

Comparing Left Ventricular Contractility Assessments: TEE dp/dt vs Arterial Pressure dp/dt

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Background

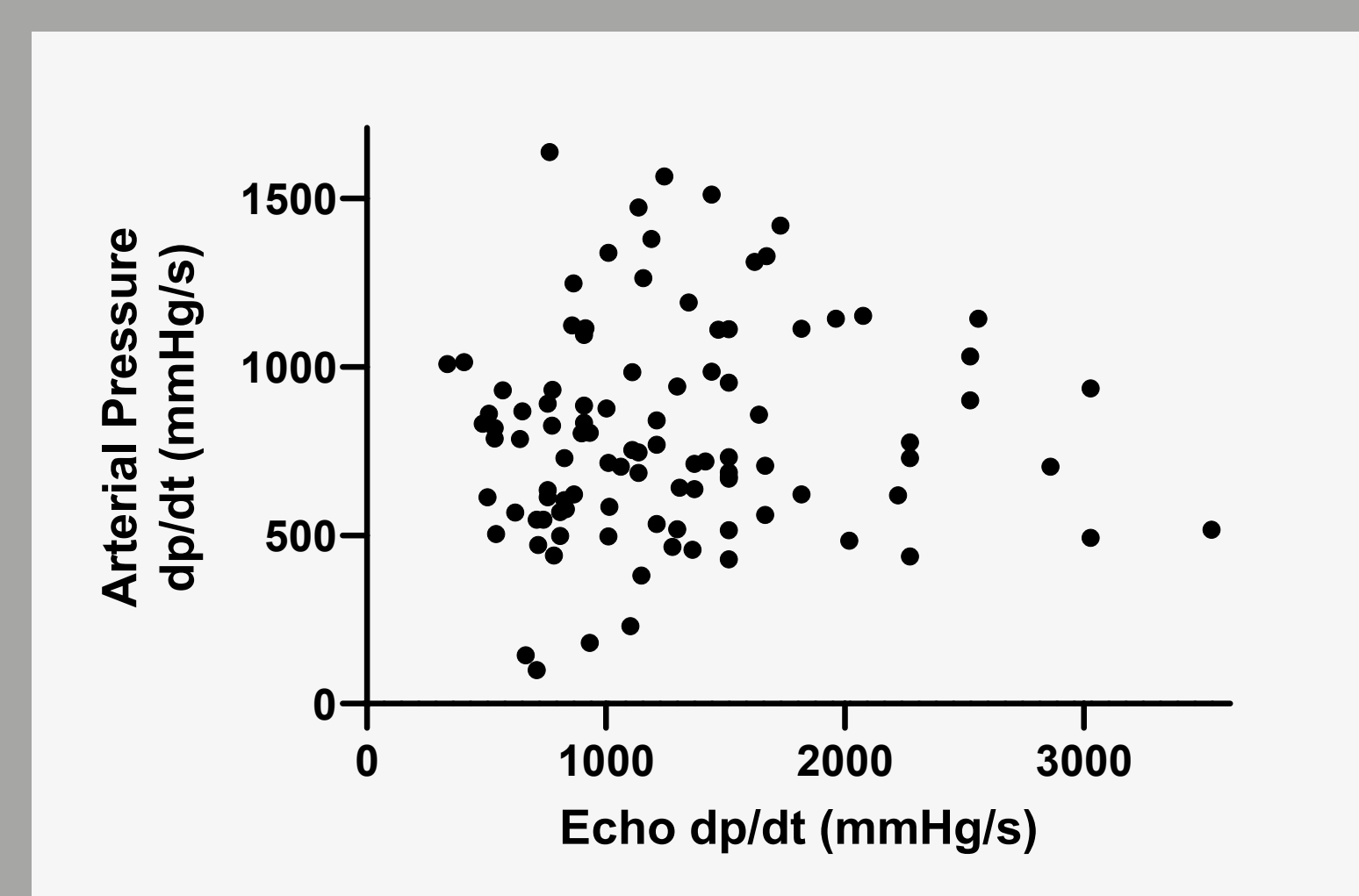
- dp/dt characterizes the change in LV pressure during isovolumetric contraction as an assessment of contractility
- dp/dt can be measured invasively by a catheter in the LV, or measured indirectly with either transesophageal echocardiography (TEE) or arterial pressure waveform
- Little existing literature comparing the two indirect methods^{1,2}
- Our study objective: compare (correlation and concordance) TEE and arterial pressure dp/dt measurements to determine interchangeability

