64. Loss of Cell Viability Due to CO_2 Pneumoperitoneum During Laparoscopy

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Objective. To assess the effect of CO_2 on cell viability under laparoscopic conditions. *Measurements and Main Results.* Cell viability was measured by flow cytometry counting and analyzing the number of cells incorporating fluorescent dye into fragmented DNA of dead or dying cells. Significant ($p < 0.05$) cell death was observed after 4- to 5-minute exposure to CO_2 used to create and maintain pneumoperitoneum. *Conclusion.* An adverse lethal effect on peritoneal-like cell viability from indirect exposure to CO_2 after 4 to5 minutes is directly attributable to desiccation.

65. Maintenance of Cell Viability at Laparoscopy by Hydration of CO_2

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Objective. To assess the efficacy and efficiency of hydrating CO_2 in maintaining and sustaining cell viability during laparoscopy. *Measurements and Main Results.* The study involved indirect CO_2 exposure of a peritoneal-like cell proxy to 1.3 L/minute gas flow of currently used laparoscopic gas compared to flow with 75% or 95% humidified gas. Cell viability was measured by flow cytometry counting analyzing incorporation of fluorescent dye into fragmented DNA of dead or dying cells. Viability of cells exposed to unconditioned CO_2 showed significant percentage of death attributable to desiccation at 4- to 5-minute exposure. Cells exposed to CO_2 containing 75% or 95% humidity showed sustained viability even after 20 minutes exposure. *Conclusion.* These data demonstrate the importance of modifying CO_2 by heating and hydration to reduce cellular stress, reduce desiccation, and prevent cell death.