

RESPIRATORY CARE

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2009 OPEN FORUM Abstracts **CORRELATION OF THE SENTEC DIGITAL MONITOR TRANSCUTANEOUS CO₂ MEASUREMENT TO ARTERIAL CO₂ USING ALTERNATE SITE PLACEMENT PROBES**

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Background: Previous studies have compared the TcCO₂ measurement from the ear probe of the SenTec Digital Monitor (SenTec AG, Therwil, Switzerland) to PaCO₂. In this study, we sought to evaluate the ability of SenTec's V-Sign multi-site placement probe at monitoring TcCO₂ using three different sites recommended by the manufacturer. Our hypothesis is that the three sites will accurately correlate with PaCO₂. Methods: After obtaining IRB approval from our institution, we recruited 15 healthy adults already enrolled in one of two other institutional research projects. The other projects required participants to breathe oxygen from a particular oxygen delivery device while an arterial blood gas was performed. This study was performed simultaneously with one of the other two projects. After subjects were seated, V-Sign sensors were placed on the subject's right clavicle, forehead above the right eyebrow, and left mastoid area. Participants were then instructed to relax, breathe normally, and not talk for a period of 15 minutes. During this period of time, stabilization of the SenTec Digital Monitor (SDM) was achieved. After a fifteen minute period, we performed a radial artery blood gas and measured PaCO₂ using a GEM 3000 blood gas analyzer. No air bubbles were observed in any of the syringes and all samples were analyzed within five minutes. Upon flash of blood in the syringe, TcCO₂ values were transcribed from the three SDMs. Between each individual, the sensors were cleaned and calibrated using recommended manufacturer's guidelines. The SDM associated with each site placement was also rotated to ensure that any variance in values was not associated with a particular monitor. Results: All three site placements showed strong positive correlation with PaCO₂. The forehead site showed no statistical difference between mean TcCO₂ and mean PaCO₂ using a paired t-test, whereas the mastoid and clavicle site's mean readings were both 3.1 mmHg lower than actual PaCO₂ and had a 0.57-1.0 mmHg higher standard deviation. Conclusion: All three multi-site placements that we evaluated offer clinicians reliable correlation between TcCO₂ and PaCO₂. Although the mastoid and clavicle sites showed statistical difference ($p < 0.05$) from PaCO₂, the clinical difference appears minimal when one looks at the proximity of the means and standard

deviations. Further research needs to be performed in the clinical setting to see if our results are similar in patients. Sponsored Research - None

Value	Mean	SD	r value with p < 0.01	paired t-test p value	95% CI
PaCO2	37.53	4.17	n/a	n/a	n/a
TcCO2 forehead	38.25	5.05	0.861	0.301	-0.7 to 2.1
TcCO2 mastoid	34.37	5.18	0.741	0.003	-5.1 to -1.2
TcCO2 clavicle	34.35	4.74	0.818	0.001	-4.7 to -1.7

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