

Dynamic variables of fluid responsiveness during pneumoperitoneum and laparoscopic surgery.
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Background

Few data exist on dynamic variables predicting fluid responsiveness during laparoscopic surgery. The aim of this study was to explore the effects of laparoscopy on four dynamic variables: respiratory variations in pulse pressure (Δ PP), stroke volume variation by Vigileo/FloTrac (SVV (Vigileo)), pleth variability index (PVI) and respiratory variations in pulse oximetry plethysmography waveform amplitude (Δ POP), and their relation to fluid challenges during laparoscopic surgery.

Methods

Δ PP, SVV (Vigileo), PVI and Δ POP were studied in 20 adult patients before and during pneumoperitoneum (10-12 mmHg). During ongoing laparoscopic surgery, relations between the dynamic variables and changes in stroke volume oesophageal Doppler, (SV(OD)) after fluid challenges (250 ml colloid) were evaluated.

Results

Pneumoperitoneum changed the dynamic variables as follows {mean [95% confidence interval (CI)]}: Δ PP 0.5 (-1.3, 2.3)%, $P = 0.53$; SVV (Vigileo) 0.6 (-1.3, 2.5)%, $P = 0.52$; PVI 2.9 (0.4, 5.3)%, $P = 0.025$. For Δ POP, median difference (95% CI) was 2.5 (-0.15, 6.7)%, $P = 0.058$. During laparoscopic surgery, areas under receiver operating characteristics curves (95% CI) were Δ PP 0.53 (0.31-0.75), SVV (Vigileo) 0.74 (0.51-0.90), PVI 0.61 (0.38-0.81), Δ POP 0.63 (0.40-0.82). Correlation coefficients (P-values) between changes in dynamic variables and changes in SV(OD) were Δ PP $r = -0.65$, $P = 0.009$; SVV (Vigileo) $r = -0.73$, $P = 0.002$; PVI $r = -0.22$, $P = 0.44$; Δ POP $r = -0.32$, $P = 0.24$.

Conclusion

Δ PP and SVV (Vigileo) did not change as pneumoperitoneum was established, whereas PVI increased and Δ POP tended to increase. All four dynamic variables predicted fluid responsiveness relatively poor during ongoing laparoscopic surgery. Δ PP and SVV (Vigileo) tracked changes in stroke volume induced by fluid challenges during ongoing laparoscopic surgery, whereas Δ POP and PVI did not.