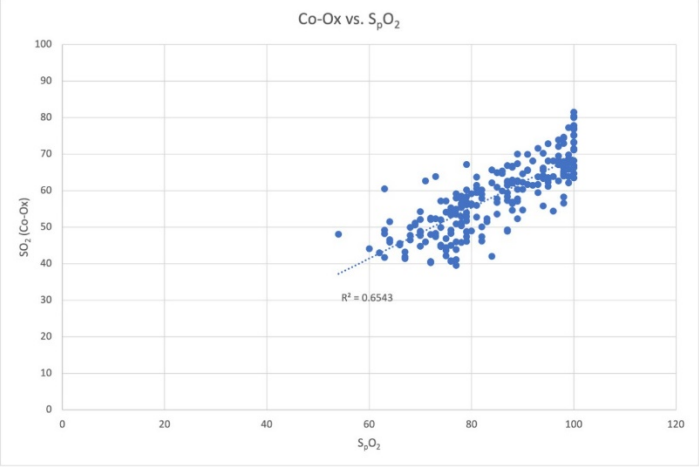
**CO-Oximetric Measurement of Left Innominate Vein Oxygen Saturation During Hypoxemia in Volunteers**

**Presenting Author:** Tris M. Miller, MD, University of Texas Medical Branch (UTMB), Galveston, TX ***Co-Authors:*** *Donald S. Prough, MD, UTMB; David Nash, MD, UTMB; Jesse Supernaw, MSIII; Jamal Saada, UTMB; Michael Kinsky, MD, UTMB; J. Sean Funston, MD, UTMB; Deepinder Mann, MD, UTMB; Beth M. Teegarden, MD, UTMB*

**Background/Introduction:** We previously used a noninvasive optoacoustic (OA) technique in volunteers to measure oxygen saturation ($SO_2$) in the left innominate vein (LIV), which joins the right innominate vein to form the superior vena cava (1). OA monitoring of $SO_2$ in the LIV ($SLIVO_2$) may represent a rapid, convenient method for assessing central venous $SO_2$ in patients in shock. In that study, progressive lower body negative pressure (LBNP) was associated with relatively well maintained $SLIVO_2$ until abrupt hypotension occurred, necessitating immediate termination of LBNP before measurements could be obtained. We hypothesized that graded hypoxemia, used by others to evaluate pulse oximeters (2), would produce stable reductions in $SLIVO_2$ measured by CO-Oximetry.

**Methods:** In a protocol approved by the institutional review board, LIV catheters were placed in 12 healthy volunteers. Pulse oximetry ($SpO_2$), noninvasive blood pressure and ECG monitoring were monitored. Through a snug face mask, $FiO_2$ was changed in the following sequence: 0.21, 0.08, 0.18, 0.09, 0.17, 0.10, 0.16, 0.11, 0.15, 0.12, 0.21. After $SpO_2$ had stabilized at each $FiO_2$, two blood samples were drawn at one-minute intervals and $SLIVO_2$ was immediately measured using a clinical CO-Oximeter. At study conclusion the LIV catheter was withdrawn. Two of 12 subjects became sufficiently uncomfortable that they did not complete the study sequence. $SLIVO_2$ and $SpO_2$were correlated using the coefficient of determination ($R^2$).

**Results:** Because two subjects could not complete the protocol, the total number of measurements of $SLIVO_2$ and $SpO_2$ was 237. Decreases in $SLIVO_2$ correlated well with decreases in $SpO_2$ ($R^2 = 0.65$) (Figure).




**Conclusion:** In volunteers, graded hypoxemia produces stable, highly correlated decreases in $SLIVO_2$. Graded hypoxemia represents a suitable protocol for comparing hemoximetric measurements to optoacoustic measurements of $SLIVO_2$.

**References:** 1. Miller TM, Prough D, Petrov I et al. Optoacoustic Measurement of Central Venous Oxygenation During Simulated Hemorrhage. IARS & SOCCA Abstracts (Critical Care Abstract 36). Anesth Analg 2021;132:291.
2. Louie A, Feiner JR, Bickler PE et al. Four Types of Pulse Oximeters Accurately Detect Hypoxia during Low Perfusion and Motion. Anesthesiology 2018;128:520-530.