

TEXAS CHILDREN'S HOSPITAL PEDIATRIC TRANSTHORACIC ECHOCARDIOGRAM PROTOCOL

All initial echocardiograms at Texas Children's Hospital are complete studies. A limited follow up study is generally only performed when the patient has recently undergone a complete echocardiogram and there is no reason to suspect any changes outside the area of interest.

General Examination Protocol

- All echocardiograms must have an order associated with them
- Type of exam (ex: Clinic pt, Inpt, Out pt, portable pt)
- Reason for the exam and suspected diagnosis written on the order
- Date of Birth, height and weight are necessary for the order to be complete
- All echocardiograms will be captured digitally and stored in the Vericis imaging system
- At least 3 beat clips will be obtained. If long sweeps are needed for specific pathology, that is accepted
- Machine settings, transducer selection and patient position will be adjusted as needed to optimize images, color and spectral Doppler
- If sedation is necessary, the appropriate sedation order must be completed and signed by the ordering physician
- Sedation nurses will complete the pre-assessment as needed on sedated patients (per sedation protocol on file)
- All echocardiograms will contain the images and Doppler measurements listed under "Normal Exams". If needed, per the patients particular pathology, additional imaging, measurements and calculations should be obtained

Patient Preparation

- The sonographer is pre-assigned patients for the day.
- Patient charts with previous echo data are available for review by the sonographer and the physician.
- When the patient arrives, the sonographer discusses the patient diagnosis and reason for the echo with the physician.
- Reading physicians in the Echo Lab are able to view echo's being performed (video linked with each machine).
- The sonographers introduces themselves to the patient / parent
- Patient ID is checked according the hospital procedure.
- The patient and parents are escorted by the sonographer into the Echo Lab.
- Patient data is entered on the ultrasound equipment.
- The procedure is explained to the patient/parent. The patient is positioned on the procedure table in the appropriate position for the suspected or known congenital heart disease.
- The appropriate transducer for patient body weight is chosen by the sonographer and appropriate settings are adjusted for optimal imaging.
- If patient had been sedated, the sedation nurse assures that all monitoring equipment is appropriately attached to the patient (ECG, respiration and pulse oximeter)

NORMAL EXAMS:

Parasternal long axis view:

- Parasternal long axis of the left atrium, mitral valve, aortic valve, left ventricle and interventricular septum
- Parasternal 2-D sweep starting at the aorta to the tricuspid valve to the pulmonary valve
- Zoom on the aortic valve
- Obtain measurements of the aortic annulus, aortic root and sinotubular junction at end diastole.
- Color and interrogation of the aortic valve
- Color interrogation of the mitral valve
- Color and spectral Doppler of the tricuspid valve
- Color interrogation of the interventricular septum
- Color and spectral Doppler of the pulmonary valve

Parasternal short axis view:

- Parasternal short axis view of the aortic valve, main pulmonary artery, left atrium, right atrium, tricuspid valve and right ventricle
- Zoom on the aortic valve; visualize all three leaflets
- Color interrogation of the aortic valve
- Visualize the coronary arteries by 2-D and color Doppler to confirm flow
- 2-D sweep from the base of the heart to the apex
- Zoom on the main pulmonary artery and branch pulmonaries
- Take measurements of the pulmonary valve and main pulmonary artery
- Take measurements of the right and left pulmonary arteries
- Color interrogation of the main and branch pulmonary arteries
- Pulse Doppler of the main and branch pulmonary arteries
- Color and spectral Doppler of the tricuspid valve
- If TR is present, obtain peak velocity.
- 2-D sweep from the base of the heart to the apex
- 2-D of left ventricle at the mitral valve and papillary muscle level
- M-mode of the left ventricle
- Show M-mode measurements
- Color sweep of the interventricular septum
- Zoom on the pulmonary valve and main pulmonary artery

Apical four chamber view (inverted and anatomically correct):

- 2-D sweep of the apical four chamber starting posteriorly at the coronary sinus level and sweeping anteriorly to the left ventricular outflow tract and then to the right ventricular outflow tract
- 2-D of the 3 chamber view
- 2-D of the 2 chamber view
- 2-D of the 5 chamber view

- Zoom on the mitral valve; take measurement
- Color interrogation of the mitral valve
- Pulse Doppler of the mitral valve
- Time measurement for MPI
- 2-D of the left ventricular outflow tract
- Color interrogation of the aortic valve and left ventricular outflow tract
- Pulse Doppler of the left ventricular outflow tract
- Time measurement for MPI
- Zoom on the tricuspid valve; take measurement
- Color interrogation of the tricuspid valve
- Pulse Doppler of the tricuspid valve
- Zoom on the left atrium, focusing on the pulmonary veins
- Color interrogation of right upper pulmonary vein
- Pulse Doppler of the vein
- Color interrogation of left lower pulmonary vein
- Pulse Doppler of the vein
- Color interrogation of the interventricular septum
- Strain imaging as needed in this view

Subcostal views:

- 2-D clip of abdominal sites
- Color interrogation of the abdominal aorta in long axis
- Pulse Doppler of the aorta
- Color interrogation of the inferior vena cava
- Pulse Doppler of the vena cava
- Invert images, 2-D sweep of subcostal long axis
- 2-D sweep of the subcostal short axis
- Color interrogation of the superior vena cava
- Pulse Doppler of the vena cava
- Zoom on the atrial septum
- Color interrogation of the atrial septum
- Pulse Doppler of the septum
- Color and Pulse Doppler of the pulmonary veins if attainable
- Color interrogation of the left ventricular outflow tract
- Pulse Doppler of the left ventricular outflow tract
- Color interrogation of the right ventricular outflow tract
- Pulse Doppler of right ventricular outflow tract
- Color interrogation of the interventricular septum

Suprasternal Notch views:

- 2-D short axis views
- 2-D clip of arch sidedness
- Color interrogation of arch sidedness
- Measurement of right pulmonary artery
- Zoom on left atrium
- Color interrogation of the pulmonary veins
- Pulsed Doppler of the pulmonary veins
- 2-D long axis view of the aortic arch; take measurements
- Color interrogation of the arch
- Pulse Doppler of the arch
- Color interrogation for a patent ductus arteriosus