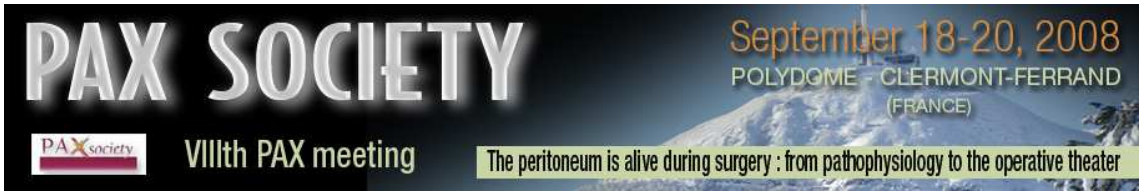

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Molecular mechanisms underlying post-operative peritoneal dissemination might differ between a laparotomy and CO2 pneumoperitoneum: a syngeneic mouse model with controlled respiratory support

The mechanisms promoting post-operative peritoneal dissemination are unclear. The objective of this study was to investigate post-operative tumor dissemination over time on both tissue and molecular levels.

C57BL6 mice were randomized into four groups of 32 animals each: anesthesia alone (control), CO2 pneumoperitoneum at low (2mmHg) or high (8mmHg) intraperitoneal pressure (IPP) and laparotomy. A mouse ovarian cancer cell line (ID8) was injected intraperitoneally just before surgery. Groups were further sub-divided into three groups and a laparotomy was performed to evaluate dissemination on post-operative day (POD) 7, 14 or 42. Comparisons were made using the one-way ANOVA.

The incidence of invasion of cancer cells into the muscle layers of the abdominal wall was significantly higher in the laparotomy and high IPP groups than in the low IPP and control groups on POD 7 and 42. Expression levels of beta 1 integrin, cMet, uPA, uPAR and PAI-1 mRNA in the disseminated nodules were not significantly different among the four groups on POD7. However, expression levels of all of these genes in the disseminated nodules in the laparotomy group were significantly increased on POD14 compared to POD7. They then returned to controls levels on POD42. There were no significant differences in the expression levels of any of these genes among the groups at POD 42

The present study suggests that the molecular mechanisms underlying post-operative peritoneal dissemination might differ between a laparotomy and CO2 pneumoperitoneum; therefore, strategies targeting post-operative tumor dissemination will likely need to account for the surgical environment.