CORRELATION BETWEEN ABG PARAMETERS AND THE INTEGRATED PULMONARY INDEX IN A MEDICAL-SURGICAL ICU IN SAUDI ARABIA

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Introduction: ABGs are routinely obtained to monitor adequacy of oxygenation and ventilation in patients undergoing mechanical ventilation. A novel respiratory assessment tool, the Integrated Pulmonary Index, (IPI™), was developed to provide a quick and continuous reflection of the respiratory status and to assist in determining if an intervention is necessary. Through a mathematical algorithm that integrates respiratory rate (RR), end-tidal CO2, pulse rate, and pulse oxygen saturation, the IPI is displayed as a number between 1 and 10, where 8 to 10 indicates a normal overall respiratory status, 5 to 7 the need for assessment and possible intervention, and 1 to 4 calls for prompt intervention. Although IPI has been shown to correlate well with respiratory status in adults and children undergoing procedural sedation, identifying the value that has the strongest correlation with the IPI has not been reported. This study evaluated the correlation between the IPI and values from arterial blood gases routinely obtained in the ICU.

Methods: We prospectively recorded the value of the IPI (Capnostream 20, Covidien, Oridion Capnography, Inc.) from 21 patients who were mechanically ventilated in a medical and surgical ICU at the National Guard Health Affairs in Riyadh, Saudi Arabia. The IPI was documented every two hours as part of the routine patient ventilator "check". A total of 64 "checks" containing both the IPI and arterial blood gas values within the same clock hour were selected for analysis. The RR, FiO2, PaO2/FiO2 ratio and SaO2/FiO2 ratios were also recorded and compared to the IPI. Descriptive statistics and Pearson correlations were obtained using SPSS 19.0 (Chicago, IL). A correlation was significant at the 0.05 level.

Results: The mean IPI and the ABG parameters in the 64 checks were within normal limits (IPI 8.10 +/-1.8; pH 7.41 +/-.04; PaCO2 43.2 +/-9.1; PaO2 94.3 +/-28.7; SaO2 97.3 +/-1.6). The mean PaO2/FiO2 and RR were 260 +/-77.4 and 21 +/-4.3, respectively. The PaCO2 demonstrated a statistically significant but moderate negative correlation with the IPI (r =-.479, p =.000) and the SaO2 had a significant positive correlation with the IPI (r =.247, p = 0.49).

IPI	FIO2	RR	pH	PaCO2	PaO2	SaO2	P/F ratio
Pearson Correlation	-0.075	-0.164	-0.044	-.479**	0.163	.247*	0.233
p value	0.554	0.194	0.731	0.000	0.197	0.049	0.064

**. Correlation was significant at the 0.01 level (2-tailed).

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Conclusion: The mean IPI and the ABG parameters in the 64 checks were within normal limits (IPI 8.10 +/-1.8; pH 7.41 +/-.04; PaCO2 43.2 +/-9.1; PaO2 94.3 +/-28.7; SaO2 97.3 +/-1.6). The mean PaO2/FiO2 and RR were 260 +/-77.4 and 21 +/-4.3, respectively. The PaCO2 demonstrated a statistically significant but moderate negative correlation with the IPI (r =-.479, p =.000) and the SaO2 had a significant positive correlation with the IPI (r =.247, p = 0.49).