ADDITIONAL NON-SCOPE BASED INSUFFLATION VIA A TRANSANAL PLATFORM MAINTAINS THE PROXIMAL ENDOSCOPIC OPERATIVE FIELD DESPITE SUSTAINED SUCTION DURING ADVANCED POLYPECTOMY

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Introduction

Endoscopic submucosal dissection (ESD) and endoscopic mucosal resection (EMR) are advanced polypectomy methods used for the removal of large, sessile polyps. When working in the proximal colon, suctioning to remove fluid and debris often results in a loss of the luminal “operative” field, leading to issues with visibility. It takes time to restore the field and to resume the polypectomy. Ideally, colonic distension would be maintained or minimally affected by suction; however, colonoscope insufflation alone may not always be sufficient. This ex vivo bovine large bowel study assessed the impact of an added source of colonic insufflation via a transanal platform on maintenance of the intraluminal diameter during colonoscopy.

Methods

Ex vivo harvested and mechanically cleaned bovine large bowel with intact sphincter (65-75 cm long) was occluded proximally with a zip tie and placed on a PEG board for this study. A hollow round rubber stent with a phalange on the inner edge (to prevent dislodgement) was placed across the anal sphincter after which a gel faceplate (with insufflation port stopcock), through which a colonoscope had been previously passed, is attached to the stent (GelPOINT Path, Applied Medical, CA). The conditions assessed in this study were: Group A, air insufflation via colonoscope only; and Group B, air insufflation with scope and second source insufflation via the transanal platform. A laparoscopic insufflator (CO2) with a flow rate 20 L/min and pressure limit of 4-6 mmHg was attached to the transanal platform. The time required to fully collapse the proximal colon when applying maximum suction (at 15 mmHg) via the scope was determined for both sets of conditions as was the time required to fully insufflate. A second model was also used wherein the bovine colon was placed in an opaque abdominal box model containing a dense gelatinous material that surrounds the colon and simulates the weight and pressure associated with the abdominal viscera.

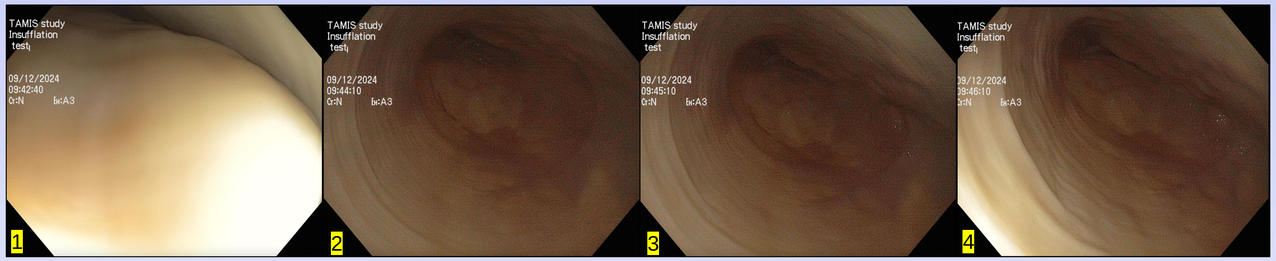


Figure 1: Full collapse of proximal colon

Figure 2: Luminal distention of proximal colon after 1 minute of continuous suction with additional laparoscopic insufflator on at 10L/min flow and set pressure limit of 6mmHg (Group B)

Figure 3: Luminal distention of proximal colon after 2 minutes of continuous suction (continued session from Figure 2)

Figure 4: Luminal distention of proximal colon after 3 minutes of continuous suction (continued session from Figure 2 and 3)

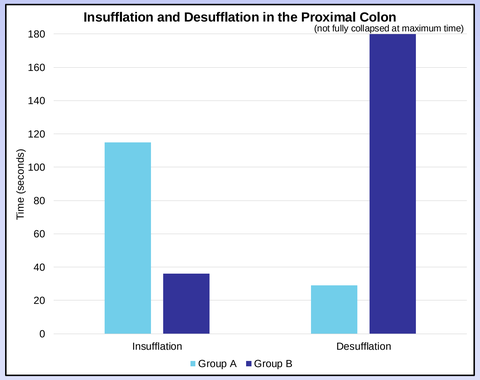
Results

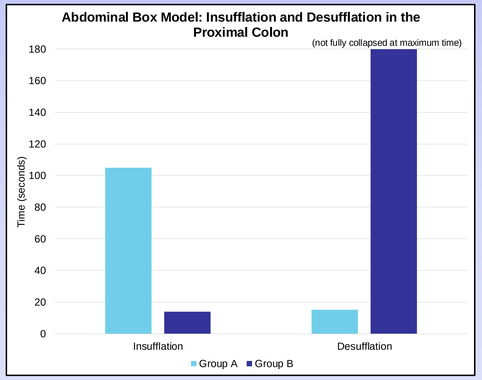
A total of 91 insufflation and desufflation events were carried out. The mean time to fully desufflate the proximal colon was 29 seconds (range 9-54 seconds) for Group A (colonoscope only). In Group B (scope and laparoscopic insufflator set to flow rate of 20 L/min and pressure limit of 4-6mmHg), despite 3 minutes of uninterrupted suction, it was not possible to fully desufflate the proximal colon. Even with lower flow rates of 10 L/min and a pressure limit of 4 mmHg, suction for 3 minutes did not cause full collapse. As regards full insufflation of the entire colon, via the scope alone it took on average 115 seconds (range 86-234 seconds) while via scope and transanal platform with additional laparoscopic insufflator, the mean result was 36 seconds (range 26-44 seconds). Similar results were noted with the abdominal box model.

Conclusion

Maintaining the lumen and exposure while applying maximal suction should facilitate advanced polypectomy. Adding a second means of insufflation at the flow rates assessed, prevented luminal collapse in these models, highlighting a potential role for maintaining an adequate visual field during endoscopic procedures. In contrast, with scope insufflation only, the proximal colon fully collapsed after 29 seconds. The use of a transanal platform may facilitate ESD/EMR by optimizing luminal visibility; further study of second source insufflation and intraluminal pressure dynamics is warranted.







References

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