

Poster Presentations

COMPARISON BETWEEN TISSUE OXYGEN SATURATION AS DETERMINED BY NEAR-INFRARED SPECTROSCOPY AND DIRECT MEASUREMENTS OF SUBCUTANEOUS TISSUE OXYGEN

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Background: Surgical wound infection is among the most common and serious complications of the perioperative period.¹ Subcutaneous perfusion and oxygenation are important components of immunity to wound infections.² Consistent with this theory, subcutaneous oxygen tension (P_{sq}O₂) is generally considered to be the best predictor of surgical wound infection.³ Near-infrared reflectance spectroscopy (NIRS) oximeters, which allow noninvasive monitoring of tissue oxygen saturation, were recently introduced into clinical practice. We thus tested the hypothesis that muscle oxygen saturation correlates with tissue oxygenation tension as determined by standard direct measurement of subcutaneous oxygen tension.

Methods: With the IRB approval and informed consent, we studied 10 ASA I, healthy volunteers aged 27 ± 5 yr (mean ± SD); 7 were men. Exclusion criteria were use of vasoactive drugs or alpha-2 agonists, obesity, and smoking. A subcutaneous tonometer (Licox, Keil, Germany) was inserted through a 16-g needle into each subject's lateral upper arm for continuous tissue oxygen monitoring (P_{sq}O₂). An NIRS saturation probe (INVOS 3100 Somanetics, Troy, Michigan, U.S.A.) was positioned nearby to monitor subcutaneous and muscle oxygen saturation (S_tO₂). Linear regression analysis was performed to detect the correlation between P_{sq}O₂ and S_tO₂.

Results: The linear relation between P_{sq}O₂ and S_tO₂ was poor: P_{sq}O₂ = 0.99*S_tO₂ - 21, r² = 0.27 (Figure).

Conclusion: There was a poor linear correlation between P_{sq}O₂ and S_tO₂. Our results suggest that noninvasive NIRS determinations of peripheral tissue oxygen saturation may not replace the invasive measurements.

References:

1. N Engl J Med 2000; 342: 161-7
2. Surg Clin North Am 1997; 77: 587-606
3. Arch Surg 1997; 132: 997-1005

