Letter to the Editor

Anatomic Insights Regarding the Srivastavas’ Correction Factor for Calculating the Diameter of the Virtual Aortic Annulus from the Distance Between the Hinge Points of the Right and Non-coronary Cusps

Jeffrey J. Silbiger, M.D.*
Matthew Cagliostro, M.D., M.P.H.*

*Icahn School of Medicine at Mount Sinai

Corresponding Author
Jeffrey J. Silbiger, M.D.
Echocardiography Laboratory
Department of Cardiology
Elmhurst Hospital Center
Icahn School of Medicine at Mount Sinai
79-01 Broadway
Room D3-24C
Elmhurst, NY 11373
Phone: (718) 334-5009
E-mail: jeffrey.silbiger@mssm.edu
Correct measurement of the diameter of the virtual annulus of the aortic valve is important for estimating prosthetic size and for measuring aortic valve area using the continuity equation (1). When measuring the diameter of the virtual annulus in the parasternal long-axis view, it is important to recognize when a chord, particularly one that connects the nadirs of the non-coronary cusp (NCC) and the right coronary cusp (RCC), has instead been measured (Figure 1) (2). This is suggested when the hinge points of both cusps are seen at the bases of their respective sinuses in systole and the line of closure of the aortic valve appears in the midline of the aortic root during diastole (Figure 1).

In the November 2021 issue of JASE, Srivastava and Srivastava (3) proposed a novel way to ascertain the diameter of the virtual annulus when a chord, as previously described, has instead been measured. Based upon geometric considerations, the authors suggest that the diameter of the virtual annulus can be calculated by multiplying chordal length by a correction factor of 1.154. It is however important to point out that the mathematical derivation of this correction factor relies upon the anatomic assumption that the nadirs of all 3 aortic cusps are equidistant from one another. Since the 3 aortic cusps are, as a rule, unequal (right > non > left) (4), this may not necessarily hold true. The derivation of this correction factor also rests upon the assumption that the geometric center of the virtual annulus is the same as its anatomic center, which is often not the case (5).

In light of these considerations, it seems prudent that the correction factor proposed by Srivastava and Srivastava be validated experimentally before it is used in daily clinical practice.

Disclosures
There were no funding sources for this work. Dr. Silbiger is member of the speakers’ bureau of the Lantheus Medical Imaging.
**Figure Legend**

**Figure 1.**

A. The measurement running from the RCC to the NCC (blue double-headed arrow) represents a chord. LCC – Left coronary cusp, RCC – Right coronary cusp, NCC – Non coronary cusp.  

B. When the same measurement is made in the parasternal long-axis view during systole (red double-headed arrow), the hinge points of both cusps are seen at the *bases* of their respective aortic sinuses. AMC – Aorto-mitral curtain, IVS- Interventricular septum.  

C. During diastole, when the aortic cusps close, their line of coaptation falls along the midline of the root.  

D. The measurement running from the RCC to the base of the posterior interleaflet triangle (ILT) (yellow double-headed arrow), represents the true diameter of the virtual annulus.  

E. When the same measurement is made in the parasternal long-axis view (red double-headed arrow), it spans from the hinge point of the RCC (at the base of the aortic root) to the point where the ILT and the AMC meet (asterisk).  

F. Note that when the aortic valve cusps close, their line of coaptation is seen posterior to the midline of the aortic root (arrowhead). Panels A and D reproduced with permission from (2).
References


