

# Haemodynamical Effects of Left Ventricular Assistance During High-risk Percutaneous Coronary Interventions with a Pneumatic Left Ventricular Assist Device

B. Bastos M.<sup>1</sup>, McConkey H<sup>3</sup>, JJ. Schreuder<sup>1</sup>, J. Daemen<sup>1</sup>, CA. Den Uil<sup>1,2</sup>, NM. Van Mieghem<sup>1</sup>

(1) Erasmus Medical Center, Interventional Cardiology, Rotterdam, Netherlands (2) Erasmus Medical Center, Department of Intensive Care Medicine, Rotterdam, Netherlands (3) St Thomas Hospital

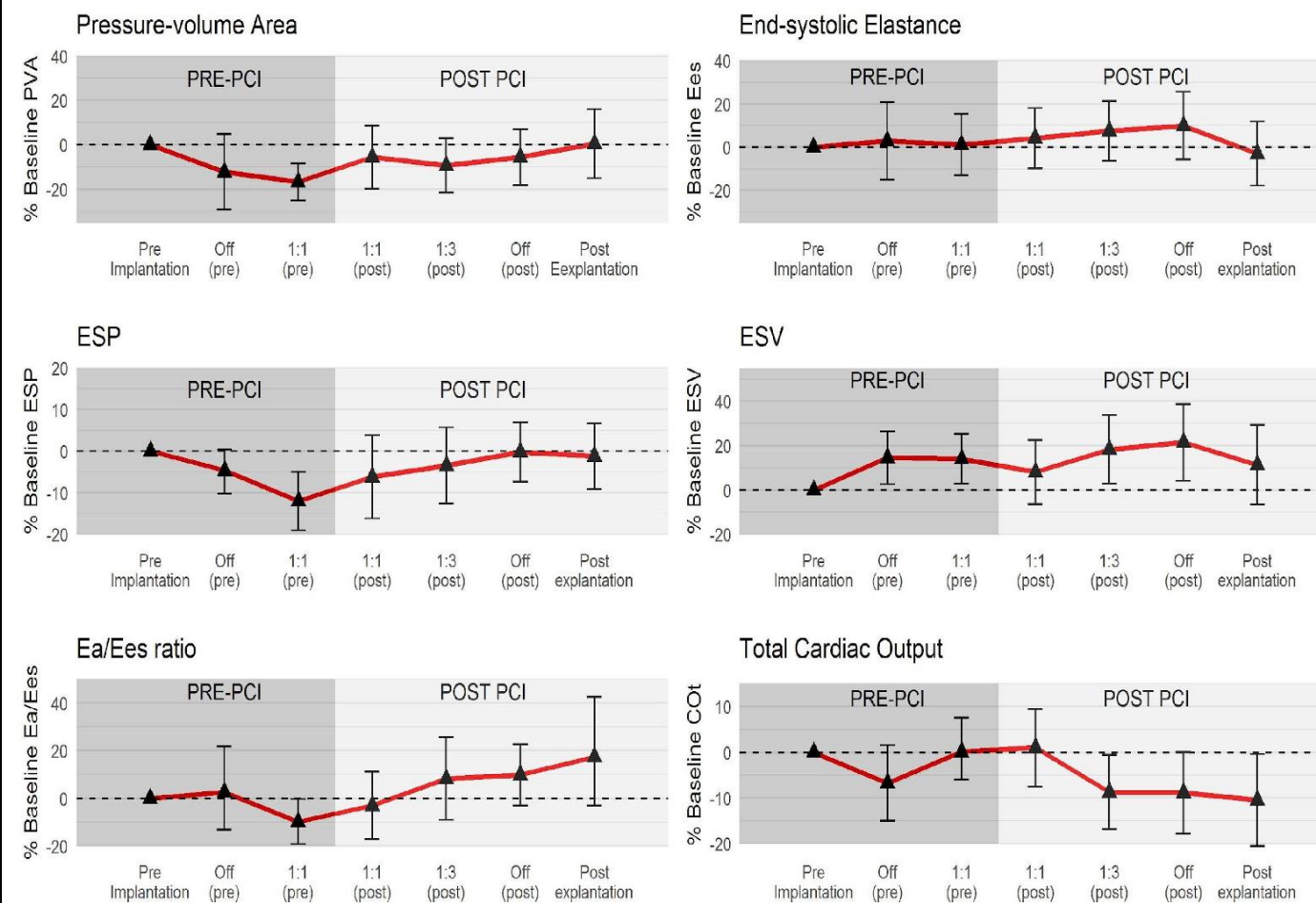
**Background:** Percutaneous Mechanical Circulatory Support (MCS) may protect the myocardium and reduce the risk of major adverse events during high-risk percutaneous coronary intervention (PCI). Data on LV unloading with pulsatile flow is currently scarce.

