1550614

Respiratory Variation in Tricuspid Regurgitation Peak Systolic Velocity: A Sign of Severe Tricuspid Regurgitation

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Background: Respiratory variation in tricuspid regurgitation (TR) peak systolic velocity is frequently observed in patients with severe TR, but the diagnostic significance of this finding is unclear.
Methods: Our echocardiographic laboratory database was searched to identify all echocardiographic examinations fulfilling the following criteria: a) presence of severe TR, defined by color flow imaging and Doppler evidence of hepatic venous systolic flow reversal; b) regular heart rhythm (sinus rhythm or regular ventricular pacing); c) continuous-wave Doppler strip with at least 4 consecutive TR Doppler signals. The difference between the maximal (expiratory) and minimal (inspiratory) TR velocities within a given Doppler strip (delta velocities) was measured and delta velocities in patients with severe TR were compared to a random sample of 20 patients with moderate TR who fulfilled criteria b and c (above).
Results: Severe TR was diagnosed in 243 echocardiographic examinations during an 18 month period and the above inclusion criteria were fulfilled in 52 examinations in 50 patients (age 71+/-12 yrs; 44% male). Delta velocities were 0.70+/-0.28 (range: 0.2-1.3) m/s in patients with severe TR vs. 0.32+/-0.17 (range: 0.1-0.7) m/s in patients with moderate TR ($p<0.001$). Using a cutoff of delta velocities >=0.7 m/s (median value in patients with severe TR), this criterion had a sensitivity of 58% and a specificity of 95% for diagnosing severe TR. Among patients with severe TR, there was a trend for greater right ventricular size and more severe tricuspid leaflet malcoaptation in patients with excessive respiratory delta velocities (>=0.7 m/s), compared to patients with severe TR and low delta velocities (<0.7 m/s), suggesting that these patients have the most severe degree of TR.
Conclusions: Excessive respiratory variation in TR velocities is a common phenomenon in patients and is a specific marker of severe TR, usually associated with very severe TR.