Vascular TEE views

14 safety check guideline views
Including Aortic Arch views
Transesophageal echocardiography (TEE) is being used in cardiothoracic surgery and interventional cardiology to create vascular views before and during cardiac surgery. Knowledge on the presence and localization of atherosclerotic plaques helps the surgeon to determine the safest surgical approach.

However, due to the position of the air-filled trachea, between the thoracic aorta and the TEE-probe, visualization of the distal ascending aorta (DAA) and Arch is impossible or mostly limited. The DAA is the part where cannulation and cross-clamping takes place and where atherosclerotic plaques are most prevalent as a source of embolisms known to be the cause of stroke.

A-View is used to overcome the limitation of the so called ‘blind spot’ of TEE. After introduction of the saline filled catheter in the trachea, echo conduction through the trachea is enabled and the ascending aorta, aortic arch and its branching vessels can be imaged. For more information about A-View see our website.

The TEE safety check contains 14 TEE views of which 6 imaged with A-View TEE. This guide will support you to obtain the best vascular views.

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Overview Vascular TEE Views

Legend

- Change omniplane angle
- Rotate probe left
- Rotate probe right
- Increase probe depth
- Decrease probe depth

4C: Four Chamber
AA: Ascending Aorta
Arch: Aortic Arch
AV: Aortic Valve
BV: Branch Vessels
DA: Descending Aorta
DAA: Distal Ascending Aorta
IA: Innominate Artery
LAX: Long Axis
LCA: Left Carotid Artery
LSCA: Left Subclavian Artery
ME: Mid-Esophageal
SAX: Short Axis
UE: Upper-Esophageal
1. ME Descending Aorta SAX

**Structures to identify**

| DA: Descending Aorta |

**To obtain this view**

- Insert the probe to the ME, sector depth 10-12 cm, angle 0°
- Turn probe to left to find the Aorta
- Put Aorta in middle of display
- Decrease depth to 5 cm
- Advance and withdraw probe

**Diagnostic issues**

- Aortic Pathology
- Intra-Aortic Balloon Pump position
- Left Pleural Effusion
- Color flow reversal: aortic insufficiency (AI severity)
2. ME Descending Aorta LAX

**Structures to identify**

- **DA:** Descending Aorta

**To obtain this view**

- Insert the probe to the ME, sector depth 4-6 cm
- Find Descending Aorta SAX (0°) view
- Keep probe tip still, rotate omniplane angle to 90-100°
- Aortic walls appear in parallel

**Diagnostic issues**

- Aortic Pathology
- Intra-Aortic Balloon Pump position
- Color flow reversal: Aortic insufficiency (AI)
3. UE Aortic Arch LAX

**Structures to identify**
- Arch: Aortic Arch

**To obtain this view**
- Insert the probe to the ME, sector depth 4-6 cm, angle 0°
- Find ME Descending Aorta SAX (0°) view
- Withdraw probe until aorta changes into oval shape
- Turn probe slightly to the right

**Diagnostic issues**
- Aortic Pathology
- Color flow reversal: aortic insufficiency (AI)
4. UE Aortic Arch SAX

**Structures to identify**
- **Arch**: Aortic Arch
- **IV**: Innominate Vein
- **PA**: Pulmonary Artery
- **PV**: Pulmonary Valve

**To obtain this view**
- Insert probe to the ME, sector depth 10 -12 cm, angle 0°
- Find the UE Aortic Arch LAX (0°) view
- Withdraw the probe to obtain the UE Aortic Arch LAX (0°) view
- Rotate the omniplane angle to 60-90°
- Bring the pulmonic valve and pulmonary artery in view

**Diagnostic issues**
- Aortic Dissection
- Atherosclerotic Disease
- Extracorporeal Circulation (ECC)
- Pulmonary Embolus
5. UE Left Subclavian Artery SAX

**Structures to identify**
- Arch: Aortic Arch
- LSCA: Left Subclavian Artery

**To obtain this view**
- Find UE Aortic Arch SAX view (90°)
- Withdraw the probe slightly turned to the left
- Use color Doppler

**Diagnostic issues**
- Atherosclerotic Disease
- Aortic Dissections
- Vascular Devices
6. ME Aortic Valve LAX

**Structures to identify**
- AV: Aortic Valve
- LA: Left Atrium
- LVOT: Left Ventricular Outflow Tract
- PAA: Proximal Ascending Aorta
- RVOT: Right Ventricular Outflow Tract

