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Case Report

Presystolic flow in ascending aorta in a case of left ventricular diastolic dysfunction



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ARTICLE INFO

Article history:

Received 26 April 2014

Accepted 18 February 2015

Available online 13 May 2015

Keywords:

Aortic flow

Diastolic dysfunction

Doppler echocardiography

Left ventricle

ABSTRACT

A 65 years old hypertensive presented with effort breathlessness. Echocardiography revealed significant concentric remodeling of left ventricle. (relative wall thickness – 0.86) with significantly impaired relaxation ($E/A = 0.54$ and $Ea/Aa = 0.52$). Doppler evaluation of flow in ascending aorta revealed a presystolic flow which coincided with P wave of ECG and A wave of mitral flow. This finding suggests increased stiffness of left ventricle resulting in significant increase in left ventricular pressure during left atrial contraction and presystolic flow in aorta. Our case shows that all cases of grade 1 diastolic dysfunction are not alike. Presystolic flow in ascending aorta suggests greater degree of diastolic dysfunction than what is apparent from conventional criteria.

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1. Case report

A 65 years old male presented with effort breathlessness. He was a known hypertensive. Pulse rate was 80/minute and blood pressure was 160/100 mm Hg. Rest of the examination of cardiovascular system was normal. 2 hr post prandial blood sugar was 150 mg%. Other biochemical investigations were within normal limits. Resting electrocardiogram was normal and treadmill stress test was negative for exercise induced ischemia.

Echocardiography revealed significant concentric remodeling of left ventricle (LV) with relative wall thickness of 0.86 and left ventricular mass index of 119.93 gm/m². Left ventricular cavity dimensions in parasternal long axis view were end diastolic 39.3 mm, end systolic 20.5 mm. Left atrial

volume index was 20.80 ml/m². All valves were structurally normal. Pulsed Doppler evaluation revealed impaired relaxation of left ventricle (Mitral flow – E wave velocity 0.59 m/sec, deceleration time 278 ms, A wave velocity – 1.10 m/sec, $E/A = 0.54$) (Fig. 1). Isovolumic relaxation time was 150 ms. Tissue Doppler imaging of lateral mitral annulus revealed Ea velocity 0.11 m/sec, Aa – 0.21 m/sec $Ea/Aa = 0.52$, Sa velocity – 0.20 m/sec (Fig. 2). Pulmonary and tricuspid flow were normal. Doppler evaluation of aortic flow revealed normal systolic velocity (1.2 m/sec). In addition, there was a diastolic (pre-systolic) wave of forward flow coinciding with P wave of ECG (Fig. 3). Color Doppler imaging in apical five chamber view (Figs. 4 and 5) confirmed presystolic flow of blood across LVOT to ascending aorta. On keeping the sample volume in left ventricular outflow tract, the diastolic forward flow in ascending aorta coincided with A wave of mitral flow (Fig. 6).

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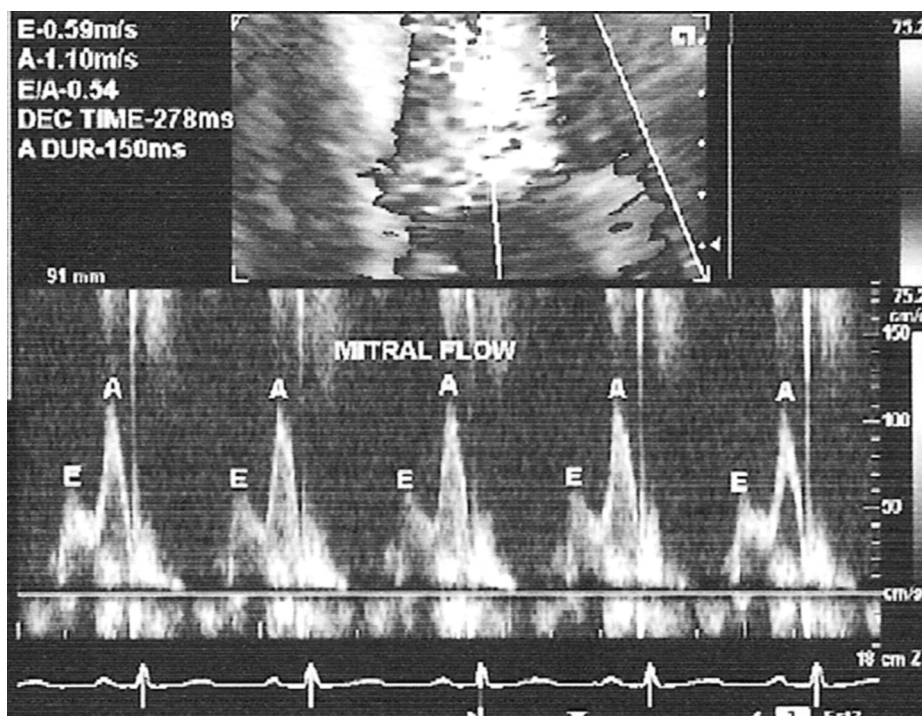


