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Topic : Adhesion Prevention

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Clinical evaluation of peritoneal acidification and fibrinolytic response during laparoscopy, a randomized parallel group study comparing Helium and Carbon dioxide

For laparoscopy, pneumoperitoneum is mainly achieved using CO₂. This endogenous gas is safe, but alters acid-base balance both systemically and on the peritoneum. Local peritoneal fibrinolytic capacity is crucial in postoperative adhesion formation, but the impact of laparoscopic gases on these enzymes is unclear. The gas itself, or the flow of gas might change local biology.

Thirty patients, scheduled for laparoscopic cholecystectomy, were randomized to surgery, using CO₂ or He. Peritoneal pH was monitored throughout the procedure. Peritoneal tissue was sampled before and after creation of pneumoperitoneum, and during the procedure. Samples were analysed for t-PA, the t-PA activity and PAI-1 using ELISA technique.

Peritoneal pH directly dropped with CO₂ reaching 96% of initial values at 4 min, continuing to 91% during surgery. No changes were seen using He. Peritoneal t-PA decreased during surgery in both groups (CO₂: p=0.03, He: p=0.006), but higher levels remained after CO₂ laparoscopy (p=0.005). Peritoneal t-PA activity was maintained during surgery using CO₂, but decreased with He (p=0.004), a decline correlating with time (p=0.001).

CO₂ has an immediate acidifying effect on the peritoneum. Peritoneal t-PA decreased in both groups, but more t-PA remained at end of surgery with CO₂, along with preserved t-PA activity. The lowered peritoneal pH induced by CO₂ does not seem to negatively affect peritoneal fibrinolytic capacity.