

Pulmonary Artery Wedge Pressure Respiratory Variation Predicts Hemodynamic Response to Systemic Vasodilators

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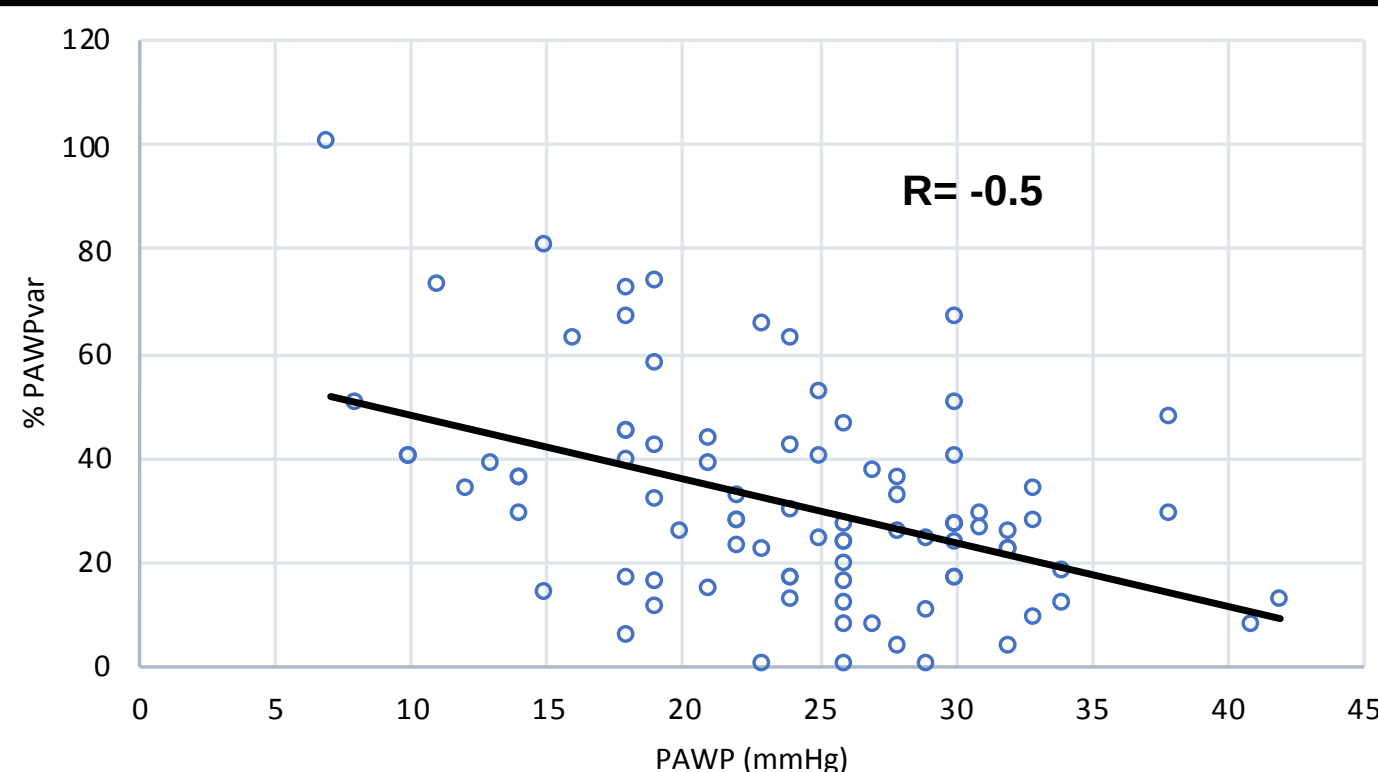
INTRODUCTION

- Obesity and lung disease may enhance pulmonary arterial wedge pressure (PAWP) respiratory variation during right heart catheterization (RHC).
- Physiologic factors leading to PAWP respiratory variation (PAWP_{var}) are unknown, as are the implications of PAWP_{var}.
- We hypothesized that PAWP_{var} is associated with baseline PAWP and would predict response to sodium nitroprusside (SNP).

METHODS

- We performed a retrospective study of 88 RHC studies in 79 cardiomyopathy patients free of severe lung disease, 51 with SNP challenge, at MUSC from 2012 to 2019.
- PAWP_{var} was defined as expiratory minus inspiratory PAWP.

