Abnormalities of the Outflow Tracts

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Benefit of Prenatal Diagnosis

The three types of malformations in which prenatal diagnosis has been shown to be beneficial are Coarctation of the Aorta, Hypoplastic Left Ventricle, and Transposition of the Great Arteries.

How Effective Is Screening?

5190 consecutive newborns examined with echocardiography

26.6

27/1,000 or 2.7% or 1 in 37
Outflow Tracts

2009

Outflow Tract Anomalies
- Tetralogy of Fallot
- Transposition of the Great Arteries
- Double Outlet Right Ventricle
- Common Arterial Trunk
- Mild Semilunar Valve Stenosis
- Aortic Arch Abnormalities

Outflow Tract Abnormalities Associated With A NORMAL Four-Chamber View
Obstetric Ultrasound Examinations

Four-Chamber View
Left Outflow Tract
Right Outflow Tract

Sweep Technique

Sweep Views

Stomach
4-Chamber
LVOT

RVOT
Tracheal
Effect of Fetal Position on the 4-Chamber and Outflow Tract Views
You Have To Remember 16 Different Positions for Each of the 5 Views or 80 Different Configurations

How Do You Decrease the Configurations From 80 to 20
Do Not Examine the Fetal Heart When the Fetus is in These Positions

5 Different Positions and 25 Configurations

FLIP the IMAGE

4 Different Positions and 20 Configurations
4 Different Positions and 20 Configurations

Other Views

Outflow Tracts

Outflow Tracts

Rotation Technique

Short-Axis View

Aortic Arch View
Outflow Tracts
Rotation Technique

Cardiac Z-Score Measurements

Z-Scores

The use of Z-scores in the analysis of fetal cardiac dimensions.

The use of Z-scores for fetal cardiac dimensions from echocardiography.

The use of Z-scores in the analysis of fetal cardiac dimensions.

Development of Z-scores for fetal cardiac dimensions from echocardiography.

Schneider C, McCrindle BW, Carvalho JS, Hornberger LK, McCarthy KP, Daubeney PE.
Brompton Fetal Cardiology, Royal Brompton Hospital, London, UK.

Devore GR.
Fetal Diagnostic Center, Suite 206, 301 South Fair Oaks Ave., Pasadena, CA 91105, USA.
fetalecho.com
The standard score is:

\[ z = \frac{x - \mu}{\sigma} \]

where:
- \( x \) is a raw score to be standardized;
- \( \mu \) is the mean of the population;
- \( \sigma \) is the standard deviation of the population.


Development of Z-scores for fetal cardiac dimensions from echocardiography.

Schneider C, McCrindle BW, Carvalho JS, Hornberger LK, McCarthy KP, Daubeney PE.

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**Z-Scores**

<table>
<thead>
<tr>
<th>Z-Scores</th>
<th>T-Scores</th>
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<tr>
<td>-4.0</td>
<td>20</td>
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<tr>
<td>-3.0</td>
<td>20</td>
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**Aortic Arch**

- IVC

**BPD**

- FL

** Weeks Gestation**

**Left Outflow Tract**

**BPD**

- FL

** Weeks Gestation**

**Main, Right and Left Pulmonary Arteries**

**BPD**

- FL

** Weeks Gestation**
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Z-Scores

Figure 1: This is from the Microsoft Excel spreadsheet that can be downloaded from the journal’s website. To view the computed Z-score, the user enters the biometric measurement (Step 1) and the measured cardiac structure (Step 2) and then reads the Z-score (Step 3).

http://www.fetalecho.com
Coarctation of the Aorta

Tetralogy of Fallot

Normal 4-Chamber View

Tetralogy of Fallot

Aortic Arch with Suggestion of Coarctation Shelf

Tetralogy of Fallot

Normal VSD

Overriding Aorta

VSD Overrides the Aorta

Tetralogy of Fallot

Weeks Gestation

Aortic Root Diameter (cm)

Schneider, 2005
**Tetralogy of Fallot**

- Normal
- Small Pulmonary Artery

**Double Outlet Right Ventricle**

- Normal
- Double Outlet Right Ventricle (DORV)

**D-Transposition**

- Normal
**Moderate Aortic Stenosis**

- Aorta: 110 cm/s
- Main Pulmonary Artery: 61 cm/s

**Hypoplastic Left Heart**

- Arduini, 1995

**Hypoplastic Left Heart Syndrome**

- Normal
- Hypoplastic Left Heart Syndrome

- Images show different views of the heart, including:
  - Abdomen
  - Four-Chamber View
  - Tracheal View
Severe Aortic Stenosis

Four-Chamber View

LA
RA
RV
LV

Bright Endocardium

Aorta

Four-Chamber View

Five-Chamber View
Severe Aortic Stenosis

Sweep

Severe Aortic Stenosis

Four-Chamber View

Reverse Flow FO

Severe Aortic Stenosis

Five-Chamber View

Mitral Regurgitation

Severe Aortic Stenosis

Sweep
Thank You