We somehow imagined it, now we know! What an opportunity!

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Despite recommendations in recent guidelines,^{1,2} there is no well-defined indication of when to prophylactically resect the aorta in patients with aortopathy associated with bicuspid aortic valves (BAVs). Nobody knows exactly how to approach it: More or less aggressively when compared with the usual degenerative dilatations and aneurysms, or similar or different to genetically triggered aortic disease such as Marfan syndrome? What is the main cause of the aortopathy—genetics or flow-mediated biomechanics? The rich body of literature provided by Bollache and colleagues³ show how many approaches, theories, and therapeutic strategies were developed trying to shed light on this complex issue.

The value of the article is in the association of quantitative histopathology (thickness of elastic fibers) of aortic specimens to regional wall shear stress (WSS) measured by means of 4-dimensional-flow magnetic resonance imaging and biaxial tissue stiffness on patients with BAV-associated aortopathy, either with prevalent stenosis or prevalent regurgitation. All values were compared with healthy control patients. Several conclusions could significantly influence how we treat our patients in the future.

First, there is a correlation between quantitative in vivo regional aortic WSS and elastic fiber thickness and biomechanical properties of the aortic wall tissue in BAV. Increased in vivo regional aortic WSS is significantly associated with elastic fiber thinning and with impaired tissue biomechanics, particularly in moderately dilated aortas (diameter < 45 mm) and in aortic valve stenosis.

Next, BAV-mediated aortic tissue changes are influenced by the predominant hemodynamic alteration of the BAV, stenosis (correlation to WSS and thickness of elastic fibers), or regurgitation (correlation not significant).

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Central Message

The association between high in vivo wall shear stress and altered tissue elasticity in aortopathy and stenotic bicuspid aortic valves could allow for a more precise surgical indication.

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The results presented by Bollache and colleagues³ suggest that stenotic and regurgitant BAV-associated aortopathies are distinct entities with different mechanisms in their pathogenesis. The only missing dimension of this study is the genetic aspect, both in terms of family history and genetic analysis. Based on these findings, larger studies, including 4-dimensional-flow magnetic resonance imaging with WSS measurements, could lead to a more precise and perhaps personalized indications for prophylactic aortic resection in patients with BAV. Our scientific community is invited to seize the opportunity and transform these initial results into scientifically sound clinical knowledge by conducting carefully designed multicenter studies sufficiently powered to address these issues.

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