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Independent Study Projects

Title
Summary of ISP : Implementation of Goal Directed Therapy at UCSD.

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**Summary of ISP: Implementation of Goal Directed Therapy at UCSD**

Goal Directed Therapy is the optimization of intraoperative fluids using dynamic markers of volume status such as stroke volume and cardiac output, rather than less sensitive measures such as urine output, blood pressure, and pulse. Using the Frank Starling curve to optimize perfusion with volume, GDT has been shown to decrease complications, decrease hospital and ICU length-of-stay, and decrease overall cost in high-risk patients undergoing surgery. It is not currently in use at UCSD but the aims of this project were to help implement it through resident education.

First, a review of prior literature was done via PubMed using the keywords “Goal Directed Therapy”, “transesophageal doppler”, “fluid optimization”, and “stroke volume variation”. The studies were analyzed for patient population, types of surgery, and outcomes. From the literature, it appeared that the patients most likely to benefit from GDT were mostly ASA III-IV and undergoing major open GI surgery. Although GDT has been used in other surgeries including extremity fractures, hip replacements, major gynecologic surgery, and major urologic surgery, further research is needed to establish a clear-cut benefit to using GDT in these situations.

A website ([http://ucsdgdt.wordpress.com](http://ucsdgdt.wordpress.com)) was then developed in order to educate residents about the rationale, evidence, and protocols for goal-directed therapy, in addition to GDT curriculum given at didactics and grand rounds. To guide clinical decision making, a “Four Quadrant” system had been developed to divide patients into four hemodynamic states based on stroke volume and blood pressure. Goal directed therapy focuses on giving fluid based on volume-responsiveness in order to prevent occult hypoperfusion from hypovolemia, a state of low stroke-volume and low blood pressure. As such, in this project Quadrant III with low stroke volume and low blood pressure was emphasized to help providers best utilize goal directed therapy appropriately.

Two devices are to be used in Goal-Directed Therapy at UCSD: the CardioQ transesophageal doppler and the FloTrac/Vigileo arterial line monitoring system. With the CardioQ, patients level of volume responsiveness is tested with a 200ml fluid bolus. If stroke volume increases >10%, it suggest a preload-dependent state and fluids should be continually given to optimize the patient’s volume-status and prevent occult hypoperfusion. There is no need to place an arterial line with this method.

The other method is using a FloTrac/Vigileo system that connects to an arterial line. It uses a dynamic indicator known as Stroke Volume Variation (SVV), which is determined by how much the stroke volume changes with mechanical ventilation. An elevated SVV >13% suggests hypovolemia and that the patient’s hemodynamics will likely respond favorably.

Although general principles for use of each of these devices are well known, specific algorithms for fluid management intraoperatively are being developed for our institution. Once those algorithms are in place, the curriculum of the website will be updated to better help anesthesia providers use GDT.