

**EVALUATION OF DYNAMIC MONITORS FOR THE PREDICTION OF VOLUME RESPONSIVENESS IN PATIENTS WITH AND WITHOUT DIASTOLIC DYSFUNCTION**  
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**Background**

- Intra-operative optimization of cardiac function can decrease incidence of complications
- Current gold standards to guide optimization are Pulse Pressure Variation (PPV) and Stroke Volume Variation (SVV)
- Left ventricular dysfunction is known to predict adverse cardiovascular outcomes (MACE), in-hospital mortality and extra fluid support
- Does left ventricular dysfunction alter the threshold for dynamic monitors and their ability to predict volume responsiveness?

**Methods**

- IRB approval collected with written consent
- Data collected from UC Davis Medical Center at the end of each case
- TTE was used to assess DD grading prior anesthesia induction
- Ventilation 8ml/kg (IBW), PEEP 5cm H<sub>2</sub>O
- IV fluids were administered at a basal infusion rate of 1ml/kg (ABW)/hr
- As hemodynamic parameters necessitated, crystalloid or colloid was infused
- Response to each fluid bolus was recorded by the FloTrac/EV-1000 monitor
- Data was analyzed as a 3 minute average with a 2 minute delay pre and post bolus
- Comparisons were made between patients with and without DD
- ROC analysis using PRISM, Youden's index (YI) and plot using Microsoft Excel 2019

**Raw Data Sample**

| Time        | CO    | SV   | SVV | SYS  | DIA  | MAP  |
|-------------|-------|------|-----|------|------|------|
|             | L/min | mL/b | %   | mmHg | mmHg | mmHg |
| 10:30:31 am | 6.3   | 91   | 8   | 157  | 59   | 82   |
| 10:31:31 am | 6.4   | 93   | 8   | 158  | 61   | 84   |
| 10:32:31 am | 6.5   | 96   | 8   | 159  | 60   | 84   |
| 10:33:31 am | 6.5   | 97   | 7   | 158  | 60   | 83   |
| 10:34:31 am | 6.5   | 94   | 7   | 147  | 57   | 79   |
| 10:35:31 am | 6.4   | 92   | 7   | 144  | 57   | 78   |
| 10:36:31 am | 6.3   | 88   | 7   | 134  | 54   | 74   |
| 10:37:31 am | 6.2   | 89   | 8   | 126  | 52   | 71   |
| 10:38:31 am | 6     | 85   | 8   | 123  | 52   | 70   |
| 10:39:31 am | 5.8   | 83   | 8   | 122  | 52   | 70   |
| 10:40:31 am | 5.7   | 80   | 8   | 120  | 50   | 70   |

**Sample Calculations**

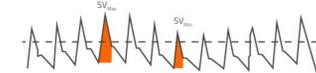
| Time | CO                    | SV   | SVV | SYS  | DIA  | MAP  |
|------|-----------------------|------|-----|------|------|------|
|      | L/min                 | mL/b | %   | mmHg | mmHg | mmHg |
| Pre  | =AVERAGE(6.5+6.4+6.3) | 93   | 8   | 158  | 60   | 83   |
| Post | =AVERAGE(6+5.8+5.7)   | 83   | 8   | 125  | 53   | 72   |

At this time, more data is needed to accurately characterize the **SVV threshold** in patients with left ventricular **diastolic dysfunction** that would predict fluid responsiveness.



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**SVV - Stroke Volume Variation**

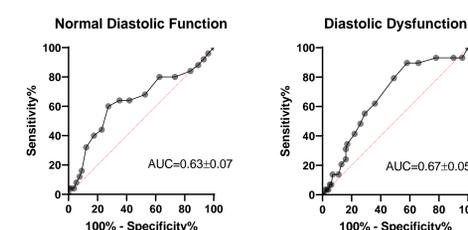


**PPV - Pulse Pressure Variation**



**Results**

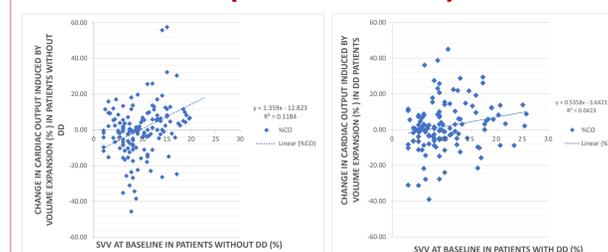
- To date, 55 patients were recruited for the study
- Mean age of 68.9 ± years and BMI of 26.1
- Patients without DD: SVV threshold of 11.5 at a (YI) of 0.363
- Patients with DD: SVV threshold of 7.5 at a YI of 0.341



**Discussion**

- Current sample size is too small for conclusions
- Further data collection and analysis is needed to fully characterize the relationship
- General anesthesia might alter the diastolic dysfunction grading

**Additional (non-essential) results**



**References**

1. Monnet, X., Marik, P.E. & Teboul, J. Prediction of fluid responsiveness: an update. *Ann. Intensive Care* 6, 111 (2016)
2. Fayad, A., Ansari, M. T., Yang, H., Ruddy, T., & Wells, G. A. (2016). Perioperative Diastolic Dysfunction in Patients Undergoing Noncardiac Surgery Is an Independent Risk Factor for Cardiovascular Events. *Anesthesiology*, 125(1), 72-91
3. Swaminathan, M., Nicoara, A., Phillips-Bute, B. G., Aeschlimann, N., Milano, C. A., Mackensen, G. B., ... Mathew, J. P. (2011). Utility of a Simple Algorithm to Grade Diastolic Dysfunction and Predict Outcome After Coronary Artery Bypass Graft Surgery. *The Annals of Thoracic Surgery*, 91(6), 1844-1850.

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