

Laparoscopic spray application of fibrin sealant effects on hemodynamics and spray efficiency at various application pressures and distances.

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Abstract:

Background: Laparoscopic resections of parenchymal organs are increasingly performed. However, little is known about the effects of laparoscopic fibrin sealant spray applications on intraabdominal pressure (IAP) and hemodynamics. Methods: Cardiac and pulmonary monitoring was performed via two central venous pressure lines in the thoracic and abdominal vena cava, a pulmonary artery catheter, and a peripheral artery line. Air was sprayed into the abdomen at pressures of 2, 3, and 4 bar for 30 s. According to the group, a valve on a trocar was open or closed. To optimize fibrin sealant application, the sealant was sprayed at three different application pressures (2, 2.5, and 3 bar) and distances (2, 3.5, and 5 cm). Results: All spray simulations caused a significant increase in the IAP. During the first 10 s of spraying, the IAP increase was 5 mmHg or less, but rose rapidly during the last 20 s of spraying. The IAP increase resulted in decreased pulmonary compliance. Pulmonary resistance and the central venous pressures of both the thoracic and abdominal vena cava increased. At application pressures of 3 and 4 bar, the IAP increase was greater than 2 bar of pressure, reaching IAP values exceeding 35 mmHg. Spray mist formation was primarily dependent on application pressure, whereas clot formation and surface coverage depended on both application pressure and distance. The best results were achieved with an application pressure of 2.5 bar and a distance of 5 cm from the surface. Conclusions: This study shows that fibrin sealants can be used safely in laparoscopic procedures. Keeping the spray periods short and allowing air to escape from

the abdomen can minimize the IAP increase. According to our results, a laparoscopic spray application of fibrin sealant should start with an insufflation pressure of 10 mmHg, an application pressure of 2.5 bar, and an application distance of 5 cm with a valve on the trocar left open. © 2007 Springer Science+Business Media, LLC.