Introduction:
The peak rate of left ventricular (LV) pressure (dP/dt\textsubscript{\text{max}}) has been classically used as a marker of LV systolic function. Since measuring LV dP/dt\textsubscript{\text{max}} requires LV catheterization, other surrogates have been proposed using the peripheral arterial waveform. The aim of this study was to test the performance of LV and arterial (aortic and femoral) dP/dt\textsubscript{\text{max}} for assessing LV systolic function against the gold-standard (the slope of the end-systolic pressure-volume relationship, E\textsubscript{\text{max}}) during different cardiac loading and contractile conditions.

Methods:
Experimental study in 6 pigs. LV pressure-volume data was obtained with a conductance catheter and peripheral pressures were measured via a fluid-filled catheter into the aortic, femoral, and radial arteries. E\textsubscript{\text{max}} was calculated during a transient occlusion of the inferior vena cava. The experimental protocol consisted in three consecutive stages with two opposite interventions each: changes in afterload (phenylephrine and nitroprusside), preload (bleeding and fluid bolus), and contractility (esmolol and dobutamine) (Fig. 1).

Measurements were obtained before and after each hemodynamic intervention.

Results:
E\textsubscript{\text{max}} variations and LV, aortic, femoral and radial dP/dt\textsubscript{\text{max}} changes throughout the study are shown in Fig. 2. All peripheral artery–derived dP/dt\textsubscript{\text{max}} underestimated LV dP/dt\textsubscript{\text{max}}. Percentage changes in LV and femoral dP/dt\textsubscript{\text{max}} were tightly correlated (r\textsuperscript{2}=0.77; P<0.02). Both LV and femoral dP/dt\textsubscript{\text{max}} were affected by preload changes during fluid infusion. All peripheral dP/dt\textsubscript{\text{max}} estimations allow to detect LV systolic function changes according to E\textsubscript{\text{max}} during isolated variations in contractility.

Conclusion:
Femoral and LV dP/dt\textsubscript{\text{max}} accurately reflected E\textsubscript{\text{max}} changes, although both were affected by preload changes during fluid administration.
Fig 2. Emax, LV dP/dtmax and aortic, femoral and radial dP/dtmax changes.