Methods

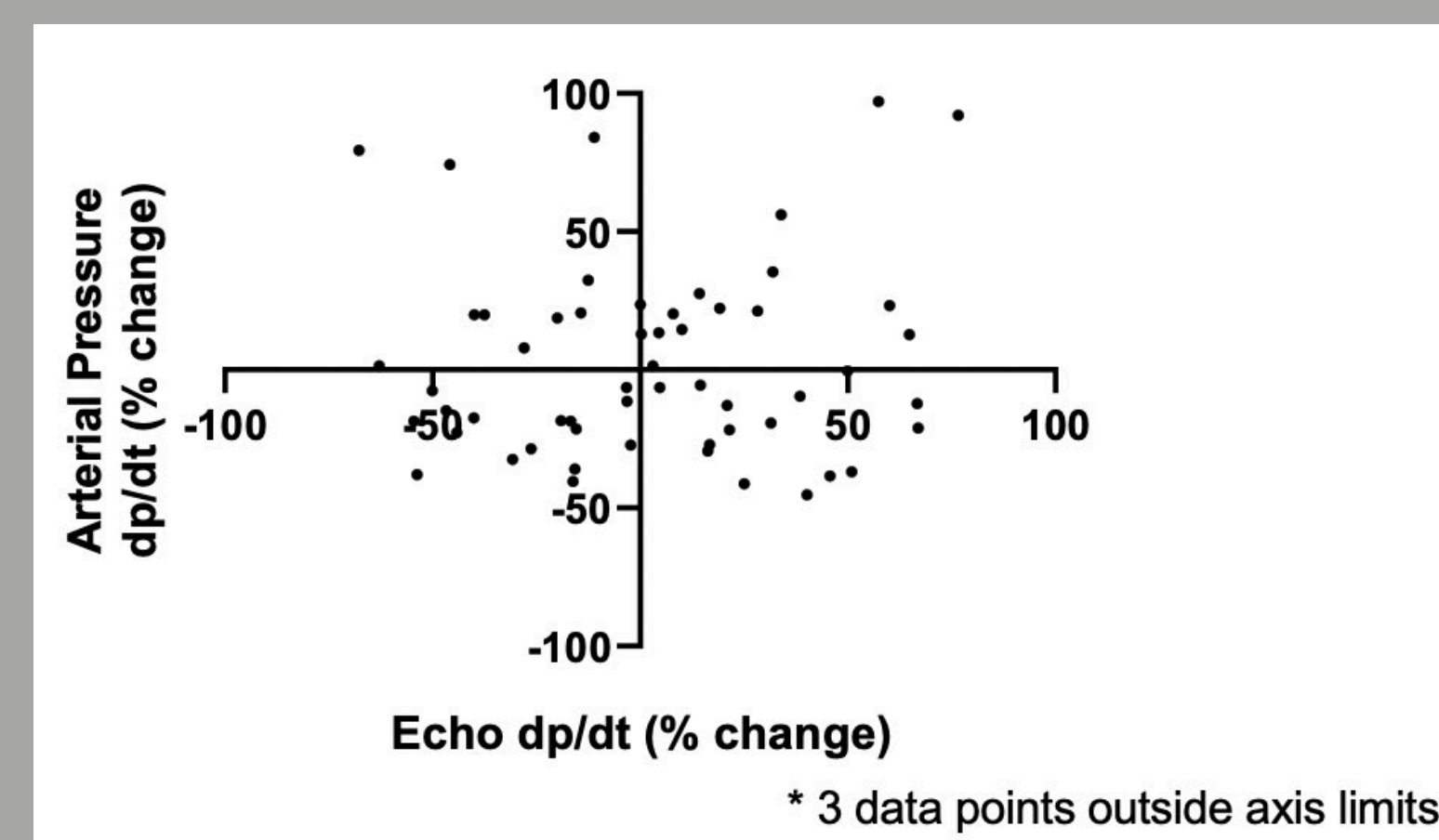
- Approved by Human Subjects Research Committee
- Sequential patients undergoing elective cardiac procedures
- Obtained TEE MR jet continuous wave doppler tracings at 5 intraoperative timepoints: post-induction; post-incision, pre sternotomy; post-heparin, pre-bypass; post-bypass, pre-sternal closure; and post-sternal closure, pre-incision closure
- Averaged 5 arterial pressure dp/dt values centered at the time of the doppler tracing capture
- Calculated nonparametric correlations and concordances

Results

- Correlations: Spearman $r = 0.097$; weak correlation
- Significance: $p = 0.336$; not significant



- Concordance (0% exclusion zone): 55.93%; moderate



TEE and arterial pressure dp/dt assessments of contractility are not interchangeable.



