Videographic conceptual dynamic representation of bicuspid aortic valve anatomic configurations and structural inter-relationships

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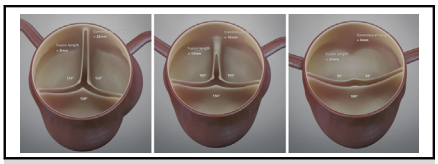


The transition of a normal aortic valve through type 1 into type 0 bicuspid aortic valve.

CENTRAL MESSAGE

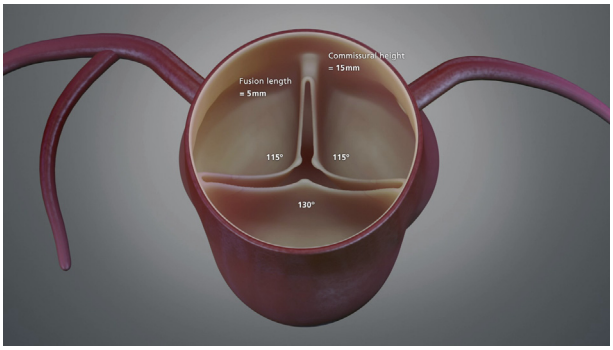
We present a video that depicts the continuous spectrum of anatomic relationships in normal, type 1, and type 0 bicuspid aortic valves.

See Commentaries on pages 46 and 48.

▶ Video clip is available online.

Bicuspid aortic valve (BAV) disease, classified by Sievers and Schmidtke,[1] encompasses a wide span of abnormal anatomy with intermediary configurations including varying states of sclerosis and calcification. Recognition has evolved greatly that the scope of different configurations has significant clinical impact on therapeutic interventions, such as aortic valve repair and transcatheter aortic valve replacement. For example, the circumferential geometric reimplantation of a BAV into a graft during aortic valve repair and valve-sparing aortic root replacement[2] has been guided in part by the anatomic configuration of the BAV.[3]

To advance the understanding of BAV configurations, we employed intraoperative measurements[4] and synthesized a video that provides a conceptual dynamic representation of the structural inter-relationship of circumferential angles, cusp fusion length, and commissural fusion height in normal aortic valves, type 1, and type 0 BAVs (Video 1). This video depicts a transition of normal tricuspid aortic valve with a commissure angle of 120° through type 1 with pauses at commissure angle 130°, 150°, and 170° to highlight very asymmetric, asymmetric, and symmetric type 1 BAVs, respectively, and finishes with a 180° type 0 BAV. Note that the pauses in this video do not to convey an actual pathophysiologic event but to convey the presence of a continuous spectrum of anatomic relationships, reflecting the 3 new general BAV categories.[3]



VIDEO 1. Animated video that provides a conceptual dynamic representation of the structural inter-relationship of circumferential angles, cusp fusion length, and commissural fusion height in normal aortic valves, type 1, and type 0 bicuspid aortic valves. Video available at: https://www.jtcvs.org/article/S2666-2507(21)00417-X/fulltext.

One can envision how very asymmetric BAVs can be repaired toward a tricuspid configuration, and symmetric BAVs can be repaired toward a 180°/180° configuration and other permutations such as bicuspidization of an unequal tricuspid valve.[5] The type 1 BAV configuration was modeled *ex vivo* and demonstrated clinically relevant aortic regurgitation from fused cusp prolapse, which was successfully repaired.[6] This video represents a visual tool that can provide important conceptual understanding of the continuous spectrum of BAV and can aid in the surgical care of this complex patient population.

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