

Arkansas Children's Hospital

Pediatric Transthoracic Echocardiogram Protocol

General Examination Protocol

- All echocardiograms must have a physician signed order/ancillary form associated with them that includes location of the patient (clinic, outpatient, and specific inpatient unit), indication for the exam and referring MDs name, medical record number, and date of birth. Information regarding height, weight, and blood pressure are also necessary for the order to be complete.
- All initial echocardiograms at Arkansas Children's Hospital (ACH) will be complete studies. A limited follow up study will be performed only when the patient has previously undergone a complete echocardiogram at ACH and there is no reason to suspect any changed outside the area of interest.
- All echocardiograms will contain the images and Doppler measurements listed under "Normal Exams" protocol. Depending on the patient's particular pathology, additional imaging, measurements and calculations will be obtained. Deviation from the sequence defined in the "Normal Exam" protocol may occur under the direction of a physician during evaluation of a critically ill patient.
- All echocardiograms will be captured digitally and stored in the Syngo imaging system. Digital clips will include at least 3 beat clips. Longer sweeps are acceptable for delineating specific pathology. If the patient has increased heart rate, clips will be adjusted to reflect seconds rather than beats.
- 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. Cardiology sedation nurses will complete the pre-assessment as needed on sedation patients according to the sedation protocol.

Patient Preparation:

- Use the worklist to select the patient and then enter additional data that is necessary (height, weight, blood pressure, sonographer initials). Then be sure to place the echo order in the Reading Room with the interpreting physicians.
- The sonographer introduces themselves to the patient and the parent(s) or guardian. Patient identifiers (per ACH policy) are used to ensure that the right patient is being subjected to the procedure.

- The procedure is explained to the patient/parent and the patient is positioned on the procedure table in the appropriate position.
- The appropriate transducer is chosen by the sonographer based on patient's size and appropriate settings are adjusted for optimal imaging.
- If the patient has been sedated, the Cardiology sedation nurse assures that the ECG and pulse oximeter are appropriately attached to the patient. Patient is monitored according to ACH Sedation Protocol (on file).
- Physicians in the Reading Room are able to view echo's being performed within the department via live feed with each machine.

Normal Exam Protocol:

Subcostal views:

- Demonstrate abdominal situs
- Sweeps and records from IVC to RA and demonstrates side of cardiac mass
- Sagittal view of IVC and aorta using 2D, color and pulsed wave Doppler, continuous wave appropriate
- Subcostal coronal image sweep from posterior to anterior evaluating flow at all structures.
- Sagittal view of atrial septum
- Color Doppler sagittal view of atrial septum
- Sagittal sweep leftward to cardiac apex

Apical Four Chamber View

- Image is inverted to display it in anatomically correct way
- 2D image of apical four chamber anatomy
- 2D 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
- Color Doppler interrogation of previously described apical four chamber view and sweep
- Pulse Doppler and continuous wave Doppler of mitral valve inflow
- Pulse Doppler and continuous wave Doppler of tricuspid valve inflow
- 2D imaging of left ventricular outflow tract
- Color Doppler of left ventricular outflow tract and aortic valve
- Pulse Doppler of left ventricular outflow tract

- Continuous wave Doppler of left ventricular outflow tract and aortic valve

Parasternal long axis view:

- 2D of the left atrium, mitral valve, aortic valve, left ventricle and interventricular septum
- 2D sweep starting at the aorta to the pulmonary valve
- 2D sweep starting at the aorta to the tricuspid valve
- Color Doppler of aortic valve
- Color Doppler of mitral valve
- Color Doppler sweep from aortic valve to pulmonary valve
- Color Doppler sweep from aortic valve to tricuspid valve
- Color Doppler interrogation of the full length of the interventricular septum

Parasternal short axis view:

- 2D view of the aortic valve, main pulmonary artery, branch pulmonary arteries, left atrium, right atrium, tricuspid valve and right ventricle
- 2D sweep from the base of the heart to the apex
- 2D of left ventricle at the mitral valve and papillary muscle level
- 2D sweep from the mitral valve to the aortic valve
- 2D sweep from the aortic valve to the pulmonary artery
- 2D sweep from the pulmonary artery to branch pulmonary arteries
- Color Doppler interrogation of aortic valve
- Visualize coronary artery origins by 2D and color Doppler to confirm flow
- 2D imaging of pulmonary valve and branch pulmonary arteries
- Color Doppler interrogation of pulmonary valve, pulmonary artery and branch pulmonary arteries
- Pulsed and/or continuous wave Doppler interrogation of pulmonary artery and branch pulmonary arteries
- 2D imaging of tricuspid valve
- Color Doppler interrogation of tricuspid valve
- If TR is present, obtain peak velocity
- Obtain M-mode of the left ventricle and clip store the measurements

Suprasternal notch view:

- 2D short axis view
- 2D view of innominate vein and right SVC with sweep to left to evaluate for left SVC
- 2D clip sweep of arch sidedness

- Color Doppler sweep of arch sidedness
- 2D image of aortic arch long axis
- Color Doppler of aortic arch long axis
- Pulsed wave and/or continuous wave Doppler through transverse to descending aorta
- Ductal view
- 2D imaging of the left atrium to demonstrate pulmonary veins
- Color Doppler interrogation of the pulmonary veins

Concluding the procedure:

- The sonographer will prepare the preliminary electronic report on the imaging system and communicate with the reading physicians when they are done.
- The reading room physician will review the echocardiographic images, and make the required changes to finalize the report and electronically sign the finalized report.
- When the reading room physician is satisfied with all imaging, the sonographer will discharge the patient from the echo lab. The clinic patients will be escorted back to their clinic room by the sonographer.
- The final report can then be found in Meditech under the patient's EMR under the report option, as well as on the Syngo workstations.

***** The below was added per QI meeting on 11/20/2013:**

The complete examination must include the hepatic veins

Apical long axis view on all exams

Aortic root dimension (were appropriate)



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