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Pitfalls in Assessment of Tricuspid Valve Gradients in Patients After Mitral Valve Replacement and Tricuspid Valve Annuloplasty

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Tricuspid valve (TV) evaluation from multiple views is part of echocardiography after TV repair. In patients with concomitant mitral valve replacement (MVR) the signal from the LV inflow over the valve is intense. We have noticed superimposition of 2 signals in continuous wave Doppler (CWD) with the cursor oriented over the TV in 4 chambers (4CH) view (figure).
We hypothesized that the higher signal is reflected from the mitral prosthesis, and will be similar to mital velocity and is not indicative of the true flow over the TV which is lower as measured from other views.
Methods: Echocardiographic images of patients after MVR and TV repair from 1/2007 to 10/2009 were evaluated. CWD measurements over the TV were repeated [parasternal long right ventricular (RV) (PLRV) inflow, short axis (SHA), 4CH, RV apical inflow (RVA)]. CWD over the mitral inflow in 4CH view was traced. 6 patients with clear overlap of traces over the TV in 4CH were used to exemplify the phenomenon. 19 patients with TV peak velocities (PVs) >1 meter per second (m/s) from any view, with no obvious overlap were included. 42 patients with TV PV <1m/s from all views were excluded. ANOVA was used to calculate differences between groups and Pearson's method to determine the degree of correlation. Results: There was a correlation between the PVs, peak and mean gradients over the mitral and TV in 4CH view (r=0.5 for all comparisons, p<0.05) and between the TV PLRV and SHA (r=0.9 for all comparisons, p<0.01). Conclusion: TV flow by CWD in 4CH view may falsely detect higher velocity because of the intense signal from the flow over the prosthetic mitral valve. Therefore cautious is imperative in order to avoid false measurement of increased gradients over the TV. It is essential to evaluate and compare the TV measurement from multiple views.

CWD values (mean+SD)	MV	TV	TV	TV	TV
Group 3 (n=19)	4CH	4CH	PLRV	SHA	RVA
Peak velocity	1.91+0.33	1.64+0.20	1.14+0.31	1.13+0.33	1.29+0.39
Peak gradient	15.1+5.2	10.8+2.6	5.6+3.5	5.5+3.4	7.3+4.7
Mean gradient	5.0+1.7	3.8+7	1.9+1.5	1.9+1.2	2.3+1.3
P<0.01 for all comparisons