RESULTS

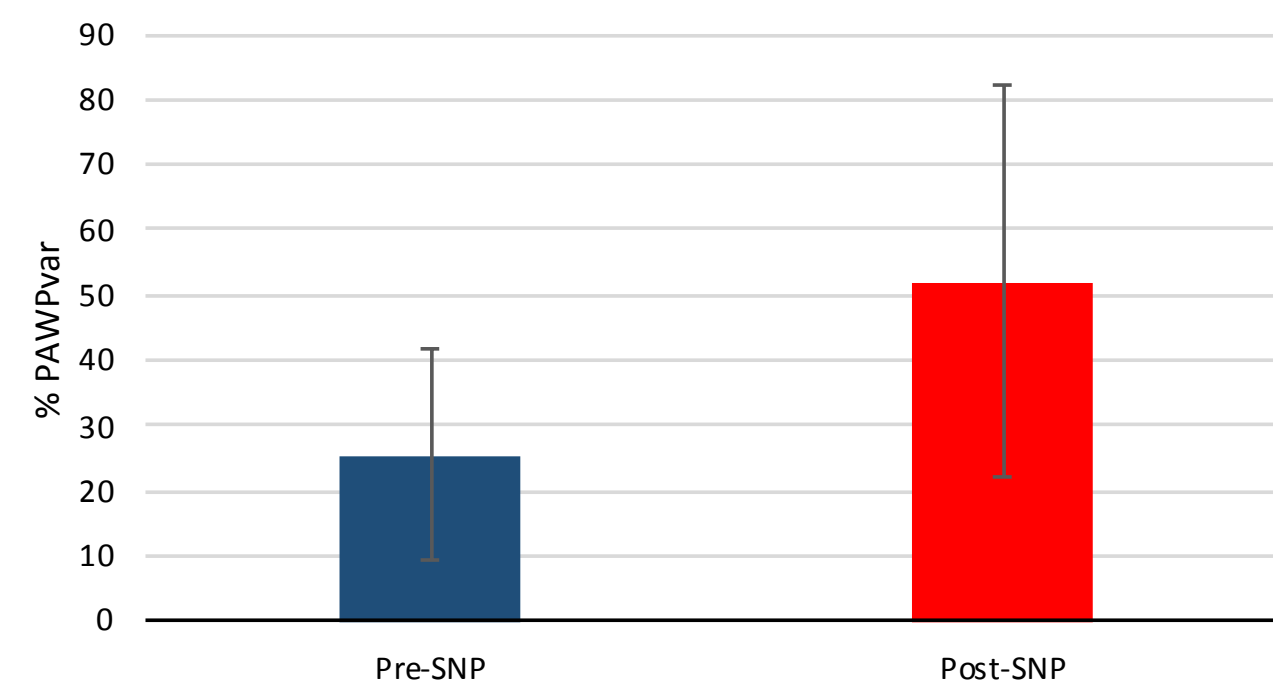


Baseline % PAWP_{var} was inversely correlated with baseline PAWP

DISCLOSURES

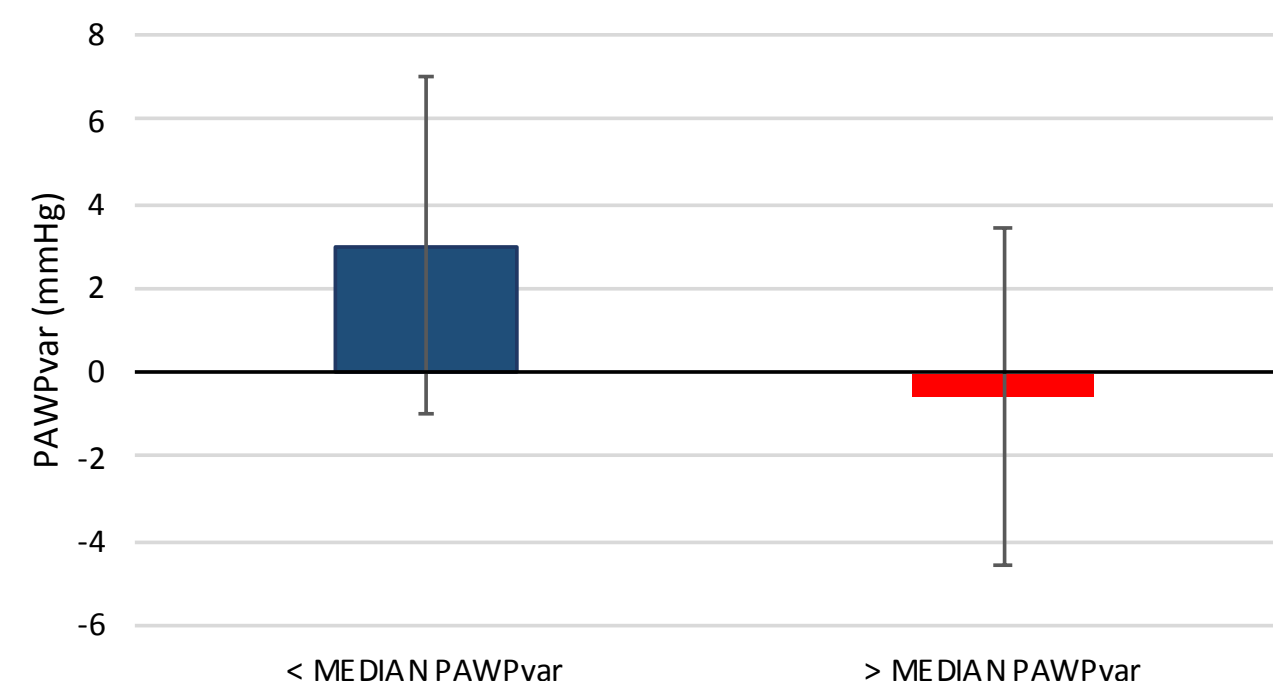