**Purpose:** describe the unloading pattern produced by a pneumatically driven pulsatile pVAD.

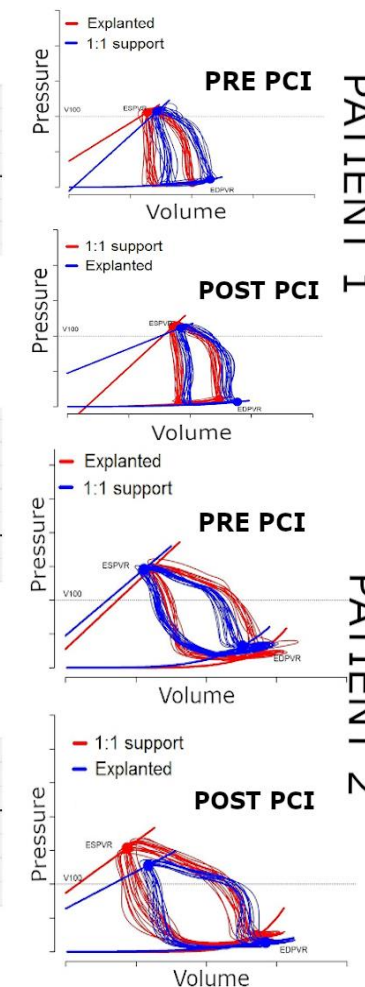
**Methods:** analysis of pressure-volume loop from 19 cases of high-risk PCI.

**Results:** When activated on 1:1 assist ratio, the mean output produced by the pVAD was  $1.36 \pm 0.13$  L/min. Compared to pre-implantation, 1:1 support produced a significant reduction in End-systolic Wall Stress ( $\Delta$ WSes: -11.95%,  $p < 0.01$ ) and PV area ( $\Delta$ PVA: -16.67%,  $p < 0.01$ ). Contractility did not significantly change ( $\Delta$ V100: +29.48%,  $p = 0.073$ ; End-systolic Elastance,  $\Delta$ Ees: 1.24%,  $p = 0.86$ ). Effective Arterial Elastance (Ea), representing afterload, decreased ( $\Delta$ Ea: -12.05%,  $p < 0.05$ ). Total Arterial Compliance ( $\Delta$ TAC: +31.59,  $p < 0.01$ ) increased and Ventricular-arterial Coupling ( $\Delta$ Ea/Ees: -9.79%,  $p = 0.06$ ) non-significantly improved. Mean arterial pressure non-significantly decreased ( $\Delta$ MAP: -6.66%,  $p = 0.06$ ) and global Cardiac Output remained stable ( $\Delta$ CO: -0.06%,  $p = 0.37$ ). When the pVAD was removed after the PCI these changes were reversed (see figure).

## Averaged Pressure-volume measurements



## Examples



**Conclusion:** High-risk PCI with pneumatic MCS may result in LV unloading and reduced myocardial oxygen consumption. Further insights will be released in the PULSE trial (Clinicaltrials.gov NCT03200990).