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PISA, Vena Contracta, and Regurgitant Jet Area have Limited Reproducibility for Assessment of Mitral Regurgitation Severity

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Objective:
The aim of this study was to evaluate the interobserver agreement of isovelocity surface area (PISA) and vena contracta (VC) for differentiating severe from non severe MR.
Background:
Recommendation for MR evaluation stresses the importance of VC width, and effective regurgitant orifice area (EROA) by PISA measurements. Reliable assessment of MR is important for decision making regarding corrective surgery. We hypothesize that color Doppler based quantitative measurements for classifying MR as severe versus non-severe may be susceptible to inter observer variability.
Methods:
PISA and VC of 16 patients with MR were interpreted by 18 echo cardiologists from 13 academic institutions. In addition we obtained quantitative assessment of MR based on color flow Doppler jet area.
Results:
The overall inter observer agreement for grading MR as severe or non severe was using qualitative and quantitative parameters was suboptimal: 0.32 (95% CI: 0.12-0.52) for jet area based MR grade, 0.28 (95% CI: 0.11-0.45) for VC measurements, and 0.37 (95% CI: 0.16-0.58) for PISA measurements. Significant univariate predictors of substantial inter observer agreement for a) jet area based MR grade was functional etiology (p=0.039), b) VC was central MR (p=0.013) and identifiable effective regurgitant orifice (p=0.049), and c) PISA was presence of a central MR jet (p=0.003), fixed proximal flow convergence (p=0.025), and functional etiology (p=0.049). Significant multivariate predictors of substantial inter observer agreements included for VC identifiable effective regurgitant orifice (P=0.035), and for PISA central regurgitant jet (p=0.02).
Conclusion:
VC and PISA for distinction of severe versus non-severe MR are only modestly reliable and associated with substantial inter observer variability. An identifiable effective regurgitant orifice improves reproducibility of VC and a central regurgitant jet predicts substantial agreement between multiple observers of PISA assessment.