Echocardiographic Evaluation of Thoracic Aorta Disease

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Thoracic Aortic Anatomy

- Common carotid artery
- Anterior scalene muscle
- Phrenic nerve
- Posterior scalene muscle
- Brachial plexus
- Subclavian artery
- Hyrercervical trunk
- Vagus nerve (X)
- 1st rib (cut)
- Brachiocephalic trunk
- Trachea
- Arch of aorta
- Aoogus vein
- Right main bronchus
- Epiaerital bronchus
- Thoracic esophagus
- Esophageal plexus
- Mediastinal pleura (cut edge)
- Anterior vasa velar (cut)
- Inferior vena cava (cut)
- Diaphragm
- Hepatic veins (cut)
- Inferior vena cava
- Right crus of diaphragm
- Inferior phrenic arteries
- Left crus of diaphragm
- Celiac trunk
- Abdominal aorta
- Lungus colli muscle
- Cervical esophagus
- Recurrent laryngeal nerves
- Thoracic duct
- Internal jugular vein (cut)
- Subclavian vein (cut)
- Left brachiocephalic vein (cut)
- Internal thoracic artery (cut)
- Phrenic nerve (cut)
- Common carotid artery
- Subclavian artery
- Vagus nerve (X)
- Left recurrent laryngeal nerve
- Bifurcation of trachea
- Costal plexus (cut edge)
- Left main bronchus
- Descending thoracic aorta
- Mediastinal pleura (cut edge)
- Pericardium (cut edge)
- Diaphragm
- Diaphragmatic pleura
- Abdominal esophagus
- Stomach
Echocardiographic Evaluation of Thoracic Aorta Disease

- Anatomy and TEE Viewing Planes
- Dissections
- Aneurysms
- Evaluation of Aortic Atheromatous Disease
20 STANDARD 2-D TEE VIEWS

a. ME four chamber  b. ME two chamber  c. ME LAX  d. TG mid SAX

e. TG two chamber  f. TG basal SAX  g. ME mitral commissural  h. ME AV SAX

i. ME AV LAX  j. TG LAX  k. deep TG LAX  l. ME bicaval

m. ME RV inflow-outflow  n. TG RV inflow  o. ME asc aortic SAX  p. ME asc aortic LAX

q. desc aortic SAX  r. desc aortic LAX  s. UE aortic arch LAX  t. UE aortic arch SAX

Shanewise et al. Anesth Analg 1999
Epiaortic Aortic Arch Long Axis
Perioperative Echo Assessment of Aortic Dissections

Determine:

- Classification (assists in decisions regarding triage and type of intervention)
  - Origin
  - Distal Extent
- Size
- Intraluminal Thrombus
- Collateral Injury
Echocardiographic Evaluation of Thoracic Aortic Dissection

Classify Type of Aortic Dissection:

- locate origin of intimal tear
- determine distal extent of dissection
Distinguishing True from False Lumen

¿ False Lumen is Larger than True Lumen
Collateral Injury Associated with Thoracic Aortic Dissection: Presence, Severity, and Cause of Aortic Insufficiency

1. Dilation of Annulus due to ascending aorta dilation

2. Annular support rupture and tear at leaflet implantation site

3. Asymmetric dissection and distortion by hematoma

4. Outward intimal prolapse into the LVOT through the AV orifice

5. Prior AV disease
Perioperative Echo Assessment of Aortic Aneurysms

Determine:

- Classification (assists in decisions regarding triage and type of intervention)
  - Origin
  - Distal Extent
- Size
- Intraluminal Thrombus
- Collateral Injury
Crawford Classification of Aortic Aneurysms

**Type I:** distal to left subclavian artery to above the renal arteries

**Type II:** distal to left subclavian artery to below left renal artery

**Type III:** 6th IC space to below left renal artery

**Type IV:** total abdominal aortic aneurysm - 12th IC space to iliac bifurcation

**Type V:** 6th IC space to just above the renal arteries
Thoracic Aortic Atheromatous Disease

- Strong risk factor for periop CVA (2-3%) following surgical manipulation (cannulation, cross-clamp, anastomosis)

- High sensitivity and specificity of TEE and epiaortic echo

- Aortic atherectomy, ascending aortic replacement, use of long aortic cannulae to prevent wall sandblasting hypothermic arrest, off-pump
Epiaortic Echo & Aortic Atheroma

Aortic Arch
Grade IV

Ascending Aorta
Grade IV