

*Comparing Midlines vs Central Line Venous Blood Gas Oxygen Saturation: A Novel Single Center Study*

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**Objectives:** Midlines (ML) are long peripheral intravenous catheters placed in an upper extremity above the antecubital space via the basilic, cephalic, or brachial veins. These provide safe and comfortable long-term vascular access for critically-ill patients and can administer high doses of vasopressors. Central venous oxygen saturations (ScvO<sub>2</sub>) are obtained from central venous catheters (CVCs) and can be used by emergency physicians to determine oxygen delivery and utilization predict cardiac output in critically ill patients. Given the proximity of MLs to the axillary vein, we aimed to compare the equivalence of midline oxygen (MO<sub>2</sub>) saturation and ScvO<sub>2</sub>.

**Methods:** A nonrandomized prospective study in adult patients with a CVC in the internal jugular or subclavian veins, who were planned to have a ML placed or with one already in situ. Venous oxygen saturations were compared between both catheters using a point-of-care iSTAT (Abbott ©) machine with CG4+ cartridges measuring pH, pCO<sub>2</sub>, pO<sub>2</sub>, TCO<sub>2</sub>, HCO<sub>3</sub>, BE, and SO<sub>2</sub>. Samples were obtained after a 10mL waste and analyzed within a 15 minute period.

**Results:** In our preliminary analysis, we enrolled a total of n= 21 patients. The relationship between ScvO<sub>2</sub> and MO<sub>2</sub> was evaluated by the Wilcoxon Signed Rank Test and Bland-Altman Plot Analysis. The mean age was 58.3 years with an average SOFA score of 8.2 and APACHE II of 19.1. The most common admission diagnoses were acute respiratory failure at 42.9%, followed by septic shock at 28.6%. The overall mean ScvO<sub>2</sub> and MO<sub>2</sub> were 67.1% +/- 2.41% and 61.9% +/- 3.48% respectively (p = 0.095), with a mean bias of 5.24% +/- 9.02%. A Bland-Altman analysis demonstrated that more than 50% of central line and midline oxygen saturation had a discordance of at least 5%; a clinically relevant difference. In a subanalysis, samples comparing right sided MLs to CVCs (n=11) revealed a mean ScvO<sub>2</sub> of 66.8% +/- 3.35% and mean MO<sub>2</sub> of 63.3% +/- 5.05% (p=0.3).

**Conclusion:** Our preliminary findings showed an approximate aggregate 5% difference in mean MO<sub>2</sub> vs ScvO<sub>2</sub>, however with significant divergence in >50% of subjects. Given the assumption that CVCs terminate near the right atrium/SVC, right sided ML anatomic location may have a closer relationship to the ScvO<sub>2</sub> as indicated in an early subanalysis. This may provide significant diagnostic and therapeutic value within the emergency department. Further investigation into MO<sub>2</sub> as a potential correlate of ScVO<sub>2</sub> is actively ongoing.