

Extra systoles cannot predict fluid responsiveness during cardiac surgery

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Introduction

- During cardiac surgery, no reliable method for fluid responsiveness prediction is available
- Today's practice prescribes giving fluid challenges and evaluate the response
- Doing this numerous times obviously entails the risk of patients being overhydrated which is associated with worse patient outcome

Aim and Hypotheses

- To investigate two new methods for fluid responsiveness prediction
- 1) Extra systoles can be used to predict fluid responsiveness due to prolonged filling time (RR-interval) See figure 1 →
- 2) A micro fluid challenge (MFC) (50 ml within 10 sec) can predict fluid responsiveness based on the transient changes in the hemodynamic indices

Methods and statistics

- Patients scheduled for coronary bypass graft surgery were included
- Patients' hemodynamic data were recorded in a surgically stable phase of their surgery
- Patients received fluids: 5 ml/kg ideal bodyweight over 3-5 minutes, of which 50 ml were infused fast (10 sec)
- Continuous cardiac index values were collected before and after a fluid challenge (see figure 2)
- Post extra systolic changes in hemodynamically indices were plotted against stroke volume index (SVI) response to fluid challenge measured by pulmonary artery catheter
- Area under the ROC curve (AUC) was used to evaluate both methods

Results

- 31 of the 56 patients had eligible extra systoles
- Best extra systolic predictor of fluid responsiveness were ΔPP_{ES} with AUC of 0.70 (CI [0.35;1.00])
- See figure 3 and 4 for other predictors
- All micro fluid challenge indices showed AUC's of around 0.5

Conclusion

- Extra systoles predict fluid responsiveness with mediocre accuracy in patients undergoing cardiac surgery
- MFC has no fluid responsive predictive value.
- Clinically both methods show unacceptable predictive value

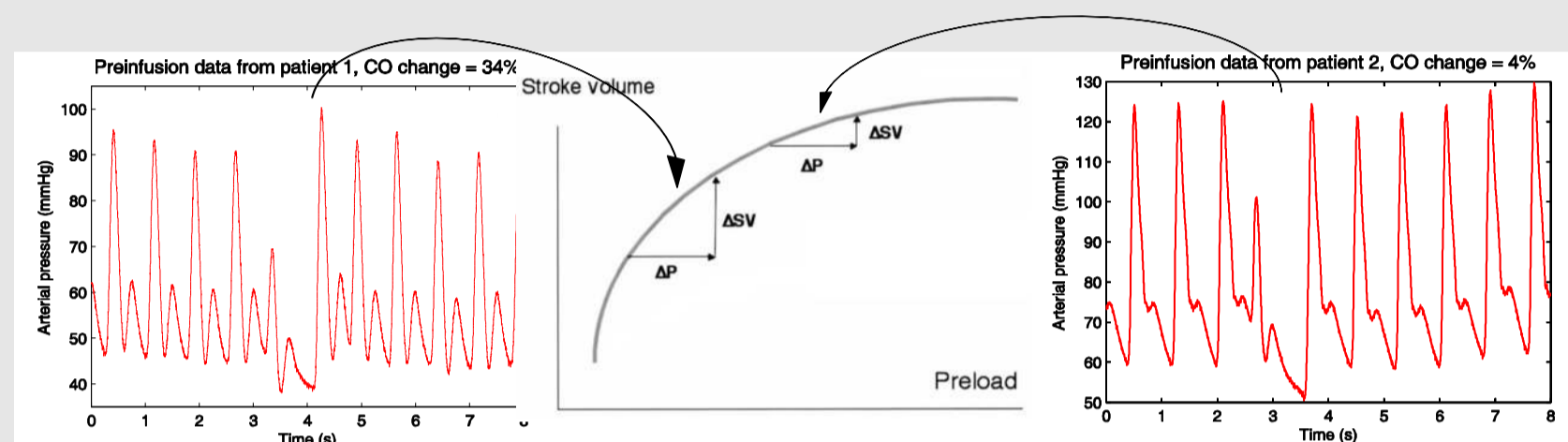


Figure 1: Data from two postoperative patients in a previous study. Left panel fluid responsive patient, middle panel patients placement on the Frank-Starling curve and right panel a unresponsive patient

