ICU MANAGEMENT & PRACTICE

Study Investigates Performance of Masimo PVi® As Part of Goal-Directed Fluid Therapy

Masimo has announced the findings of a recently published study in which researchers at Firat University in Turkey evaluated the performance of Masimo PVi®, a noninvasive and continuous measurement of the dynamic changes in perfusion index (Pi) that occur during respiratory cycles, as the basis of a goal-directed fluid therapy (GDFT) protocol during laparoscopic bariatric surgery on mechanically-ventilated patients.[1]

In the study, Dr. Demirel and colleagues sought to evaluate whether using GDFT guided by PVi on morbidly obese patients undergoing laparoscopic Roux-en-Y gastric bypass (RYGB) surgery might result in less intravenous fluid use without compromising outcomes. They enrolled 60 patients and divided them randomly into control and GDFT groups. The control group's fluid levels were managed by standard fluid therapy, using mean arterial pressure (MAP) and central venous pressure (CVP) measured via a central venous access catheter as indicators of fluid responsiveness. The GDFT group's fluid status was monitored using a GDFT protocol based on PVi as a noninvasive, dynamic indicator of fluid responsiveness.

Both groups were initially administered 500 mL bolus colloid fluid at the beginning of surgery, followed by a continuous infusion of crystalloid fluid (4-8 mL/kg/h in the control group, or 2 mL/kg/h in the GDFT group per the protocol). In the control group, if CVP was less than 6 mmHg or MAP less than 65 mmHg, a 250 mL additional bolus of colloid fluid was administered. In the GDFT group, if PVi was greater than 14% for five minutes, the 250 mL colloid bolus was administered.

The researchers found that there was a significantly higher mean volume of crystalloid fluid administered in the control group (1499 mL ± 516.87 mL) compared to the GDFT group (1126 mL ± 234.98 mL) ($p = 0.001$). There were no significant differences in blood lactate levels ($p > 0.05$) or creatinine levels before and after surgery ($p > 0.05$) between the two groups.

The researchers concluded that, "Utilization of GDFT protocols based on PVi may prevent excessive intraoperative infusion of fluids in laparoscopic bariatric surgery. This method when intending to prevent intraoperative excessive fluid loading in RYGB surgery appears to have no effect on either renal functions or lactate levels. While this study shows the adequacy of PVi for fluid therapy in mechanically ventilated patients undergoing bariatric surgery, further research is warranted to assess adequacy of optimization of PVi."

Reference

1. Demirel I, Bolat E, Altun AY, Özdemir M, and Beştaş A. Efficacy of Goal-Directed Fluid Therapy via Pleth Variability Index During Laparoscopic Roux-en-Y Gastric Bypass Surgery in Morbidly Obese Patients. *Obes Surg*. 31 July 2017. DOI: 10.1007/s11695-017-2840-1

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