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Reliability of Continuous Non-Invasive Assessment of Hemoglobin and Fluid Responsiveness: Impact of Obesity and Abdominal Insufflation Pressures.

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BACKGROUND: During surgery, proper fluid resuscitation and hemostatic control is critical. Pleth variability index (PVI) is advocated as a reliable way of optimizing intraoperative fluid resuscitation. PVI is a measure of dynamic change in perfusion index during a complete respiratory cycle. Non-invasive monitoring of total hemoglobin could provide a reliable means to determine need for transfusion. We analyzed the impact of insufflation and obesity on non-invasive measurements of hemoglobin and PVI in laparoscopic procedures to validate reliability of fluid responsiveness and hemoglobin levels.

METHODS: A non-invasive hemoglobin and PVI monitoring device was prospectively analyzed in patients undergoing abdominal operations. Patients were stratified by open and laparoscopic approach and obesity (body mass index (BMI) ≥35). PVI and hemoglobin values were assessed before, during, and after insufflation and compared to control patients undergoing open surgery.

RESULTS: Sixty-three patients were enrolled (mean age 42 years; 71 % male; mean BMI 36) with 24 patients laparoscopic non-obese (LNO), 20 laparoscopic obese (LO), and 19 undergoing open operations. There was no significant blood loss. Hemoglobin did not change significantly before or after insufflation. There was false elevation of PVI with insufflation and more pronounced in obese patients.

CONCLUSIONS: Insufflation or obesity was not associated with significant variations in hemoglobin. Non-invasive monitoring of hemoglobin is useful in laparoscopic procedures in obese and non-obese patients. PVI values should be used cautiously during laparoscopic procedures, particularly in obese patients.