**To obtain this view**
- Insert the probe in the ME, sector depth 14 cm
- Find ME LAX view (120°)
- Decrease depth to focus on aortic root
- View can be obtained from ME AV SAX (30-60°)
- Rotate omniplane angle to 120-150°
- LVOT, AV, Proximal Ascending Aorta line up
- Optimize aortic annulus and make the sinus of Valsalva symmetric

**Diagnostic issues**
- Aortic Valve Disease
- Aortic Root Dimensions and Pathology
- LVOT Pathology
- Mitral Valve Disease
- Ventricular Septal Defect (VSD)
7. ME Ascending Aorta SAX

**Structures to identify**
- AA: Ascending Aorta
- PA: Pulmonary Artery
- RPA: Right Pulmonary Artery
- SVC: Superior Vena Cava

**To obtain this view**
- Insert the probe to the ME, sector depth 10-12 cm, angle 0°
- From ME AV LAX (120°)
- Withdraw probe and rotate omniplane angle back to 0°

**Diagnostic issues**
- Pulmonary Artery Pathology
- Pulmonary Embolus
- Ascending Aorta Pathology
- Swan-Ganz in SVC
8. ME Ascending Aorta LAX

**Structures to identify**  
AA: Ascending Aorta  
RPA: Right Pulmonary Artery

**To obtain this view**  
- Insert the probe to the ME, sector depth 8-10 cm, angle 0˚  
- Find the ME AV LAX (120˚)  
- Withdraw probe to bring the Right Pulmonary Artery in view  
- Decrease omniplane angle slightly by 10-20˚ to make the aortic wall symmetric

**Diagnostic issues**  
- Aortic Pathology  
- Pericardial Effusion  
- Pulmonary Embolus
Starting point for A-View Views:

1. Find the ME Ascending Aorta SAX view, withdraw the probe to the UE, sector depth 10 cm, angle 30°
2. Anteflex probe slightly
3. Withdraw the probe till entering the blind spot area
4. Leave the probe in this position and insert the A-View
5. Proceed to obtain the following 6 views
9. UE Distal Ascending Aorta SAX A-View

**Structures to identify**
- DAA: Distal Ascending Aorta
- RPA: Right Pulmonary Artery
- T: Trachea with A-View

**To obtain this view**
- Find ME AA SAX
- Withdraw probe slightly to UE position, with sector depth 10 cm, angle 0-30°
- The trachea will become visible or the right or left bronchus
- Keep the aorta centered midfield, this is important as it is the starting view

**Diagnostic issues**
- Atherosclerotic Disease
- Aortic Dissection
- Pulmonary Embolus
10. UE Distal Ascending Aorta LAX A-View

<table>
<thead>
<tr>
<th>Structures to identify</th>
<th>To obtain this view</th>
<th>Diagnostic issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: Anterior</td>
<td>• Find UE DAA SAX</td>
<td>• Atherosclerotic Disease</td>
</tr>
<tr>
<td>DAA: Distal Ascending Aorta</td>
<td>• Withdraw probe slightly to UE position, with the sector depth 10 cm, angle 0-30°</td>
<td>• Aortic Dissection</td>
</tr>
<tr>
<td>P: Posterior</td>
<td>• The trachea will become visible or the right or left bronchus</td>
<td>• Pulmonary Embolus</td>
</tr>
<tr>
<td>RPA: Right Pulmonary Artery</td>
<td>• Keep the Aorta centered before rotate to 60°</td>
<td></td>
</tr>
<tr>
<td>T: Trachea with A-View</td>
<td>• Aorta will become visible as a tube directed to the right upper screen position</td>
<td></td>
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</tbody>
</table>

- DAA: Distal Ascending Aorta
- P: Posterior
- RPA: Right Pulmonary Artery
- T: Trachea with A-View

- UE: Upper Extremity
- SAX: Short Axis View
- A-View: Anterior Lateral View
# 11. UE Aortic Arch LAX A-View

![Aortic dispersion cannula](image)

## Structures to identify
- **DAA**: Distal Ascending Aorta
- **T**: Trachea with A-View

## To obtain this view
- Find UE DAA SAX (0°) view, sector depth 6-8 cm
- Keep the trachea centered
- Only move the probe, A-View remains in the same location
- Use color Doppler to verify arterial flow

