

**17TH ANNUAL CANADIAN ECHO WEEKEND
APRIL 23-25, 2015
TORONTO, ON**

**Session Title: Adult Congenital Heart Disease: From A to Z
Presentation: Fear Not! A Segmental Approach
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OBJECTIVES: What questions or points will participants learn or discuss?

- 1. To understand the philosophy of the segmental approach to describe the cardiac anatomy in congenital heart disease.**

- 2. To understand the basic terms of terminology in congenital heart disease.**

- 3. To identify the three segments of the heart and to describe their connections.**

DISCUSSION: Please provide a summary of the discussion and/or include 3 to 6 key presentation slides.

1. Background

In order to understand the simplest and the most complex congenital cardiac malformations, a standardized, systematic approach is required to describe the anatomy, morphology and connections between the atria, ventricles and great arteries. The sonographers and physicians must be familiar with the terminology used in congenital heart disease in order to appropriately communicate and to avoid misunderstanding. All patients including those with simple defects undergo the same systemic, rigorous analysis.

2. Segmental analysis

The heart is divided in three segments: 1) the atria, 2) the ventricles and 3) the great arteries. Each chamber has its intrinsic, morphologic feature and each heart is described in a sequential manner: 1) arrangement of the right and left atria (cardiac situs); 2) ventricular morphology (right / left ventricle); 3) atrio-ventricular connection (concordant / discordant / isomeric / univentricular); 4) great arteries (pulmonary artery, aorta, common arterial trunk); 5) ventriculo-arterial connection (concordant / discordant); 6) associated cardiac malformations. Finally, describe the cardiac position of the heart within the chest (levo-/meso-/dextroposition) and cardiac orientation or base-apex axis (levocardia, mesocardia, dextrocardia). *'Right' and 'left' always refer to morphology; rightness and leftness NEVER refer to the position of a chamber.*

3. Tips and tricks

- WYSIWID: What You See Is What You Describe.
 - Atrial morphology: The atrial appendages are the landmark for morphologic rightness and leftness of the atria (by TEE). The identification of the morphologic right atrium (RA) by TTE, however, is best assessed by the connection between the systemic veins and RA; the systemic veins constantly connect to the morphologic RA (in contrast to the pulmonary veins). Inject *agitated saline* into the right/left arm to identify the RA.
 - Atrial and abdominal situs are usually concordant.
 - Ventricular loop (D-loop / L-loop): Looping is best described in the apical 4-chamber view. D-loop: inflow portion of the morphologic right ventricle (RV) lies to the *right* of the morphologic left ventricle (LV); L-loop: inflow portion of the morphologic RV lies to the *left* of the morphologic LV. Looping CANNOT be accurately determined in the parasternal short-axis view (this view visualizes the relation of the pulmonary artery trunk to the aorta).
 - Univentricular heart/AV-septal defect: There is NO tricuspid/mitral valves in this setting; the AV – valves are called right-sided / left-sided AV-valve.
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CONCLUSIONS:

1. **Knowledge and full understanding of the terminology (language in congenital heart disease), of the anatomy and morphology are essential in order to adequately describe a congenital heart defect.**
 2. **The systematic, segmental approach is the key to successfully describe simple and complex congenital heart defects.**
 3. **Surgical notes have to be reviewed prior to scanning a congenital heart disease patient in order to tailor the study and acquisition of the images (most patients underwent surgical procedures). Sonographers and physicians have to be familiar with the surgical / interventional procedures which are frequently named after a physicians / surgeons.**
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REFERENCES: (journals, websites, etc.)

http://www.cachnet.org/achd_index.html

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Ho SY, et al. Anatomic/echocardiographic correlates: an introduction to normal and congenitally malformed hearts. *Heart* 2001; 86 (Suppl II):ii3-ii11

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Schallert EK, et al. Describing Congenital Heart Disease by Using Three-Part Segmental Notation. *Radiographics*; 33:E33-E46.
