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**A Practical Approach to Echocardiographic Imaging in Patients with Hypertrophic Cardiomyopathy**

Resting and stress echocardiographic assessment of patients with hypertrophic cardiomyopathy (HCM), or concern for HCM, should follow HCM specific imaging protocol. The following is a practical resource to help develop HCM imaging protocols and provides technical guidance for image and measurement acquisition in this cohort.

**Parasternal**

**B-Mode Long-axis LV**

- 2D measurements and diastole.
- LV myocardium.
- RV posterior wall.
- Measure only compacted myocardium (excludes RV structures).
- Cross-reference with PSSA views.

**B-Mode M-Mode Long-axis LV**

- Evaluate for SAM of the MV leaflets.
- Evaluate leaflet tips throughout the cardiac cycle.
- M-mode may assist with evaluating timing of SAM (blue arrow).
- Scroll slowly through the image to define degree of SAM.

**Color Doppler Long-axis LV focus on MV**

- Evaluate for MR.
- MR is typically posteriorly directed when related to SAM.
- If MR is anteriorly directed, evaluate closely for intrinsic valve disease.

**Apical**

**B-Mode 5C and 3C**

- Focus on MV to evaluate for SAM.
- Note length of the MV leaflets in diastole if LVOT.
- Note severity of SAM.

**B-Mode Measurement of MV leaflets 3C**

- Measure total length of the anterior and posterior leaflets of the MV (yellow lines) from annulus to leaflet tip in diastole.
- Measure the anterior and posterior residual leaflet coaptation length (red lines) in the first frame of systole.
- A3C view is often the optimal view to measure MV leaflets.
- PLAX view is a good alternative.

**CW Doppler 5C and 3C**

- Quantify the severity of obstruction at rest.
- CW Doppler measurement.
  - Peak dynamic gradient.
  - Label, noting location of obstruction (e.g. resting LVOT gradient).
- MR signal can contaminate the LVOT flow acceleration.
- To evaluate for contaminant, move the transducer more laterally and angle the probe to align the CW Doppler beam through the LVOT and aorta, avoiding the left atrium.
- Obtain and label LVOT jet then sweep the probe into the MR jet to highlight differences in velocities and Doppler profiles between the two jets.

**Provocative maneuvers B-mode and Color Doppler 5C and 3C**

- Assess level of dynamic obstruction while patient performs a provocative maneuver (Valsalva) in both the A5 and A3 chamber views.
- Practice the maneuver with the patient.
- Define the best probe position to obtain optimal imaging during provocation.
- Record cine clip while the maneuver is being performed with B-mode and color Doppler to define whether SAM occurs/answers or whether there is another location of worsening obstruction.

**Color Doppler 5C and 3C**

- Evaluate change in MR.
- CW Doppler to evaluate level of obstruction.
- Same as prior view.
- Set color Doppler ROI over the LV and LA to assess the level of obstruction and degree of MR.
- This can be performed at the same time as the B-mode imaging using Color Compare.

- CW Doppler across the LVOT and measure the peak gradient.
- Perform as quickly as possible from the time imaging begins using B-mode and color Doppler to define the LVOT and label.

**Post-exercise**

**B-Mode 5C or 3C**

- Quickly evaluate for SAM.

**Color Doppler 5C or 3C**

- Quick evaluation for SAM.
- Set color Doppler ROI over the LV and LA to assess the imaging sequence level of obstruction and degree of MR.
- This can be performed with B-mode imaging using Color Compare.

**CW Doppler**

- Perform CW Doppler across the LVOT and measure the peak gradient.
- Perform as quickly as possible from the time imaging begins using B-mode and color Doppler to define the LVOT and label.

**Ultrason Enhancing Agents (UEA)**

**Tips:**
- Use to evaluate apical hypertrophy or those with mild to severe outflow obstruction to evaluate for apical aneurysm.
- Can improve accuracy of measured wall thickness in some cases.

**Strain**

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- Measure global longitudinal strain.
- Record parametric “bully-eyes” segmental strain maps for regional patterns in strain.
- Regional longitudinal strain is reduced at sites of hypertrophy and fibrosis.

**Tips:**
- Ensure apical views are not foreshortened.
- Confirm that tracking is moving with the walls to show areas of decreased strain.

**Pre-exercise**

**B-Mode 5C or 3C**

- Evaluate for level of obstruction (SAM with LVOT vs midsystolic vs none).
- Determine which view (5C or 3C) optimally evaluates the LV and LVOT gradient and record cine clip.

**Color Doppler 5C and 3C**

- Color Doppler ROI over the LV and LA to assess the level of obstruction and degree of MR.
- Performance can be evaluated at the same time as the B-mode imaging using Color Compare.

**CW Doppler**

- Evaluate and measure peak velocity across the LVOT valve.
- Performance with LV exercise stress echocardiography views.

**Abbreviations:**

- **2D** = Two-dimensional
- **3D** = Three dimensional
- **PLA** = Parasternal long-axis
- **PSAX** = Parasternal short-axis
- **PSSA** = Parasternal short-axis
- **LV** = Left ventricle
- **RV** = Right ventricle
- **RVOT** = Right ventricular outflow tract
- **SM** = Septal reduction therapy
- **TEE** = Transesophageal echocardiography
- **UA** = Ultrasound enhancing agent

**Access Additional ASE Hypertrophic Cardiomyopathy Resources**