## Diagnostic issues
- Atherosclerotic Disease
- Aortic Dissection
- Extracorporeal Circulation (ECC)
- Vascular Devices (cannulation and flow)
### 12. UE Branch Vessels LAX A-View

<table>
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<tr>
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<th>To obtain this view</th>
<th>Diagnostic issues</th>
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<tbody>
<tr>
<td>IA: Innominate Artery</td>
<td>• Find the UE Aortic Arch LAX (0˚) view</td>
<td>• Atherosclerotic Disease</td>
</tr>
<tr>
<td>LCA: Left Carotid Artery</td>
<td>• Position sector depth 6-8 cm, withdraw the probe slightly</td>
<td>• Aortic Dissection</td>
</tr>
<tr>
<td>T: Trachea with A-View</td>
<td>• Use color Doppler to verify arterial flow</td>
<td>• Extracorporeal Circulation (ECC)</td>
</tr>
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<td></td>
<td></td>
<td>• Antegrade Cerebral Perfusion</td>
</tr>
</tbody>
</table>
### 13. UE Innominate Artery LAX A-View

<table>
<thead>
<tr>
<th>Structures to identify</th>
<th>To obtain this view</th>
<th>Diagnostic issues</th>
</tr>
</thead>
</table>
| IA: Innominate Artery  | • Find the UE Aortic Arch LAX (0°) view  
| T: Trachea with A-View | • Position sector depth 6-8 cm, withdraw the probe slightly and turn probe to the right  
|                         | • Use color Doppler to verify arterial flow | • Atherosclerotic Disease  
|                         |                                   | • Aortic Dissection  
|                         |                                   | • Extracorporeal Circulation (ECC)  
|                         |                                   | • Antegrade Cerebral Perfusion  
|                         |                                   | • Vascular Devices |
# 14. UE Left Carotid LAX A-View

<table>
<thead>
<tr>
<th>Structures to identify</th>
<th>To obtain this view</th>
<th>Diagnostic issues</th>
</tr>
</thead>
</table>
| **LCA:** Left Carotid Artery | • Find the UE Aortic Arch LAX (0°) view  
• Slightly withdraw and rotate the probe to the left  
• Use color Doppler to verify arterial flow | • Atherosclerotic Disease  
• Aortic Dissection  
• Extracorporeal Circulation (ECC)  
• Antegrade Cerebral Perfusion  
• Vascular Devices |
| **T:** Trachea with A-View |                     |                   |
Advanced user guidance

Below suggestions address specific situations. Please consult the “Instructions for Use” for routine application of A-View®.

To verify positioning of the A-View
The optimal position of the A-View catheter is in the distal trachea and the left main bronchus, although this correlation to the position of the aorta might vary according to patient anatomy. Below image shows the position of A-View in the trachea and the left main bronchus. (A) Placement into the left main bronchus, (B) TEE view of carina, and (C) placement into the right main bronchus.

Difficulties to obtain distal ascending aorta views?
Check the following:
1. **Is the A-View balloon adequately filled?** Obtain an echo view of the trachea, the balloon should be aligned with the trachea wall, without any space in between. Adding additional saline should result in improved views.
2. **Is the ET tube inserted too deep?** In case of a small patient e.g. short trachea, not enough room is left outside the ET tube for the balloon to be correctly positioned / inflated
3. **Is the A-View located in the right or left main bronchus?**
   a) In short patients, view from the main bronchus is most effective
   b) In tall patients, view through the carina or trachea is suggested
4. **Is the aorta positioning altered?** For example a retracting sling around the aorta or a cross-clamp can impede TEE effectiveness.

Difficulties to obtain the aortic arch and branch vessels?
For the targeted anatomy, A-View balloon and TEE probe must be aligned to obtain effective views. If the TEE probe is sufficiently retracted cranially and still no accurate view can be obtained; the A-View catheter might be placed too deep. This might be due to a short trachea (e.g. small stature of the patient) or the ET tube being positioned too deep.
To enable the missing views:
1. Empty the A-View balloon
2. Empty the ET cuff
3. Withdraw the ET tube 2-3 cm
4. Retract the A-View catheter 2-3 cm, align the 24 cm mark on A-View and ET tube
5. Refill the A-View sufficiently
6. Obtain the view: position TEE probe according to the guidelines

Legend:
1. Right main bronchus
2. Left main bronchus
3. Trachea
4. Carina
5. ET tube
6. A-View®
7. A-View® into the left main bronchus
8. A-View® at the carina
9. A-View® into the right main bronchus