ECHO SCREENING OF CONGENITAL HEART DISEASE

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Let’s watch this case
The fundamental principle of segmental analysis of CHD is to analyze each component of the heart in sequential step by step fashion.

Analysis of CHD is based upon an understanding of the developmental, morphologic and segmental anatomy the heart and great vessels.

The cardiac segments are the anatomic and embryologic “building blocks” that form the mammalian heart.

**The three main segments are:**

(i) veins and atria;
(ii) ventricles;
(iii) great arteries.

**There are two connecting segments** between the main segments:

(i) the atrioventricular (AV) canal;
(ii) the conus or infundibulum
• **First**, Situs of the abdominal and thoracic organs is defined and the position of the heart is described.

• **Then**, each of the five cardiac segments is examined, described Based upon its unique morphologic features, independent of neighboring segments.

• **Finally**, a complete set of diagnoses is formulated by combining the five cardiac segments and all associated cardiovascular anomalies.
1. Thoraco-abdominal situs

[Situs Solitus] [Situs Inversus] [“Situs Ambiguous”]

- Bilateral right morphology
- Bilateral left morphology
- Bilaterally trilobed
- Bilaterally bilobed
- Liver
- Spleen
- Stomach
2. CARDIAC POSITION

Levocardia  Mesocardia  Dextrocardia

3. Segment-by-segment Analysis Of Cardiac Anatomy

At this stage, the three main segments and the two connecting segments are analyzed individually.
4-Atrial situs

Right atrial morphology

Left atrial morphology
Types of Visceral and Atrial Situs

Situs Solitus

Situs Inversus

“Situs Ambiguous”

5-Ventricular loop
Features of the morphologic RV:

- Coarse trabeculae with prominent septal band, parietal band, and moderator band.
- No septal attachments of the mitral valve.
- Well-developed infundibulum resulting in fibrous discontinuity between the tricuspid and semilunar valves.

Features of the morphologic LV:

- Smooth septal surface, fine trabeculae.
- No septal attachments of the mitral valve.
- No infundibulum resulting in fibrous continuity of the mitral and semilunar valves.

6. ATRIOVENTRICULAR ALIGNMENTS AND CONNECTIONS
7-Ventriculo-arterial alignments
A. Concordance
B. Discordance
C. Double-inlet LV
D. Ticuspid atresia: absent right A-V connection

8-TYPE OF INFUNDIBULUM (CONUS)
9. RELATIONSHIP BETWEEN SEMILUNAR VALVES

10. ASSOCIATED ANOMALIES.

Once the three main cardiac segments and the two connecting segments have been evaluated and categorized, all associated cardiovascular anomalies are systematically examined and described.
Normal pediatric Echocardiogram

The five standard views of a pediatric echocardiogram, as defined by the ASE, are all employed as part of a routine examination: subxiphoid (subcostal), apical, parasternal (left parasternal), suprasternal notch and right parasternal.

A complete examination requires that the cardiovascular structures be imaged from multiple orthogonal planes. This practice minimizes artifacts due to false “dropout” and shadowing.
Serial images of subxiphoid long-axis
Serial images of parasternal short-axis sweep

Suprasternal long axis view
Suprasternal short axis view

Image of right parasternal longitudinal view
Take Home Messages:

• Sequential step by step segmental analysis of the heart component
• Consider you are building a structure form The cardiac segments blocks, so be careful !!
• A complete examination requires images from multiple orthogonal planes by five standard views of pediatric echocardiography.

Thank you