- No disclosures

INCREASE IN % PAWPvar WITH SNP



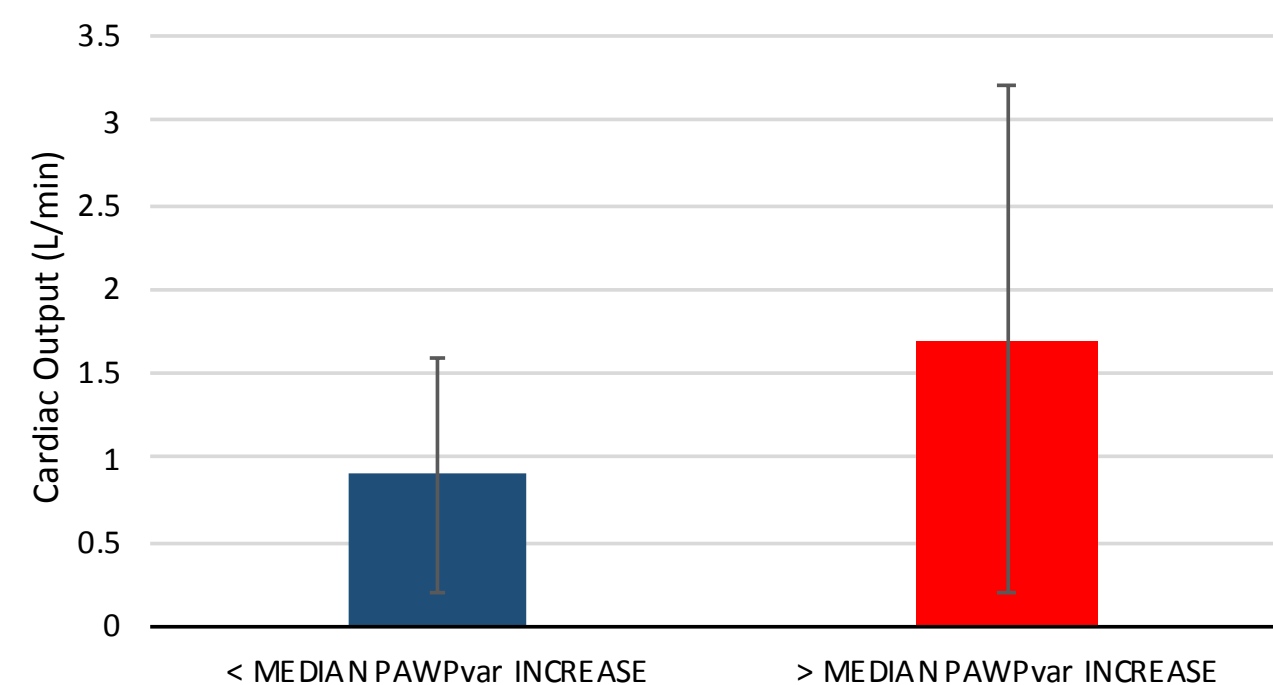
SNP administration led to increased % PAWP_{var} (+27%, p < 0.01)

