Inter-rater reliability of contractility when measured with MR dP/dt

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BACKGROUND

- Assessment of contractility is of clinical significance given its load and length independent properties that are responsible for the development of force (inotropy), and velocity (clinotropy).(1) Contractility when surveyed with TEE or calculated from an arterial waveform often impacts clinical decision making. Contractility is not a static consideration. Hemodynamic factors including ejection fraction, afterload, preload, and heart rate all contribute dynamic variables when assessing overall cardiac performance.(2,3)
- **Major Aim:** The purpose of this study was to assess the inter-rater reliability among three different groups of users (medical students, anesthesiology residents, and TEE-certified/experienced anesthesiologists measuring already captured TEE mitral regurgitant jet doppler images.

METHODS

20 images were selected from data collected under the UC Davis IRB approved protocol: *Comparison of Arterial Pressure Waveform Derived dp/dt Versus Transesophageal Echocardiogram Derived Left Ventricular dp/dt Max in the intra-operative setting* (ClinicalTrials.gov: Identifier: NCT04726852) to include a diverse sample of flow patterns.

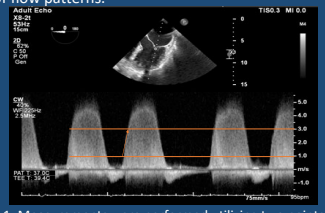
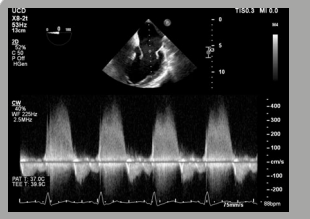
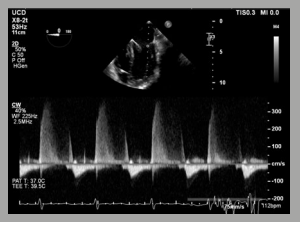
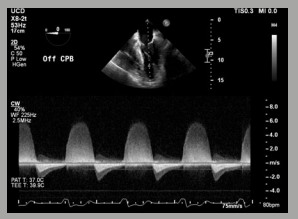


Figure 1: Measurements were performed utilizing two points (100 and 300 cm/s) from the continuous-wave Doppler spectrum of the MR jet.

The measurements of dP/dt across various training levels were closely in agreement with one another per Krippendorf's alpha







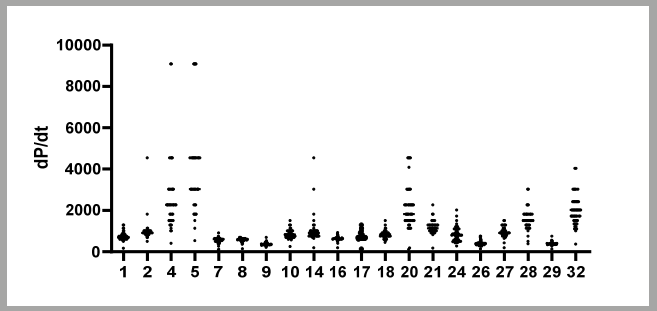


Figure 2: Scatterplot showing dP/dt (y-axis) across each respective TEE image (x-axis)

RESULTS

Across a total of 20 selected TEE acquired images, kappa across medical students, residents, and attendings.

Group	Kappa		
All	.586		
Medical Students	.697		
Anesthesiology Residents	.476		
Anesthesiologists/ TEE/ All	.568	.633	.584

CONCLUSION

- Measurements of dP/dt were highly agreeable to one another, highlighting the reproducibility of contractility measurements with TEE acquired images.
- Technical expertise did not result in higher agreement.
- Future studies could explore utilizing AI for static image measurements to compare accuracy and reproducibility.
- Comparing various modalities to measure contractility could also be explored.

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