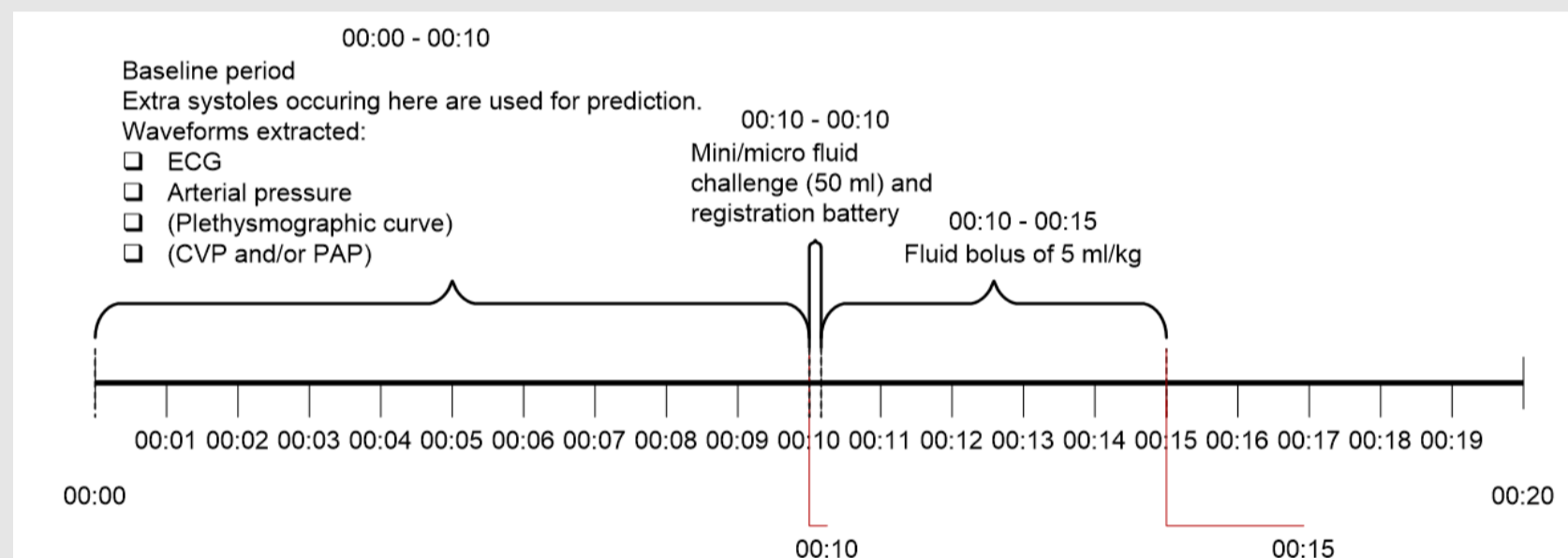


Figure 2: Study outline

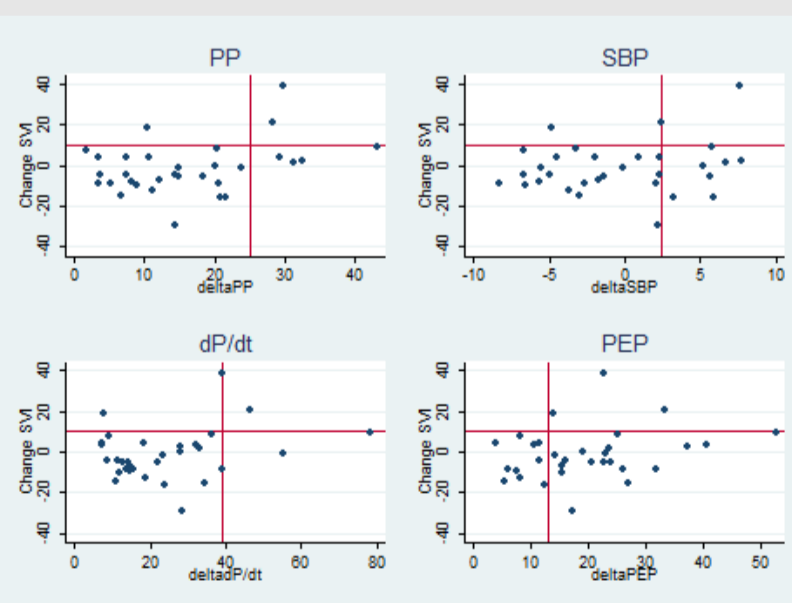


Figure 3: Extra systolic indices plotted against ΔSVI . Red vertical line = best cut-off

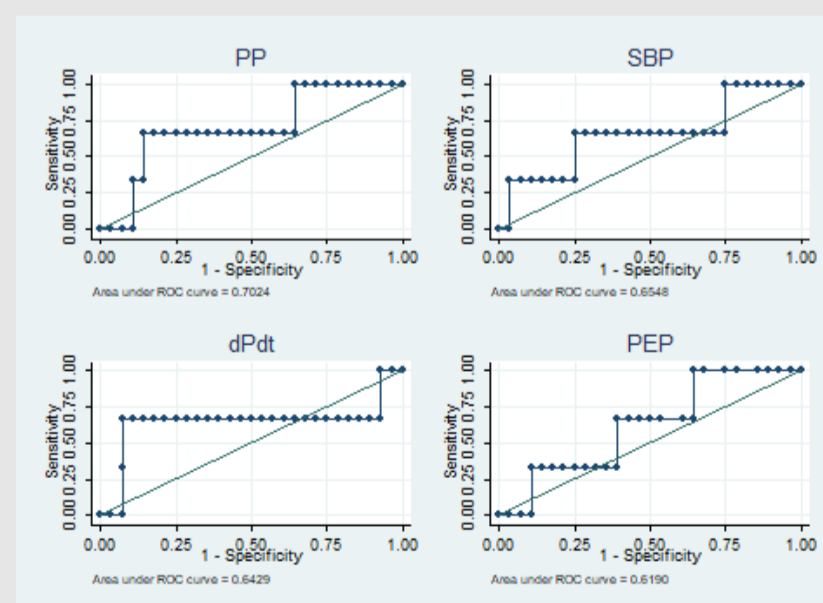


Figure 4: Receiver operating characteristic curves for post extra systolic changes

