

CARBOXYHEMOGLOBIN CHANGES DUE TO LASER SMOKE AT LAPAROSCOPY

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“ Objectives: Laparoscopic procedures using laser for tissue combustion processes generate smoke. This biphasic aerosol is confined to the abdominal cavity. Respiratory absorption of carbon monoxide causes changes in carboxyhemoglobin levels. Absorption of smoke components through the peritoneum has not been evaluated. To appraise and quantify carbon monoxide absorption in blood via absorption of smoke in the closed abdominal cavity by laser generated smoke, a study assessing the changes in blood concentration of carboxyhemoglobin was designed.

Design: Laparoscopic procedures which generated smoke from laser use was compared to a smokeless control group.

Materials & Methods: Thirty five patients having laparoscopic procedures which generated smoke had carboxyhemoglobin evaluation prior to induction of anesthesia, at 5, 10, 15, 30, 60, and 180 minutes after laser smoke production. Thirty-five control patients having laparoscopic procedures without smoke generation served as controls.

Results: All patients in the smoke group beyond the 15 minute period showed statistically significant acute elevation of carboxyhemoglobin. At 5 minutes 91% (32/35) showed changes. Post-operatively only 17% (6/35) returned to pre-operative levels in 3 hours, 43% (15/35) at 6 hours, 94% (33/35) at 9 hours and all by 9 hours. No control patient developed abnormal carboxyhemoglobin levels.

Conclusion: These data demonstrate an acute elevation in carboxyhemoglobin due to intra-abdominal absorption of smoke resultant from tissue combustion and carbon monoxide during laparoscopic procedures. Increased levels of carboxyhemoglobin reduced oxygen carrying capacity to tissues. Standard pulse oximetry methods do not correct for carboxyhemoglobin which can lead to a false sense of security during anesthesia monitoring. Appropriate laser use and timely evacuation of intra-abdominal smoke is recommended to reduce this hazard.”