

The impact of intra-abdominal pressure on the stroke volume variation and plethysmographic variability index in patients undergoing laparoscopic cholecystectomy.

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The purpose of the present study was to evaluate the effect of increasing intra-abdominal pressure (IAP) on stroke volume variation (SVV) and plethysmographic variability index (PVI) in patients undergoing laparoscopic cholecystectomy. PVI examined by Masimo Radical 7 pulse oximeter and SVV determined using FloTrac/Vigileo were monitored simultaneously in forty-five patients undergoing laparoscopic cholecystectomy (LC). Mean arterial blood pressure (MAP), heart rate (HR), cardiac index (CI), perfusion index (PI), airway pressures (P), SVV, and PVI were also recorded at the following predetermined time: 5 min after endotracheal intubation (T1), 5 min after pneumoperitoneum at 5 mmHg (T2), 5 min after pneumoperitoneum at 10 mmHg (T3), 5 min after pneumoperitoneum at 15 mmHg (T4), and 5 min after the termination of pneumoperitoneum (T5). Forty-five patients with a total of 225 pairs of measurements were included in the analysis. Compared with the values at T1, both SVV and PVI showed significant progressive increases as the IAP was adjusted from 5 to 10, 15 mmHg at T2, T3, and T4, respectively. No significant difference was found when the pneumoperitoneum was terminated at T5. Further regressive analysis indicated strong relationships between SVV and IAP ($r = 0.8118$, $p < 0.001$), PVI and IAP($r = 0.8876$, $p < 0.001$) respectively. Both PVI and SVV showed rapid and IAP correlative changes with increasing intra-abdominal pressure in patients undergoing laparoscopic cholecystectomy.