

Caution in the Interpretation of Z-Scores in Patients with Pulmonary Atresia with Intact Ventricular Septum

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Introduction

A common means of expressing how far an observed measurement deviates from the normal is through the use of Z-scores. Z-scores are applied widely in the interpretation of echocardiographic data, and clinical decisions are often based upon them. However, they are extremely sensitive to the properties of the 'normal' population from which they are derived, and also amplify errors in measurement. This study sought to gauge the impact of observer variability on z-scores for a study population with a hypoplastic right heart.

Methods

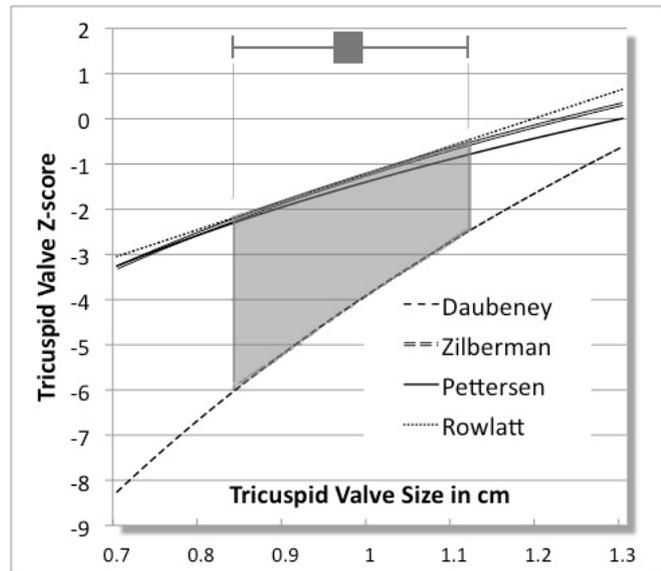
The echocardiograms of 18 consecutive neonates at this institution with pulmonary atresia and intact ventricular septum (PAIVS) were reviewed. Measurements on the tricuspid valve (TV) annulus were made on two separate occasions by three independent observers (two consultants and one registrar).

Results

The Interclass Correlation Coefficient (ICC) between the two sets of measurements by each observer was 0.83 (representing good agreement). The ICC between the three observers was 0.77 (representing fair agreement).

The median TV size of the neonates with PAIVS was **0.98cm**. The 95% confidence interval of the mean of the six observations for a valve of this size was **0.84cm- 1.11cm**.

When converted to a z-score for a neonate of median body surface area (0.21m^2), the range of z-scores obtained from commonly used data sets ranges from **-6.0** to **-0.6** (see figure 1)



Conclusions

The range of z-scores obtainable from a carefully measured echocardiogram is significant. A z-score of >-3.0 is commonly used as a guide towards biventricular repair in PAIVS, but clinicians should be extremely cautious in their interpretation of z-scores, and should be aware of the wide variation between different published z-score algorithms.