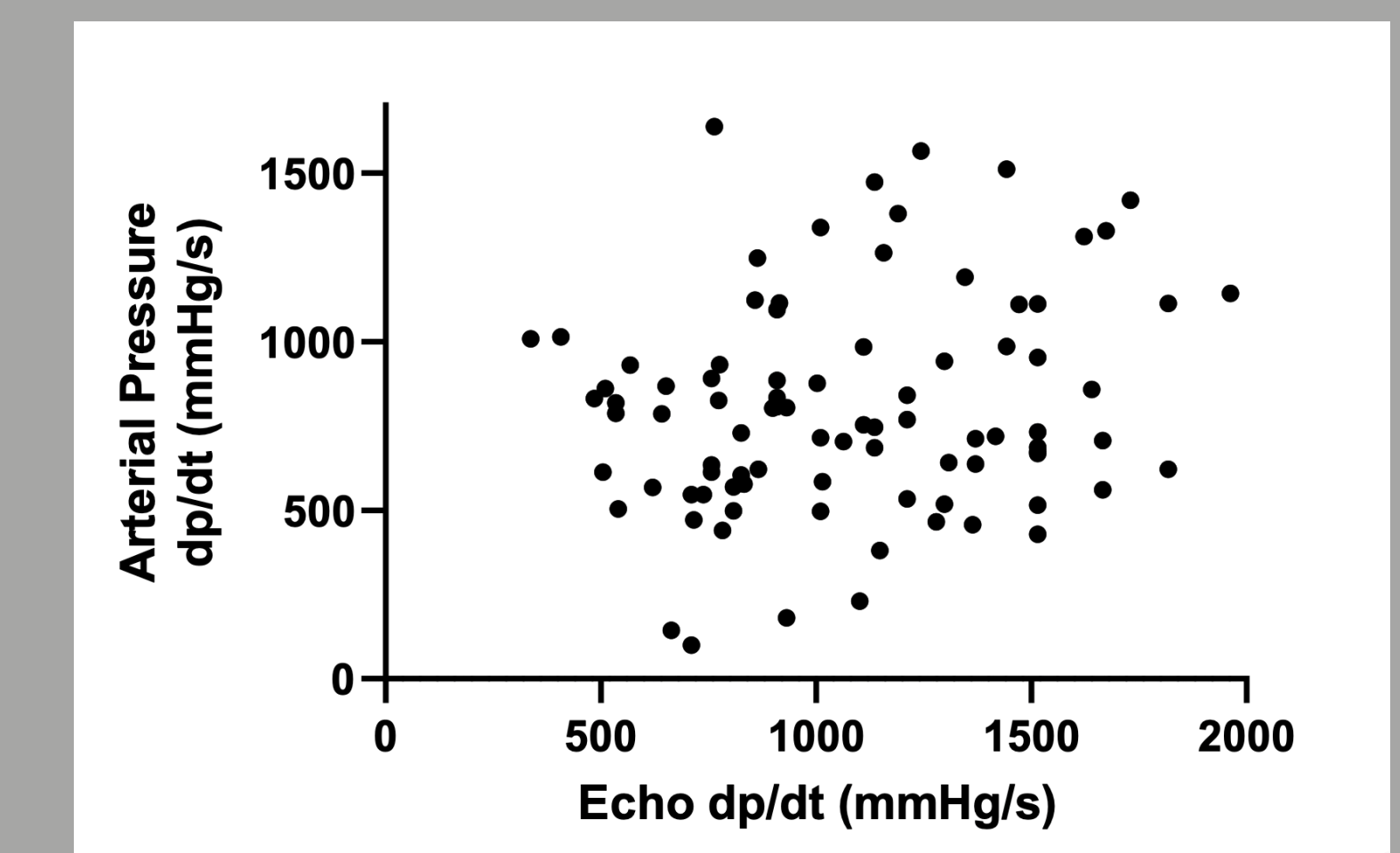
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Discussion

- TEE and arterial pressure dp/dt measurements are not equivalent in this clinical setting
- Accounting for SVR or disregarding high TEE dp/dt values does not account for this disparity in measurements

