**AORTIC REGURGITATION; ASSESSMENT OF ETIOLOGY & SEVERITY:**

**IS IT STILL A CHALLENGE?**

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Aortic regurgitation (AR) can be either due to valvular pathology or aortic root pathology or both. Transthoracic echocardiography is sufficient in most cases while transesophageal echocardiography and magnetic resonance imaging are necessary in some cases. Currently semi-quantitative and quantitative method are used to assess the severity of AR. Although, Doppler color flow imaging is widely used, this method has limited utility in patients with eccentric jets.
Pressure half-time of the AR jet combined with holo-diastolic flow reversalsin the descending thoracic aorta will add to the comprehensive assessment of AR. One can assess AR also by measuring vena contracta width or area. Vena contracta width of AR is obtained by measuring the smallest width of AR jet just distal to the aortic valve. Vena Contracta width >6 mm is suggestive of severe AR. Measurement of left ventricular size is important as well given that, in chronic severe aortic regurgitation, the left ventricle is dilated. Continuity method and proximal isoveloctiy surface area method (PISA), which are based on conservation of mass, are two quantitative methods for the assessment of AR. If there is no significant mitral regurgitation, then one can subtract the flow through the mitral valve from the left ventricular outflow tract flow to calculate the precise aortic regurgitant volume based on continuity principle. It is a challenging technique as small errors in diameter measurements can lead to erroneous results. Unlike the continuity method, PISA method can be used even in the setting of mitral regurgitation. Effective regurgitant orifice area, and regurgitant volume (RV), can be calculated by assuming a hemispheric shape of the proximal isovelocity of the AR jet. Effective regurgitant orifice area of >0.3 cm2 and RV >60 ml are consistent with severe AR.

Current advancements in 3D echocardiography now make it possible to measure the vena contracta area and proximal isovelocity surface area without the need for geometric assumptions. However, still some challenges exist due to limitations of special and temporal resolution. Comprehensive assessment of aortic regurgitation requires an integrative approach.