INCREASE IN PAWPvar WITH SNP



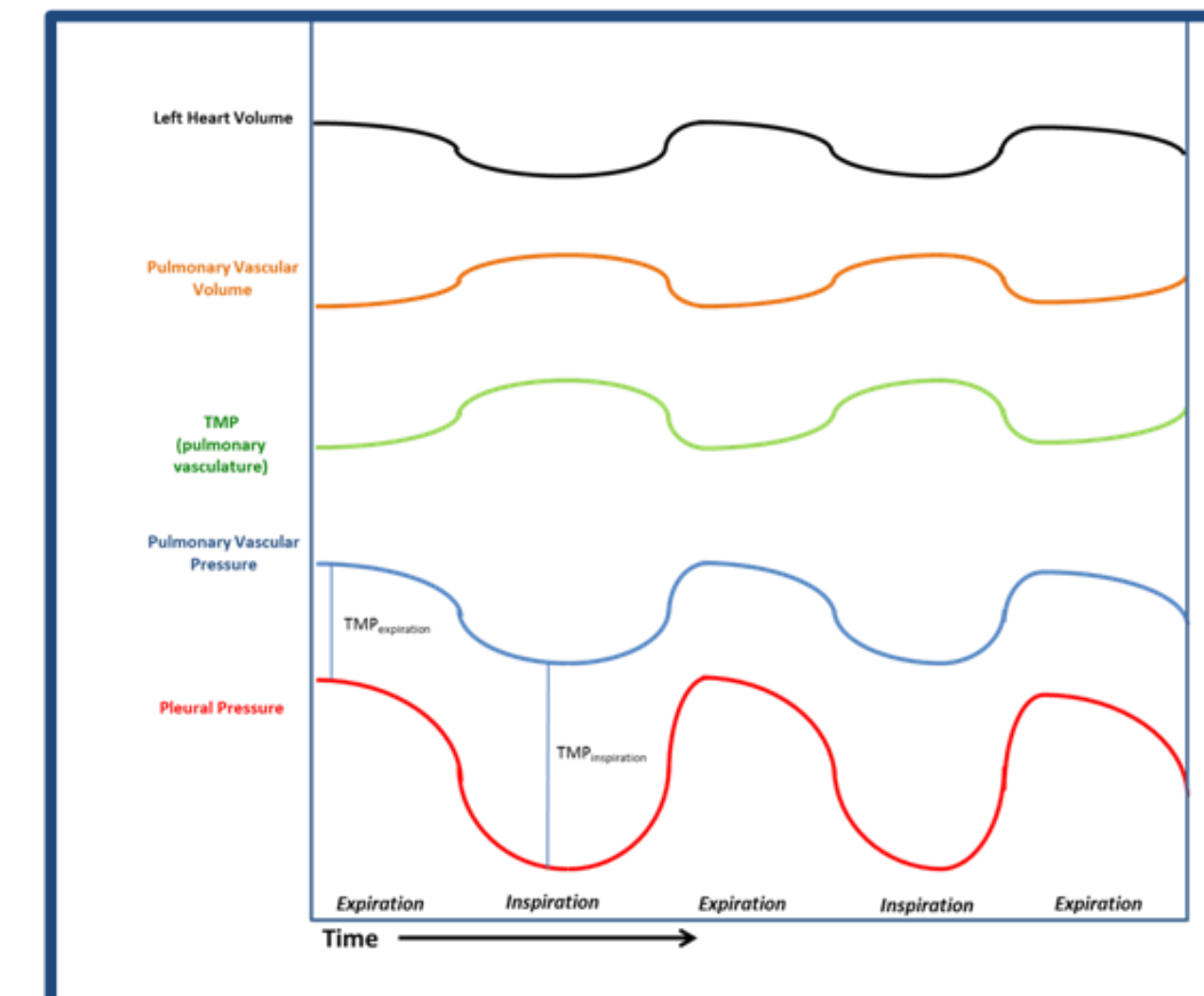
Patients with low baseline PAWP_{var} (< median) had an increase in PAWP_{var} with SNP (3 ± 4 mmHg) while those with high baseline PAWP_{var} (> median) did not (-0.6 ± 4 mmHg; p = 0.003)

