Comparison of products for preoperative oral rehydration therapy and carbohydrate loading in children

Taito Iwamoto 1, Kozue Iwamoto 1, Tomoharu Shaku o 1, Ai Tayama 2, Yusuke Ohhashi 2, Komei Suzuki 2, Yu Watarai 2, Kazuyuki Serada 1
Department of Anesthesiology 1, Department of Pediatric Surgery 2, Showa University Northern Yokohama Hospital

Objective: In recent years, preoperative oral rehydration therapy or carbohydrate loading for the purpose of enhanced recovery after surgery is scheduled to be put into the perioperative management in many institutions. It is believed that if we select the appropriate beverage, in children, patient discomfort will be reduced, and allows a smooth induction of anesthesia. So we compared the effect of the preoperative beverages in children.

Method: One hundred low-risk patients 1-10 years old scheduled for elective laparoscopic inguinal total extraperitoneal hernia repair, were randomly assigned to an oral rehydration solution liquid (OSB n=20) group, oral rehydration solution jerry (OSJ n=20) group, carbohydrate-rich drink (ArgW n=20) group, drinking water (W n=20) group, or a fasting (NPO n=20) group. All patients placed on NPO once in the midnight of the day before surgery. Between until ago of three hours and two hours that went into operating room, patients in the OSB group, OSJ group, ArgW group, and W group consumed OS-1(Otsuka Pharmaceutical Factory, Tokushima, Japan), OS-1 Jerry (Otsuka Pharmaceutical Factory), Arginaid Water (Nestle Japan Limited, Kobe, Japan), and drinking water respectively. In the crowd that does the drinking water, even 100ml or less (At less than 15kg in weight) or 200ml or less (At 15kg or more in weight) is for drinking. Patients in the NPO group continued fasting until surgery. Anesthesia was induced by inhalation of sevoflurane and oxygen. At the time of venous access, we took blood samples for the measurement of free fatty acid (FFA), albumin, and blood sugar. After intubation, we measured stomach contents using gastric tube, and measured cross-sectional area of pyloric region of stomach (CSA) with ultrasonography. Comparisons among groups were made using ANOVA and Sheffe’s post hoc test. A p value less than 0.05 was considered statistically significant. We evaluated statistical dependence between stomach contents and CSA with calculation of Spearman’s rank correction coefficient.

Result: The amount of the stomach content that had been obtained from gastric tube was intentionally large in the ArgW group. We observed the amount of the stomach content of 25ml or more in 10 cases of ArgW group, 2 cases in OSJ group and 1 case in W group. A comparison of CSA showed no significant differences. There was almost no correlation between CSA and stomach volumes. FFA during induction of anesthesia was significantly lower in ArgW group. Albumin and blood sugar were showed no significant differences in 5 groups. In 1 case of OSB group and 2 cases of NPO group patients caused vomiting after a drinking water first time after the operation.

Conclusions: In children, carbohydrate loading with Arginaid Water keep out patients from starving and possibly PONV without increase of blood sugar. But Arginaid Water may remain in stomach for more than 2 hours.
Accuracy of Noninvasive Hemoglobin Measurements by Pulse CO-Oximetry  
— Smokers vs Non-Smokers

Keiichiro Saito, Aki Ando, Kenji Ito, Maki Takahashi, Toshiyasu Suzuki  
Department of Anesthesiology, Tokai University School of Medicine

With the Masimo rainbow SET Pulse CO-Oximetry, continuous and noninvasive measurements of hemoglobin are now possible. We hypothesized that the carboxyhemoglobin (COHb) and methemoglobin (MetHb) values affect the noninvasive total hemoglobin (SpHb) value, and compared the SpHb and measured hemoglobin (Hb) values of smokers, whose values are likely to be higher, with values obtained from non-smokers.

The study was performed on a group of 20 smokers (group S) and a group of 20 non-smokers (group NS), who are preoperative patients and require invasive arterial blood pressure measurement. We started SpHb monitoring when the patients were admitted, and inserted a radial artery catheter after anesthetic induction. Blood was collected before and after the surgery. Hb, COHb and MetHb were measured with a blood gas analyzer (ABL825), and SpHb was recorded simultaneously. The Hb value obtained by ABL825 was set as X, and the SpHb value measured concurrently was set as Y, and a regression line determined. Comparisons were made for COHb and MetHb between the S and NS groups (t test). The study was performed on 80 samples from 40 patients. The range of measured Hb values obtained by ABL825 was between 5.3 and 15.9 g/dL. The regression equations were $Y = 0.95X + 0.34$, $R^2 = 0.95$ for the S group and $Y = 0.73X + 3.1$, $R^2 = 0.41$ for the NS group. The COHb values were significantly different between the S (1.29± 0.39) and the NS group (1.13± 0.60). The MetHb values were significantly different ($p < 0.05$) between the S group (1.07 ± 0.33) and the NS group (0.71 ± 0.26).

