

Noninvasive Remote Monitoring of Tissue Oxygen Saturation

James Turner¹, Ivo P. Torres-Filho², Kevin R. Ward³, R. Wayne Barbee³, M. Hakam Tiba³,
Roland N. Pittman⁴, and Luciana Torres³

*Virginia Commonwealth University Reanimation Engineering Shock Center, Depts. of
¹Chemistry, ²Anesthesiology, ³Emergency Medicine, and ⁴Physiology, Virginia Commonwealth
University, Richmond, VA 23284-2006, USA*

There are presently methods in use or being developed for monitoring tissue oxygen saturation by noninvasive or minimally invasive means. Of the current technologies, near-infrared spectroscopy remains semiquantitative, and gastric tonometry is difficult to put into practice. We have been implementing alternative noninvasive methodology based upon fluorescence and Raman signals from hemoglobin, utilizing visual excitation, which is adaptable for use with fiber optics. Measurements obtained during controlled hemorrhage with animal models showed correlation with other markers of tissue oxygenation such as lactate, base deficit, central venous oxygen saturation and venous-arterial PCO₂.

Support is acknowledged from NIH grant GM57042.