

## Intraperitoneal adhesions after open or laparoscopic abdominal procedure: An experimental study in the rat

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**Background:** Adhesion formation is common after abdominal surgery. The incidence and severity of adhesion formation following open or laparoscopic surgery remain controversial. The role of CO<sub>2</sub> pneumoperitoneum is also widely discussed. This study aimed to compare adhesion formation following peritoneal injury by electrocoagulation performed through open or laparoscopic procedures in a rat model.

**Materials and Methods:** Sixty male rats were randomized to undergo a 1.5 cm peritoneal injury with unipolar cautery under general anesthesia: open surgery (Group A, n=20), laparoscopic surgery with CO<sub>2</sub> pneumoperitoneum (Group B, n=20), and laparoscopic surgery with air pneumoperitoneum (Group C, n=20). Duration of the procedures was fixed at 90 minutes in all groups, and pneumoperitoneum pressure was kept at 10 mm Hg. Ten days later, the animals underwent a secondary laparotomy to score peritoneal adhesions using qualitative and quantitative parameters.

**Results:** Forty-five rats developed at least one adhesion: 95% in Group A, 83% in Group B, and 55% in Group C (P<.01; Group C versus Group A, P<.01). According to number, thickness, tenacity, vascularization, extent, type, and grading according to the Zuckerkle classification, no significant difference was observed between Groups A and B. The distribution of adhesions after open surgery was significantly different than after laparoscopic surgery (P<.001). It is interesting that Group C rats developed significantly fewer adhesions at the traumatized site, and their adhesions had less severe qualitative scores compared with those after open surgery (P<.01).

**Conclusion:** In this animal model, CO<sub>2</sub> laparoscopic surgery did not decrease the formation of postoperative adhesion, compared with open surgery. The difference with the animals operated on with air pneumoperitoneum emphasizes the role of CO<sub>2</sub> in peritoneal injury leading to adhesion formation.

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