Fig. 1 – Pulsed Doppler evaluation of mitral flow. A – flow during atrial systole, E – flow during early diastole.

2. Discussion

Normally there is no presystolic forward flow in ascending aorta. Our patient had significant impairment of left

ventricular relaxation as is evident from IVRT(150 ms), E/A ratio (0.54), E wave deceleration time (278 ms) and Ea/Aa ratio (0.52). Impaired relaxation of left ventricle results in decreased filling of left ventricle in early diastole which is compensated by forceful contraction of left atrium (LA) to complete LV

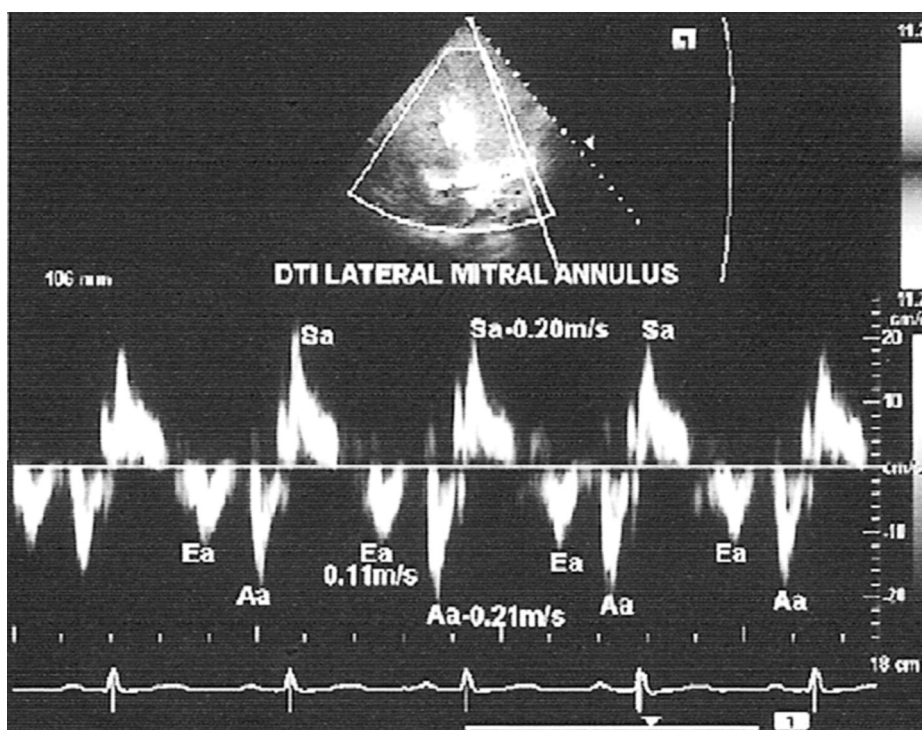


Fig. 2 – Tissue Doppler imaging of lateral mitral annulus. Aa – velocity during atrial systole, Ea – early relaxation velocity, Sa – systolic velocity.

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