

Jugular Venous Oximetry

Clinical Education

Physiology and Venous Oxygen Saturation

Venous oxygen saturation (SvO_2) is a measurement used to describe the balance between oxygen delivery and consumption in the brain. SvO_2 has been studied comprehensively, since it has shown to be an improved measurement over the traditional methods (heart rate, blood pressure and central venous pressure). Monitoring jugular venous oxygen saturation ($SjvO_2$) has been occurring for many decades and has shown to have useful clinical applications for neurosurgical procedures, cardiovascular procedures, head injuries, and sepsis patients.

Monitoring jugular venous oximetry allows clinicians to make more accurate adjustments, in order to improve the patient's wellbeing and will result in better long term outcomes.

Current Method

In the past monitoring involved the use of co-oximetry laboratory analysis and fiber optic technology. Currently the most common device used are fiber optic catheters. Fiber optic catheters are an invasive method. The Mespere VO 100 Jugular Venous Oximetry is a noninvasive continuous jugular venous oxygenation monitoring system, which uses near infrared spectroscopy to measure venous hemodynamics without the need for invasive catheterization.

Interpreting a Change in Venous Oxygen Saturation

The normal range for $SjvO_2$ is 60-80%, below 60% usually indicates that there is a low oxygen delivery, and above 80% indicates that there is low consumption. When monitoring a patient, clinicians should look for changes of $\pm 5-10\%$ for a period of 5 minutes or longer. If this occurs, that it is an indication of a change in oxygen consumption or demand³. Jugular desaturation commonly occurs in patients with traumatic brain injury⁴, cardiac surgery patients⁵, and patients that are comatose.

Accuracy of Mespere VO 100 Jugular Venous Oximetry Compared to Catheters

Current risks involved with taking a S_{jv}O₂ reading, are catheter placement and maintenance. Catheters are susceptible to conflicting results due to, the rate that the blood is withdrawn, head positioning, and correct tip placement¹. The current precision for commonly used fiber optic catheters, is $\pm 4.41\%$ ². Contrary to fiber optic catheters, the Mespere VO 100 Jugular Venous Oximetry system is not susceptible to these risks since it is non-invasive, blood is not withdrawn and there is no placement or insertion of a catheter. The accuracy and precision of the Mespere VO 100 Jugular Venous Oximetry is $\pm 2.00\%$, therefore it is more precise than the current S_{jv}O₂ continuous monitoring methods.

Clinical Applications of Venous Oxygen Saturation

Monitoring jugular venous oxygen saturation (S_{jv}O₂) has been occurring for many decades and has useful clinical application for neurosurgical procedures, cardiovascular procedures, head injuries, and sepsis patients. Continuous monitoring of venous oxygenation, has shown to be a valuable measurement for clinicians. It allows them to monitor the balance between oxygen delivery and consumption. The Mespere VO 100 Jugular Venous Oximetry is a non-invasive continuous jugular venous oxygenation monitoring system that is more accurate, precise, and has far less risks than most commonly used fiber optic catheters.

The Mespere VO 100 Jugular Venous Oximetry is ideal for use in Emergency Departments, Intensive Care Units and in Anesthesia.

References

1. Holly C.G., Matta B.F., Lam A.M., Mayberg T.S., Accuracy of Continuous Jugular Bulb Venous Oximetry during Intracranial Surgery. *J. Neurosurgical Anesthesiology* 1995;7(3):174-7
2. Mahajan A, et al. An Experiment and clinical evaluation of a novel central venous catheter with integrated oximetry for pediatric patients undergoing cardiac surgery. *International Anesthesia Research Society* 2006; 16:1257-63
3. Frazier J., Theory and Clinical Application of Continuous Fiberoptic Central Venous Oximetry (ScVO₂) Monitoring Edwards Lifesciences
4. Roberson CS, Gopinath SP, Goodman JC, et al. S_{jv}O₂ monitoring in head-injured patients. *J Neurotrauma* 1995;12:891-6
5. Croughwell N. Warming during cardiopulmonary bypass. *Ann Thorac Surg* 1992;53:827-32