

Images in Cardiovascular Disease



Unusual Cause of Hepatic Vein Systolic Flow Reversal

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Conflict of Interest

The authors have no financial conflicts of
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We present an unusual case of systolic flow reversal on hepatic vein doppler tracing. It is important to be aware of reasons for hepatic vein systolic flow reversal other than severe tricuspid regurgitation (TR). Our case illustrates an important echocardiographic correlate of a well-known clinical examination finding.

80-year-old female with end stage renal disease, hypertension, supraventricular tachycardia & aortic stenosis (AS) presented with severe symptomatic AS and underwent uneventful transcatheter aortic valve replacement. **Figure 1** shows hepatic vein doppler findings on transthoracic echocardiogram obtained the next morning. What is the diagnosis?

Answer: Short RP tachycardia, likely atrioventricular nodal reentrant tachycardia (AVNRT).

Explanation: Hepatic vein doppler shows large flow reversals occurring in systole with each beat. Systolic flow reversal on hepatic vein doppler usually indicates severe TR. However, doppler interrogation revealed moderate TR (**Figure 2**). Therefore, an alternative explanation must exist.

Careful examination of electrocardiogram (EKG) in **Figure 1** reveals heart rate of 136 bpm and retrograde P-waves after each QRS. Twelve-lead EKG (**Figure 3**) confirmed short RP

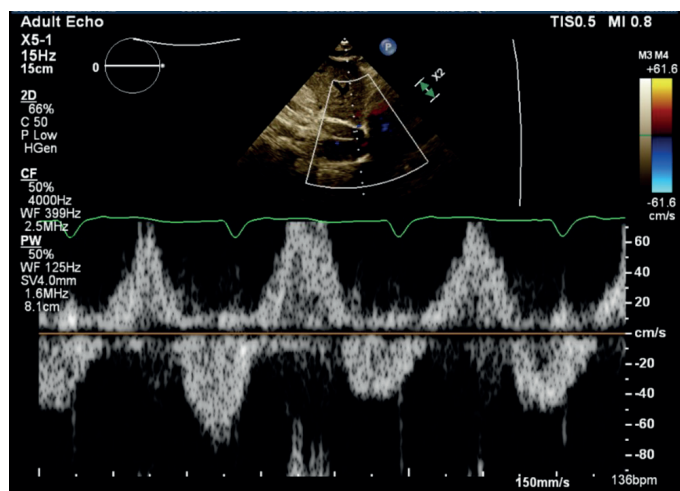


Figure 1. Hepatic vein doppler showing systolic flow reversal.

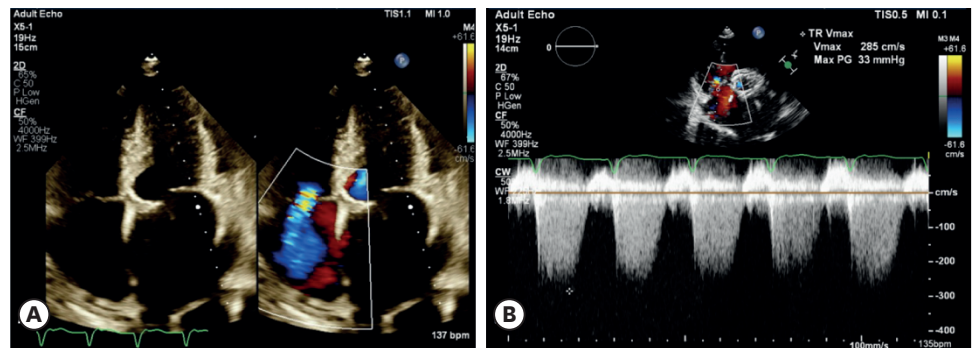


Figure 2. (A) Color doppler across tricuspid valve showing moderate TR. (B) Continuous wave doppler across tricuspid valve showing a rounded contour of the TR jet. TR: tricuspid regurgitation.

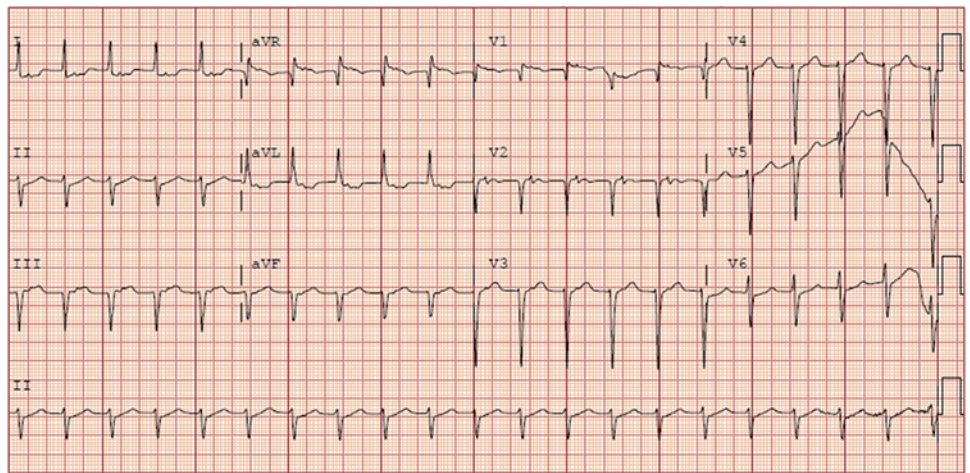


Figure 3. 12-lead electrocardiogram showing short RP tachycardia.

tachycardia (AVNRT). During AVNRT, atria contract after the ventricles. Therefore, right atrial contraction is occurring against a closed tricuspid valve resulting in prominent flow reversals with each atrial contraction. Flow reversals seen in **Figure 1** are actually large A-waves occurring after retrograde P-waves. This echocardiographic finding correlates with the physical examination finding of regular “cannon a-waves” in patients with AVNRT.¹ Hepatic or pulmonary vein systolic flow reversal can also occur in conditions causing atrioventricular dissociation such as complete heart block and ventricular tachycardia (VT); however, flow reversal will only occur during the beats when atrial and ventricular contraction is happening simultaneously. Theoretically, findings seen in **Figure 1** can also occur due to pacemaker induced retrograde 1:1 ventriculoarterial (VA) conduction² or slow VT causing 1:1 retrograde VA conduction.

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