

Pre-operative Pulse Wave Velocity (PWV) Values and Refractory Systemic Hypotension after Induction of General Anesthesia in Patients Treated with Angiotensin Converting Enzyme Inhibitor: A Pilot Study

Janiczek, D., Casey, DP., Ueda, K.

The University of Iowa Roy J. and Lucille A. Carver College of Medicine, Iowa City, Iowa, USA

Objective: During the induction of anesthesia moderate hemodynamic disturbances are common due to concurrent autonomic nervous system suppression and the stress response from endotracheal intubation. Previous studies have shown that patients chronically taking angiotensin converting enzyme (ACE) inhibitors have a higher incidence of developing hypotension under general anesthesia and are refractory to adrenergic vasoconstrictor medications given to help restore blood pressure. We aimed to investigate whether differences in baseline levels of arterial stiffness, as measured by PWV, contribute to this phenomenon.

Methods: Twenty three patients (69±7 years), chronically taking an ACE-inhibitor and were scheduled for morning surgery under general anesthesia with endotracheal intubation were enrolled. Applanation tonometry (SphygmoCor®) was utilized to measure carotid-femoral PWV (cfPWV) preoperatively. Blood pressure was recorded at 1 minute intervals for 10 minutes after intubation. Three groups were defined by systolic blood pressure (SBP) response; 1) non-hypotension: SBP never dropped greater than 20% from baseline, 2) hypotension: SBP dropped greater than 20% from baseline, however, it was restored with less than 200 mcg phenylephrine, 3) refractory hypotension: SBP dropped greater than 20% from baseline that required more than 200 mcg of phenylephrine to return SBP to baseline.

Results: Of the 23 patients enrolled, 11 (47%) patients developed hypotension within 10 minutes of endotracheal intubation. Among those who developed hypotension, 4 (17%) patients were refractory to phenylephrine (200 mcg bolus). cfPWV values in the non-hypotension, hypotension, and refractory hypotension group were 11.0±1.1, 10.0±0.9 and 8.2±0.9 m/sec, respectively (P=0.2).

Conclusion: Our preliminary results suggest there was a trend for lower pre-operative cfPWV values being associated with the development of hypotension or refractory hypotension during the induction of anesthesia in patients on an ACE inhibitor. These results may help anesthesiologists predict and manage hypotension after induction of general anesthesia and consequently reduce the adverse events from persistent hypotension.

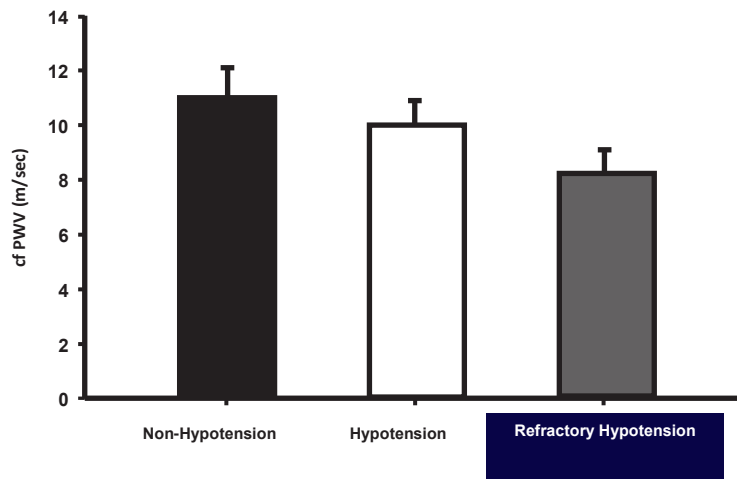


Figure 1: Pre-operative mean cfPWV based on the patient's systolic blood pressure response after induction of general anesthesia.