Image guidance has been shown to be useful for placing and subsequently confirming the location of the central venous pressure line's tip (1–3). Our report confirms the dictum that all central venous catheters should have their position confirmed radiographically.

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DOI: 10.1213/01.ane.0000256080.47043.cd

Indocyanine Green Plasma Disappearance Rate as an Indicator of Hepato-Splanchnic Ischemia During Abdominal Compartment Syndrome

To the Editor:

Monitoring of hepato-splanchnic blood flow in critically ill patients is considered important, albeit often difficult to establish. In the clinical setting, indocyanine green plasma disappearance rate (ICG-PDR) as a marker of global hepato-splanchnic blood flow and regional co_2-tension (P_RCO_2) as a measure of gastric mucosal blood flow have been suggested (1,2). Changes in both ICG-PDR and P_RCO_2 have been shown to react within a short-time after interventions (3,4). In addition, variables of systemic O_2 transport (i.e., central venous or mixed venous O_2 saturation) are often used in critically ill patients to detect an imbalance between O_2 supply and demand and are considered helpful in detecting regional hypoperfusion.

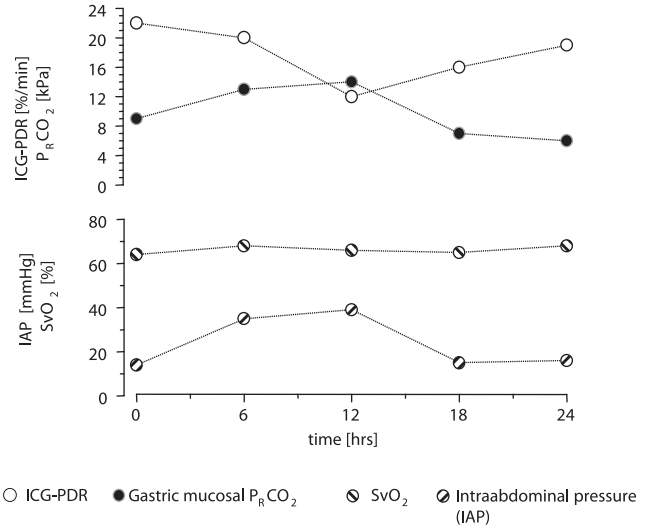

Figure 1. Indocyanine green plasma disappearance rate (ICG-PDR), gastric mucosal CO_2-tension (P_RCO_2), mixed venous O_2 saturation (SvO_2), and intra-abdominal pressure (IAP) over time in a patient with abdominal hypertension and surgical decompression.

We present a case of a 67-yr-old female with hypertensive heart disease who underwent laparotomy for an acute abdomen and in whom a cecal perforation due to carcinoma and a local peritonitis were found. The patient developed septic shock and was admitted postoperatively to the intensive care unit (ICU) requiring 0.1 $\mu g \cdot kg^{-1} \cdot min^{-1}$ norepinephrine for hemodynamic support.

On admission, a pulmonary artery catheter was placed for continuous extended hemodynamic monitoring (7.5F 5-lumen pulmonary artery catheter, Edwards Swan Ganz, CCO/SvO_2, Baxter Healthcare Corporation, Irvine, CA). In addition, ICG-PDR (LiMon, Pulsion Medical Systems AG, Munich, Germany) and P_RCO_2 by the Tonocap system (16F catheter, Tonometrics Division, Helsinki, Finland) were monitored.

The initial findings were within normal limits, and the patient's hemodynamics responded well to further intravascular fluid administration. However, an intraabdominal compartment syndrome developed over the following 6 h (Fig. 1). However, the surgeons were not willing to re-explore the abdomen even though her intraabdominal pressure as measured by the urinary bladder filling technique was 32 mm Hg. Six hours later, ICG-PDR had decreased from 22.2% to 12.0% per minute and P_RCO_2 had increased from 8.0 to 13.9 kPa, respectively. Of note, continuously measured mixed venous O_2 saturation (SvO_2) did not change significantly. The patient then underwent reoperation and the abdomen remained open after surgery due to massive swelling of the gut. After surgery, ICG-PDR and P_RCO_2 improved significantly over the next 12 h. The patient required a long-term ICU stay with tracheotomy for respiratory weaning but was discharged successfully from the ICU on day 29.

