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The peritoneum is alive during surgery : from pathophysiology to the operative theater

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Topic : Peritoneal Immunity and Surgery

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PERITONEAL DAMAGE IS CAUSED BY FLUID FLOW GENERATED BY PRESSURIZED IRRIGATION DEVICES

A prerequisite to adhesion formation is peritoneal damage. To assess the effect of pressurized irrigation on intact peritoneum an experiment was designed to analyse and measure five irrigation devices and their effect on intact peritoneum.

One, two and five (1, 2, and 5) second exposure of intact peritoneum by lactated Ringer's irrigation using currently available laparoscopic irrigation devices on porcine peritoneum. Fluid streams were directed at peritoneum for timed durations with biopsies of the areas evaluated by histology.

Fluid streams reached 2,500 cubic millimeters per minute. Tissue pressures ranged between 400 and 800 millimeters mercury (mm Hg) or 7.735-15.47 pounds per square inch. This resulted in dislodging and pressure washing peritoneal cells from intact peritoneum. Single cells, clumps of cells and sheets of peritoneum were found. The peritoneal defects and specimens were edematous and undermined showing evidence of unintended hydro- or aqua-dissection. A force of 550 mm Hg for 5 seconds uniformly resulted in peritoneal cell dislodgement. A pressure of 780 or greater for 1 second uniformly caused peritoneal cell loss from an intact surface.

Pressurized irrigation directed at intact peritoneum can damage, dislodge and strip away peritoneal cells causing defects and un-intended hydro-dissection.