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TITLE: CONTINUOUS MONITORING OF HEPATIC VENOUS OXYGEN SATURATION PREDICT POSTOPERATIVE LIVER DYSFUNCTION

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Introduction: Surgical stress and anesthetics affect hepatic blood flow and oxygen uptake. We have proposed a continuous monitoring of hepatic venous oxygen saturation (ShvO₂) during hepatic surgery for continuous evaluation of hepatic oxygen supply/demand ratio.¹ In the last ASA annual meeting, we reported that low ShvO₂ in hepatic surgery could affect the postoperative serum transaminases. In this study, we prospectively studied the relationship between ShvO₂ and serum transaminases in patients undergoing hepatic lobectomy.

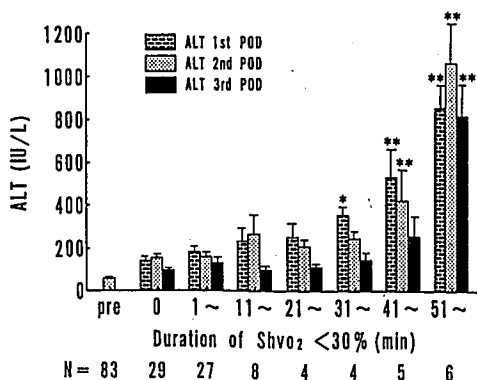
Method: Eighty-three consecutive patients undergoing elective hepatic lobectomy were studied, after institutional approval and informed consent. An oximeter catheter (Oximetrix CO.) was placed in the hepatic vein via the right internal jugular vein for continuous measurement of ShvO₂ during surgery. Anesthesia was maintained with 67% nitrous oxide and oxygen with 1-2% enflurane. The duration of ShvO₂ below 50, 40, 30, 20 and 10 % were determined in each case, from the recordings. Cases were divided into groups according to the ShvO₂ level and the duration. The effect of the duration of ShvO₂ below 10, 20, 30, 40 and 50 % on postoperative changes in AST and ALT were examined. Statistical analysis was done by using ANOVA and Dunnett's test.

Results: Significantly increases in postoperative AST and ALT values were found when the duration of ShvO₂ less than 10, 20, 30, 40 and 50 % were longer than 1, 10, 30, 50 and 180 minutes, respectively. The results of ALT and the duration of ShvO₂ below 30% were shown in the figure.

Discussion: Our results suggested that the intraoperative oxygen supply/demand ratio of liver could influence the postoperative liver function. We recommend that continuous monitoring of hepatic venous oxygen saturation is always done in hepatic surgery to minimize postoperative liver damage.

Reference

1. Kainuma et al. Anesthesiology 74: 49-52, 1991



* p<0.05, ** p<0.01 versus 0 minutes of the duration
N = the number of patients
pre = preoperative value

A415

Title: EVALUATION OF NONINVASIVE OPTICAL SPECTROSCOPY DURING GENERAL ANESTHESIA

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Introduction: Near infra-red in vivo optical spectroscopy penetrates the scalp, skull and brain tissue to a depth of several centimeters. Attenuation of the reflected signal is primarily influenced by the regional saturation of the hemoglobin (rSO₂) within the intracranial microvasculature, and accurately reflects mixed venous cerebral saturation.¹ The aim of our study was to determine its usefulness in detecting imminent cerebral ischemia during general anesthesia.

Methods: With IRB approval 45 patients were studied. Prior to induction the NIR emitter-receiver probe (INVOS 3100, Somnatics, Troy, MI) was attached to patients' foreheads with standard adhesive tape. Anesthesia was maintained using a balanced narcotic technique. All hemodynamic variables, ETCO₂, temperature, pulse oximetry and any changes in rSO₂ after administration of drugs were recorded. Where applicable, data was analyzed using linear regression. P < 0.05 was considered significant.

Results: No episodes of hypoxia (SaO₂ < 90%) occurred in our series. Within the normal SaO₂ range rSO₂ correlated poorly with pulse oximetry (r=0.02). In patients who were hyperventilated (n=18), a lowered ETCO₂ resulted in a decrease in rSO₂ (r=0.95, Figure 1). Response times to changes in rSO₂ were rapid (65±32 seconds). Within the physiological range, mean arterial pressure (MAP) correlated poorly with rSO₂ (r=0.02). One patient, with bilateral carotid artery disease, was sensitive to drops in MAP below 60 mm/Hg (Figure 2). In this patient, SaO₂ measured by pulse oximetry remained at 98±1%. The sudden decreases observed in rSO₂ prompted pharmacological intervention, and maintenance of MAP in the 70-80 mm/Hg range. In patients with rSO₂ values of 70% or below, the administration of isoflurane resulted in an increase of rSO₂ by 12±8%.

Discussion: We found optical spectroscopy to be a reliable and sensitive monitor. It offers a noninvasive technique for measuring cerebral O₂ delivery and/or consumption, and detection of imminent cerebral ischemia even when all other parameters are within normal limits.

Reference: Crit Care Med 19:89-97, 1991