AUGMENTATION IN CARDIAC OUTPUT WITH SNP

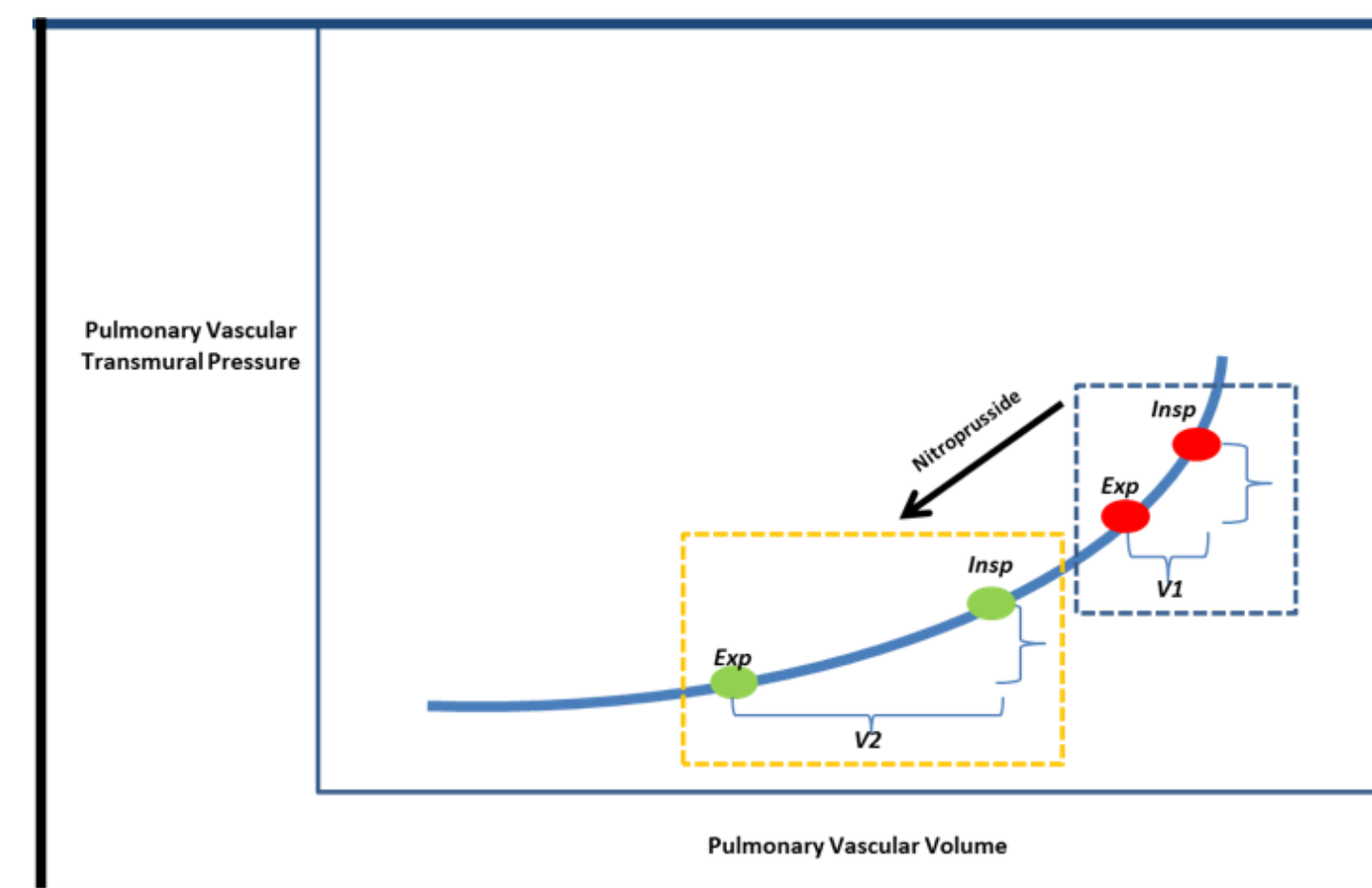


Those who had > median PAWP_{var} increase with SNP had greater CO augmentation compared with those who had < median increase in PAWP_{var} (1.7 ± 1.5 vs. 0.9 ± 0.7 l/min, p = 0.02)

DISCUSSION



Pulmonary vascular pressure declines with inspiration and it does so to a less extent than pleural pressure. Thus, pulmonary vascular transmural pressure (TMP) rises, as does pulmonary vascular volume. Left heart volume therefore declines during inspiration



Nitroprusside alters the pressure-volume relationships by shifting toward a more compliant portion of the pressure-volume relationship. Increased inspiratory volume sequestration in the pulmonary vasculature leads to greater reduction in inspiratory LV filling volume and pressure and thus augmented PAWP_{var}

REFERENCES

- Permutt S, Bromberger-Barnea B, Bane HN. Alveolar pressure, pulmonary venous pressure, and the vascular waterfall. Med Thorac 1962;19:239-60.
- Magder S. Heart-Lung interaction in spontaneous breathing subjects: the basics. Ann Transl Med. 2018 Sep; 6(18): 348.