In this case, we describe the changes in global and regional O_2 transport parameters observed during intraabdominal hypertension and laparotomy for decompression. As seen in this case and described earlier (5,6), variables of global O_2 transport (here mixed venous O_2 saturation) did not immediately lead to a diagnosis of hepato-splanchnic hypoperfusion. On the other hand, gastric tonometry was used which revealed ischemia, thus confirming ICG-PDR results. In conclusion, ICG-PDR and P_RCO_2 may be more useful than global O_2 transport variables in monitoring changes in hepato-splanchnic blood

in patients with abdominal compartment syndrome.

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DOI: 10.1213/01.ane.0000256097.61730.cc

Respiratory Depression and Difficult Ventilation After Inadvertent Epidural Administration of Remifentanil

To the Editor:

An otherwise healthy 60-year-old man weighing 61 kg was scheduled for elective cholecystectomy under epidural anesthesia. A T8–T9 epidural catheter was placed and 5 mL of a local anesthetic mixture was given via the catheter. The local anesthetic mixture (30 mL) was intended to contain 50 mg tetracaine (lyophilized powder), 1% lidocaine, and epinephrine 1:200,000. However, 1 mg remifentanil was mistakenly substituted for 50 mg tetracaine in the mixture. Two additional 6-mL doses of the mixture were given epidurally at 5-min interval. The patient reported slight light-headedness after the first dose. His hemoglobin oxygen saturation (S_PO_2) decreased to 36% and the patient became unconscious while developing rigidity of the chest and abdominal muscles after the third dose. Mask ventilation was initiated, but was difficult, and the S_PO_2 increased to 76%. The patient received IV propofol 100 mg and vecuronium 8 mg and the S_PO_2 increased to 100% with mask ventilation. The trachea was intubated and surgery was performed under general anesthesia. There were no neurological sequelae after the surgery.

Our patient received 567 μg remifentanil epidurally via three injections over 10 min. The recommended IV bolus dose of remifentanil during general anesthesia is 1 μg/kg. (1) Although 167 μg remifentanil given in the first dose to this patient was much larger than the recommended IV dose of 61 μg, muscle rigidity, respiratory depression, and change of consciousness did not occur. The absence of these signs may have been due to a delay caused by diffusion of remifentanil from the epidural space into the systemic circulation, and its rapid metabolism by nonspecific esterases (1,2).

The remifentanil formulation contains 15 mg glycine per 1 mg remifentanil powder and our patient received 8.5 mg glycine epidurally. Intrathecal administration of glycine in dogs caused hindlimb twitching, pain, and convulsions (1). Intrathecal infusion of glycine alone or as part of the remifentanil formulation resulted in dose-dependent, but reversible, motor impairment in rats (3). The ED_{50} for this effect was 6.5 μg glycine/min over 90 min (3). The lack of neurological deficits in our patient may have been due to the different routes (epidural versus intrathecal) of injection.

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DOI: 10.1213/01.ane.0000258822.21787.db

The Glide Scope: Also Helpful with Difficult Transesophageal Echocardiography Probe Placement

To the Editor:

Hunter and Cohen (1) reported using the Glide Scope to help with difficult nasogastric tube placement. Herein, we describe using a Glide Scope to insert larger tubes/scopes when all other placement methods have failed.

A 64-year-old female patient had been scheduled to undergo a redo sternotomy for replacement of an infected prosthetic aortic valve. Like the patient described by Hunter and Cohen, intubation was simple and difficulty was noted with the nasogastric tube. Routinely, a nasogastric tube is inserted to remove air from the stomach, and removed, prior to placement of the transesophageal echo probe to obtain optimal visualization. We abandoned the nasogastric tube placement and opted for the insertion of the echo probe.

This too met with difficulty at the 20–25 cm mark. All clinical tricks including direct laryngoscopy were unsuccessful. Cardiology was asked to assist, and their efforts were also unsuccessful. We were faced with an urgent clinical