Complete Intraoperative Basic TEE Examination

Pre-Cardiopulmonary Bypass Views

1. ME AV SAX

2. ME AV LAX

3. ME AV LAX with CFD of AV

4. ME Bicaval

5. ME RV inflow-outflow

6. ME RV inflow-outflow with CFD of PV

7. ME Four Chamber

8. ME Four Chamber with CFD of MV

9. ME Four Chamber with CFD of TV

10. ME Two Chamber

11. TG Mid SAX

12. TG Two Chamber

Separation Views

1. ME Four Chamber

2. ME Four Chamber with CFD of MV

3. ME Four Chamber with CFD of TV

4. ME Two Chamber

5. TG Mid SAX

6. TG Two Chamber

Post Chest Closure Views

1. ME Four Chamber

2. ME Two Chamber

3. TG Mid SAX

4. TG Two Chamber

Basic Cross Section Criteria

At least three key structures are needed to define the imaging plane for the view. In general all key structures must be demonstrated or would be if imaging artifacts were not present (e.g. shadowing from calcium deposition or shadowing and reverberations from a mechanical bioprosthesis).

ME AV SAX

Angle (~ 40°-60°) Sector Depth (~ 8 cm)

Primary Diagnostic Issue
Aortic Stenosis

Required Structures
Three Leaflets
Commisures
Coaptation Point

ME AV LAX

Angle (~ 110°-140°) Sector Depth (~ 8 cm)

Primary Diagnostic Issue(s)
Aortic Insufficiency
Aortic Pathology (Ascending and Root)

Required Structures
LVOT (At least 1 cm proximal to the Aortic Valve)
Aortic Valve
(Visualized cusps approximately equal in size)
Ascending Aorta
(At least 1 cm distal to the Sinotubular Junction)

ME Bicaval View

Angle (~ 110°) Depth (~ 10 cm)

Primary Diagnostic Issue(s)
Atrial Septal Defect
Tumor

Required Structures
Right Atrial Freewall(or Appendage)
Superior Vena Cava (At least its entry into the right atrium)
Inter Atrial Septum

ME RV inflow-outlow

Angle (~ 60°-80°) Sector Depth (~ 10 cm)

Primary Diagnostic Issue(s)
Pulmonic Valve Disease
Pulmonary Artery Pathology
RVOT Pathology

Required Structures
Pulmonic Valve
Main Pulmonary Artery
(At least 1 cm distal to the Pulmonic Valve)
RVOT
(At least 1 cm proximal to the Pulmonic Valve)

ME Four Chamber

Angle (~ 0 - 20°) Sector Depth (~ 14 cm)

Primary Diagnostic Issue(s)
Atrial Septal Defect
Chamber Enlargement/ Dysfunction
Mitral Disease
Tricuspid Disease

Required Structures
Left Atrium
Left Ventricle
Mitral Valve
Tricuspid Valve

ME Two Chamber

Angle (~ 90°) Sector Depth (~ 14 cm)

Primary Diagnostic Issue(s)
Left Atrial Appendage Mass/Thrombus
LV Apex Pathology
LV Systolic Dysfunction
(Apical Segments)

Required Structures
Left Atrial Appendage
Mitral Valve
Left Ventricular Apex (i. e. maximum LV length)

TG Mid SAX

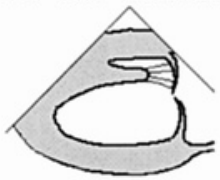
Angle (~ 0°) Sector Depth (~ 12 cm)

Primary Diagnostic Issue(s)
Hemodynamic Instability
LV Enlargement
LV Hypertrophy
LV Systolic Dysfunction
(Global and Regional)

Required Structures
Left Ventricle Cavity
Left Ventricular Walls
(at least 50% of circumference with visible endocardium)
Papillary Muscles
(approximately equal in size and distinct from ventricular wall)

TG Two Chamber

Angle (~ 90°) Sector Depth (~ 12 cm)



Primary Diagnostic Issue(s)
LV Systolic Dysfunction
(Basal Segments)

Required Structures
Mitral Leaflets
Mitral Subvalvular apparatus
Left Ventricle (Basal + Mid Segments

Interpretation Form for Initial Basic TEE Examination

Patient Information **Date of Surgery** _____

Anesthesia Attending _____

Left Atrium ○ Normal **Enlargement** ○ None ○ Trivial or Mild ○ Moderate or Severe

Comments

Right Atrium ○ Normal **Enlargement** ○ None ○ Trivial or Mild ○ Moderate or Severe

Comments

Right Ventricle ○ Normal **Enlargement** ○ None ○ Trivial or Mild ○ Moderate or Severe

Additonal Dx's ○ Hypertrophy

Systolic Dysfunction ○ None ○ Trivial or Mild ○ Moderate or Severe

Comments

Left Ventricle ○ Normal **Enlargement** ○ None ○ Trivial or Mild ○ Moderate or Severe

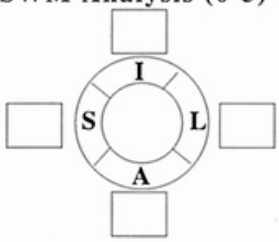
Additonal Dx's ○ Hypertrophy

Fractional Area Change ○ > 35% ○ 20 - 35% ○ < 20%

Systolic Function: Normal to Mild Dysfunction | Moderate Dysfunction | Severe Dysfunction

