal dimension and/or volume at end-diastole 2. Left ventricular internal dimension and/or volume at end-systole 3. Left ventricular posterior free wall thickness at end-diastole 4. Ventricular septal thickness at end-diastole 5. LVOT diameter 6. Aortic root dimension or ascending aorta dimension at end-diastole 7. Left atrial volume index at end--systole
Standard Doppler flow evaluations	1. Four cardiac valves – forward flow spectra for each valve, and any regurgitation, shown in at least two imaging planes with color Doppler 2. Expanded assessment of any valve with suspected > mild disease with and without color flow Doppler 3. Use non-imaging Doppler Transducer to assess stenotic valves, valvular regurgitation or whenever indicated 4. LV Diastolic function assessment using a combination of pulsed-wave Doppler and tissue Doppler methods 5. Tricuspid regurgitation spectrum must always be sought with CW Doppler from multiple views for estimation of systolic right ventricular pressure when tricuspid regurgitation is present 6. Atrial and ventricular septa – color Doppler screening for defects 7. Left ventricular outflow tract velocity and TVI 8. Hepatic and pulmonary vein flow spectra (when indicated) 9. For aortic stenosis, the systolic velocity must be evaluated from multiple transducer positions (e.g., apical, suprasternal, right supraclavicular, and right parasternal). This must include interrogation from multiple views with a dedicated non-imaging continuous wave Doppler transducer (at least one clear envelope must be obtained).

## Related Documents

[Mayo Clinic Echocardiography Laboratory Clinical Protocols](#)

[Mayo Clinic Echocardiography Laboratory Standardized Measurements](#)

## References

Oh J.K., Kane, G.K., Seward J.B., Tajik A.J. (2019). *The Echo Manual* (4<sup>th</sup> ed.). Philadelphia: Walters Kluwer.

[Mayo Clinic Echo Lab Website](#)

[IAC-Echocardiography Standards](#)

[ASE Guidelines](#)

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