Discussions and Conclusions: The result shows that the MetHb value has the potential to affect the SpHb value.
McGRATH™MAC enhanced direct laryngoscope for intubation of manikin’s trachea: study in medical students

Hidechika Ozawa, Shigeki Yamaguchi, Taro Otani, Yoshiyuki Kimura, Shinsuke Hamaguchi
Department of Anesthesiology, Dokkyo Medical University

Purpose of this study is to evaluate a newly designed the McGRATH®MAC (enhanced direct laryngoscope: EDL) for intubation in a manikin’s trachea for medical students. After obtaining a written informed consent, 24 medical students (5th grade of 6 years medical education in Japan) with no previous experience with tracheal intubation were enrolled in this study. All participants made attempts of intubation at the manikin's trachea using EDL and C-MAC® video laryngoscope (Macintosh laryngoscope: MLS). The primary outcome was the laryngoscopic view evaluated by Cormack-Lehane classification. Time to observation of vocal cord and intubation attempt were also recorded. All students succeeded intubation of the manikin's trachea using both EDL and MLS in the first attempt. EDL (23 of 24 participants) provided significantly more grade 1 laryngoscopic views, compared to MLS (9 of 24 participants). Average of Cormack-Lehane grading using EDL and MLS were 1.0±0.2 and 1.7±0.6, respectively. Time to observation of vocal cord and intubation attempt using EDL (21.1±7.6, 41.7±10.5 seconds, respectively) were significantly shorter when compared with MLS (37.0±13.3, 55.0±18.8 seconds, respectively). Although this study was scheduled and performed using the manikin’s trachea and for medical students, our results suggest that EDL may allow greater ease of tracheal intubation and a quicker intubation time, compared to MLS. Its reason may be due to difference in the shape of laryngoscopic blade between EDL (C angle) and MLS (L angle).
Simplified Goal-Directed Intraoperative Therapy Using the FloTrac Sensor

Kenji Ito, Aki Ando, Maki Yamaguchi, Keiichiro Saito, Toshiyasu Suzuki
Department of Anesthesiology, Tokai University School of Medicine

Recently, anesthesiologists have not only stabilized vital signs management during surgery, but also increased opportunities to discuss postoperative patient outcomes. This phenomenon can be attributed to the expansion of the scope of anesthesiologists to cover the whole medical practice. Among various strategies, Goal-Directed Intraoperative Therapy (GDT) recently attracts the most interest. The aim of GDT is to clear the targeted values of cardiovascular parameters by fluid loading and using vasopressors. In this context, the standardization of control of general anesthesia is expected. Previous reports have stated that practicing GDT is associated with reduced complications and a shorter length of hospital stay for postoperative patients.1) Parameters used in earlier years included mean blood pressure and oxygen extraction fraction. The use of a pulmonary-artery catheter as a device was also attempted. At present, parameters such as stroke volume, cardiac output, and oxygen delivery calculated based on stroke volume and cardiac output, DO2, are used. Furthermore, there has been a shift to use less invasive monitoring devices.

We have devised a simplified GDT using the Vigileo monitor and the FloTrac sensor from Edwards Lifesciences Corporation, and started using this device in practice during cardiac and abdominal surgeries. Stroke volume variation (SVV) obtained from the sensor is used as a parameter. When SVV is over 13%, patients receive a bolus injection of colloidal solution. If an increase in stroke volume as a result of this bolus injection is observed, follow-up observation is performed. If there is no observed increase in stroke volume after several injections of colloidal solution, the use of vasopressors is considered.

To date, there is experience for approximately 50 patients and the results suggest that changes may occur in the volume of infusion, perioperative complications, length of hospital stay, and medical practice cost per patient.

Based on these results, we discuss the usefulness and enhancement of the simplified GDT.

Abel D et al: Goal-Directed Intraoperative Therapy reduced morbidity and Length of hospital stay in high-risk surgical patients: Chest 2007; 1817-1824,