

## **Real-Time Hemoglobin Monitoring During Liver Transplantation: A Case Report.**

Peiris P., Torp K., Nguyen J., Shine T., Aniskevich S., Shapiro D. *Proceeding for the Society for the Advancement of Blood Medicine 2010 Annual Meeting.* Abs 4091.

### **Introduction**

The purpose of this study was to investigate whether one could monitor intra-operative hemoglobin changes rapidly and accurately by a simple noninvasive method.

### **Methods**

During a liver transplant operation blood samples are commonly sent for analysis at pre-determined stages of the operation and also at other times as the patient's condition dictates. After obtaining IRB approval and patient consent, we compared the hemoglobin values obtained from our laboratory Coulter Counter with that measured from an eight wavelength infrared Rainbow Pulse CO-Oximeter (Masimo Corporation, Irvine, CA). The CO-Oximeter results were displayed as hemoglobin (SpHb) in g/dL.

### **Case**

The patient was a 53-year-old Hispanic male with end stage liver disease secondary to hepatitis C, hepatoma, and alcohol abuse. After placement of standard monitors prior to induction of anesthesia, two Pulse CO-Oximeter probes were placed on the middle fingers of both hands. The routine liver transplant anesthesia protocol included standard large-bore intravenous access, a Swan-Ganz catheter, and two arterial lines. Eleven blood draws were taken during the operation and SpHb values were retrospectively obtained from the saved data. The measured hemoglobin and two curves for predicted hemoglobin are displayed in the graph below. During massive hemorrhage, having the ability to monitor hemoglobin levels in real time may enable the anesthesiologist to assess and match transfusion needs fast, allowing one to rapidly optimize oxygen delivery, intravascular volume and importantly to avoid over transfusion. This case demonstrated that the Masimo pulse oximeter compared favorably with the laboratory measured values over a range of measured Hb values from 6-12 g/dL. It also gave results faster and as an instantaneous readout. The stored data is also easily retrievable enabling post-procedure processing. A larger study to confirm these findings is indicated. The non-invasive nature of the probe suggests it could also be useful in other situations of rapid blood loss, for example in acute trauma and in the ICU.

## Continuous SpHb versus Laboratory Hb Measurements

