

Aortic Stiffness may Confound the Interpretation of Diastolic Flow Reversal in Aortic Insufficiency Assessment

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Editorial

Heart valve disease plays a main role to decrease physical ability and quality of life and leads to cardiovascular morbidity and mortality throughout the world [1]. Aortic valve disease is one of the most common valvular pathologies which is responsible for 61% of all valve heart deaths [2]. Aortic valve insufficiency is prevalent finding in patients with mixed valvular heart disease and increases with age. It is associated with debilitating symptoms including heart failure and premature mortality [3]. Echocardiography is used as a diagnostic test to provide comprehensive assessment containing qualitative, semi quantitative and quantitative parameters in patients with Aortic Insufficiency (AI) [3]. Diastolic flow reversal assessment in proximal thoracic descending aorta and abdominal aorta is one

of diagnostic method in echocardiography to evaluate AI severity [3,4]. If aortic regurgitation volume is large, blood flow will reverse in diastole phase in aorta. Holodiastolic flow reversal in descending aorta with an end diastolic velocity equal or more than 20 cm/s or reversal velocity- time integral equal or more than 15 cm and diastolic flow reversal in abdominal aorta are highly specific indicators for severe AI [5,6]. Echocardiographic method can be affected by some factors such as aortic dispensability [6]. Descending aorta expands during systole to store blood delivered from proximal aorta and it recoils in diastole to push this blood to peripheral (windkessel effect). Some part of this blood expels upward which increases with aortic stiffness without evidence of aortic regurgitation [7,8]. Systemic hypertension and aging can lead to this aortic remodeling and stiffness

[8]. In normal condition, proximal of aorta is more distensible than distal part leading to lower pulse wave velocity in proximal part and an impedance mismatch which generates reflection of pressure waves. In fact, diastolic flow reversal appears to be influenced by reservoir and recoil function of aorta along with alteration of stiffness gradient (more pulse wave velocity in aorta compared to peripheral) [7,9].

Additionally, some case reports and small case series have described diastolic flow reversal in aorta in some children with concomitant acute myocarditis and aortitis or in patients with aorta dilation in absence of aortic valve abnormality. They have reported low output condition and redistributive shock cause ischemia, release of inflammatory cytokine and aortitis and Finally, This aortic pathologies lead to disappearance of “windkessel effect” in aorta and affects reservoir and recoil mechanisms [6,10,11].

According to available data, aortic stiffness which occurs for various reasons such as hypertension, aging or aortitis, may contribute to diastolic flow reversal in descending aorta in absence of aortic insufficiency. These aortic pathologies attenuate “windkessel effect”. As a result, reduced aortic distensibility during systole phase limits blood storage and aortic recoiling decreases followed it. Stiffness of aorta and reduced reservoir function may spill some blood volume backwards and increase retrograde diastolic flow component. On the other hand, Impaired recoiling diminishes forward flow in distal part of aorta and peripheral in diastole that may facilitate the appearance of retrograde blood flow. consequently, interpretation of diastolic flow reversal should be integrated with other echocardiographic parameters particularly in elderly and hypertensive

individuals in whom factors like aortic stiffness may contribute to retrograde diastolic flow.

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