Comparison of transgastric access techniques for natural orifice transluminal endoscopic surgery.

BACKGROUND: Different transgastric access techniques for natural orifice transluminal endoscopic surgery (NOTES) have been described. OBJECTIVE: To evaluate different methods of transluminal access with regard to leak pressures after the procedure. DESIGN AND SETTING: Experimental endoscopic study in an ex vivo porcine stomach model. METHODS: The following endoscopic techniques for transgastric access were evaluated in 34 stomachs: (1) 1.5-cm to 2-cm linear incision, (2) balloon dilation after needle-knife puncture, (3) via a short submucosal tunnel, and (4) via an extended submucosal tunnel. For techniques 3 and 4, a submucosal tract was endoscopically created by physically separating the mucosa from the muscularis. Mucosal incisions were closed by the standardized application of clips. Handsewn gastric closure after a linear needle-knife incision served as a positive control, whereas, open 1.5-cm to 2-cm gastrotomies were negative controls. After the procedure, pressures to liquid leakage were recorded. RESULTS: The unclosed controls demonstrated leakage at mean (SD) 2 +/- 2 mm Hg, which represents a baseline system resistance. The handsewn gastric closure after linear incision leaked at 50 +/- 7 mm Hg. The needle-knife gastrotomy, the balloon dilation, the short submucosal tunnel, and the extended submucosal tunnel leaked at
37 +/- 15 mm Hg, 41 +/- 24 mm Hg, 44 +/- 13 mm Hg, and 87 +/- 19 mm Hg, respectively. There were significant differences in leakage pressures between the group with the extended submucosal tunnel and all other transgastric access techniques (all P< or = .002). CONCLUSIONS: The extended submucosal tunnel yielded the best leak resistance, which is superior to standard transgastric access methods and rival handsewn interrupted stitches.