Maintaining Constant Pressure Insufflation in Endoscopic Full Thickness Resection using the EVA15 Insufflator

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Objective of the Technology

Endoscopic Full Thickness Resection, EFTR, presents challenges due to the fact that the space being operated in, the inner cavity (e.g. the stomach), sits within another space, the outer cavity (the peritoneum). Once the wall of the inner cavity is breached, essentially two cavities become a single cavity and the task of insufflation and visualization is negatively impacted. Insufflation gas flows from the inner cavity to the outer cavity often leading to collapse of the inner cavity, rendering continuation of the procedure challenging. The objective of this work was to evaluate a new dual smart insufflation technique, to prevent inner cavity collapse after resection of the inner cavity wall during EFTR.



Figure 1 – Use of two insufflators to simultaneously inflate the stomach and peritoneal cavity at the same constant pressure setting

Description of the Technology and Method of its Use or Application

The EVA15 insufflator (Palliare, Galway, Ireland) is a new smart insufflator designed to provide constant pressure insufflation during endoscopic procedures, in a manner similar to the insufflation paradigm employed for laparoscopic surgery. Two constant pressure EVA15 insufflators were employed (Figure 1) in a porcine EFTR model (both cadaveric and live pigs were used). The first EVA15 was teed in intra-luminally via the endoscope instrument channel and set up to deliver a constant 10mmHg insufflation pressure, using a modified Bioshield Irrigator (Steris Healthcare, Mentor, OH). A second EVA15 insufflator was set up to deliver the same 10mmHg to the peritoneal cavity via a trocar or veress needle. For the purposes of the demonstration, a laparoscopic scissors was deployed laparoscopically via a trocar to resect the stomach wall. A minimal incision, the width of a laparoscopic scissors, was first made, followed by a larger incision approximately 20mm in diameter. The outer wall of the stomach was observed to assess the degree of deflation of the stomach after the incisions were made.

Preliminary Results

As can be seen in Figure 2, satisfactory insufflation of the stomach was maintained for both minor and significant incisions in both porcine models.

Conclusions/Future Directions

This initial application of the "balanced insufflation technique" offers promise in addressing the insufflation challenges of EFTR. Further work will evaluate whether efficacy of visualization is similar during EFTR in the colon.

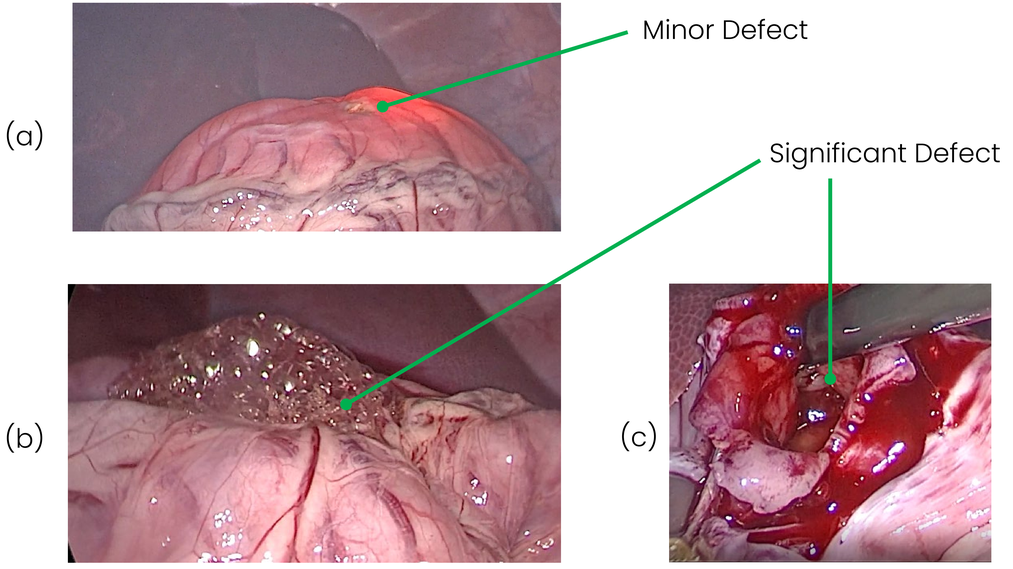


Figure 2 Inflated stomach after (a) small and (b) large (20mm) incision created with a laparoscopic scissors in the presence of a pre-established pneumoperitoneum including (c) laparoscopic view of the latter