Comments

SWM Analysis (0-5)*



Miscellaneous Findings

☐ Mobile Ascending Aortic Atheroma
☐ Large Intracardiac Mass/Thrombus
☐ Large Pericardial Effusion (≥ LVEDA)

Miscellaneous Comments

Aortic Valve ○ Normal **Insufficiency** ○ None ○ Trivial or Mild ○ Moderate or Severe

Stenosis ○ None ○ Trivial or Mild ○ Moderate or Severe

Comments

Mitral Valve ○ Normal **Insufficiency** ○ None ○ Trivial or Mild ○ Moderate or Severe

Stenosis ○ None ○ Trivial or Mild ○ Moderate or Severe

Comments

Pulmonic Valve ○ Normal **Insufficiency** ○ None ○ Trivial or Mild ○ Moderate or Severe

Stenosis ○ None ○ Trivial or Mild ○ Moderate or Severe

Comments

Tricuspid Valve ○ Normal **Insufficiency** ○ None ○ Trivial or Mild ○ Moderate or Severe

Stenosis ○ None ○ Trivial or Mild ○ Moderate or Severe

Comments

Reference Information for Basic Interpretation Form

Left Atrium/Right Atrium
ME 4 Chamber
Diameter (at end ventricular systole)
Ant-Posterior or Med-Lateral Diameter
Normal: 38 ± 6 mm
Trivial & Mild: 44 - 50 mm
Moderate & Severe: > 50 mm

Right Ventricle
ME 4 Chamber or ME Mid Sax
Size (at end diastole)
Normal: ≈2/3 of LV Size
Trivial & Mild: 2/3 - LV Size
Moderate & Severe: > LV Size
Hypertrophy: > 9 mm at end diastole
Assume Normal LV Size

Left Ventricle
ME Mid Sax
Ant-Posterior Diameter (at end diastole)
Normal: 43 ± 7 mm
Trivial & Mild: 50 - 57 mm
Moderate & Severe: > 57 mm
Hypertrophy: > 11 mm at end diastole

Aortic Valve

Aortic Insufficiency

Color Flow Doppler	Trivial	Mild	Moderate	Severe	View-Axis	Technique
Jet Height to LVOT Height Ratio (%)	1 - 24	25-46	47-64	≥ 65	AV-Long	CFD

Findings Associated with Moderate & Severe AI

Abnormal Valve Structure	Dilated Aortic Root	Fluttering of IVS and Anterior MV Leaflet
Premature AV Opening	Premature MV Closure	Reverse Doming of Anterior MV Leaflet
LV Overload/Dilation	Non-coapting Valve Cusps	Pre-systolic Mitral Regurgitation

Aortic Stenosis

General Criteria	Mild	Moderate	Severe	View-Axis	Technique
Aortic Valve Area (cm^2) (Normal 2-4)	1.2-2.5	0.75-1.2	< 0.75	ME AV-SAX	Planimetry

Findings Associated with Moderate & Severe AS

Calcium Deposition LV Hypertrophy LV Systolic Dysfunction Post-stenotic Dilation

Mitral Valve

Mitral Insufficiency

Color Flow Doppler	Trivial	Mild	Moderate	Severe	View-Axis	Technique
Width of Vena Contracta (mm)	< 2	< 4	4 - 5	> 5	4C	CFD

Findings Associated with Moderate & Severe MR

Failure of coaptation	Left Atrial Enlargement	Eccentric Jet
Increase in Left Atrial size in systole	Left Ventricular Enlargement	Jet enters pulmonary veins or LAA
Interatrial Septum bulges to right	Large PISA	Jet circles atrium

Mitral Stenosis

Findings Associated with Moderate & Severe MS

Abnormal Valve Structure	Calcium Deposition	Restricted Motion	Doming of MV Leaflets
Left Atrial Enlargement	Small LV Size	Decreased AV Motion	

Pulmonic Valve

Pulmonic Insufficiency (Color flow Doppler guidelines similar to aortic insufficiency (No validation.))

Findings Associated with Moderate & Severe PI

Right Atrial Enlargement Right Ventricular Enlargement Dilated Pulmonary Root

Tricuspid Valve

Tricuspid Insufficiency (Color flow Doppler guidelines similar to mitral regurgitation (No validation.))

Findings Associated with Moderate & Severe TR

Right Atrial Enlargement	Jet circles atrium	Large PISA
Right Ventricular Enlargement	Eccentric Jet	Interatrial Septum bulges to left
Increase in Right Atrial size in systole	Failure of coaptation	Inc. RV ejection

Segmental Wall Motion Analysis

Score	Description	Radial Shortening (Center to Endocardium)	Wall Thickening (Endocardium to Epicardium)
0	Not Evaluated/Interpretable	NA	NA
1	Normal	> 30 %	+++
2	Mild Hypokinesis	10 - 30 %	++
3	Severe Hypokinesis	< 10 %	+
4	Akinesis	No Radial Shortening	None
5	Dyskinesis	Radial Enlargement	Myocardial Thinning

The preceding tables and images are from the highly recommended article

Miller JP, Lambert AS, Shapiro WA, et al. The adequacy of basic intraoperative transesophageal echocardiography performed by experienced anesthesiologists. Anesth Analg 2001, 92:1103-10.