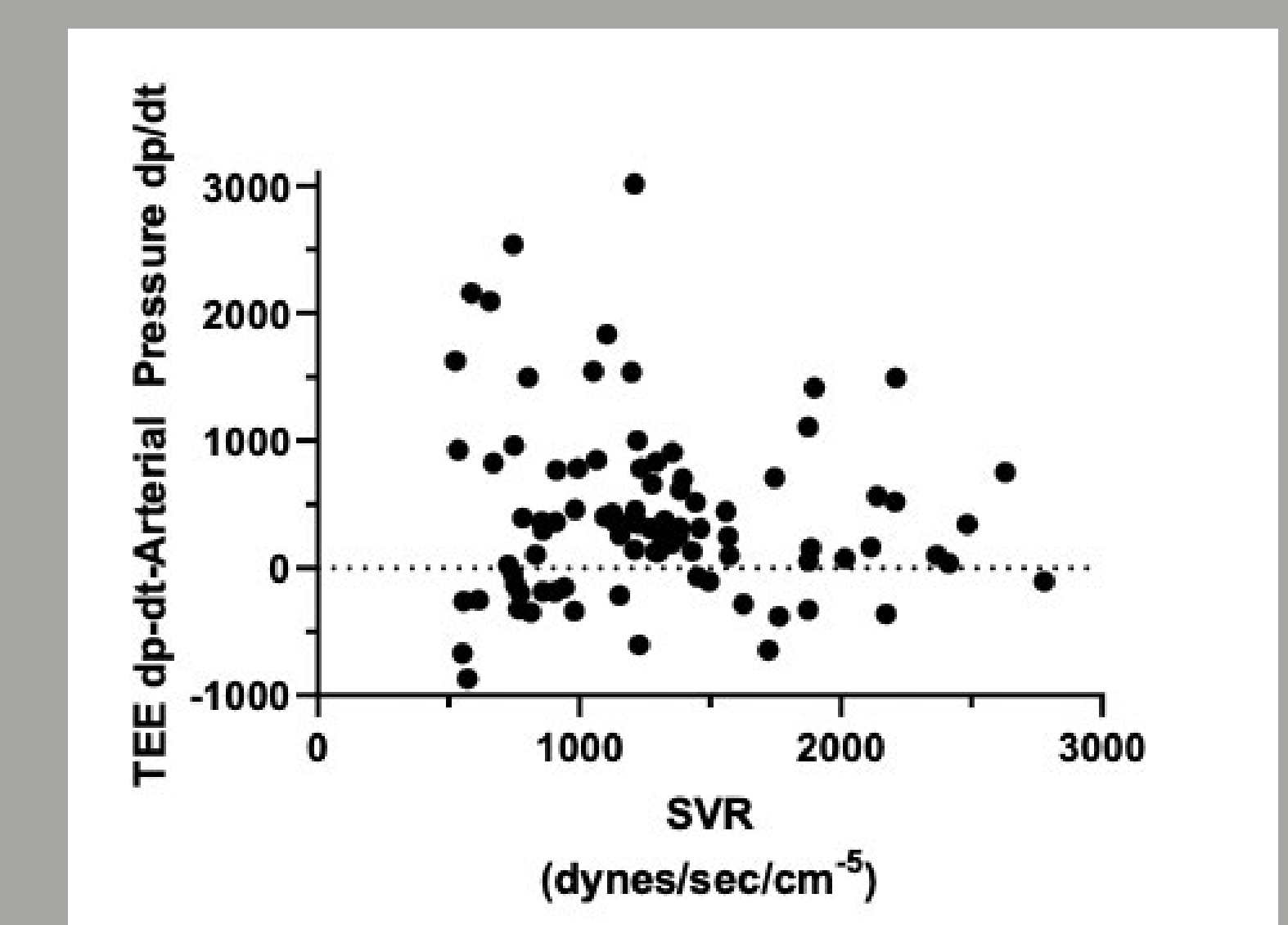
Echo dp/dt <2000 mmHg/s

- Correlation did not gain significance; $p = 0.145$



SVR and dp/dt

- High afterload does not affect the difference in TEE and arterial pressure dp/dt values



Limitations / Next Steps

- Next step: Extend study to other comparisons of left ventricular contractility (strain, 2D and 3D ejection fraction, and fractional area change) to determine if there is correlation with TEE dp/dt or arterial pressure dp/dt
- Next step: Perform inter-rater reliability testing to characterize any variability and/or reproducibility in the measurement of TEE dp/dt data
- Limitation: pathology-related variability in the quality and size of the MR doppler jet biases dp/dt measurements

References

1. Ostadal, et al, Critical Care 2019; 23(1):364
2. Garcia, et al., Critical Care 2018; 22(1):325