

Submucosal endoscopy with mucosal resection (SEMR): a new hybrid technique of endoscopic submucosal dissection

In Western countries endoscopic submucosal dissection (ESD) has not prevailed because of training issues and a target patient population. We identified the ability to transform the submucosa into a free working space within which one could potentially undermine mucosal disease and perform en bloc excision “from the inside out” to the lumen, a direction which should also increase the safety of excising tissues. The same submucosal working space could also allow the overlying intact mucosa to serve as a protective flap during natural orifice transluminal endoscopic surgery (NOTES) access to body cavities, or the performance of achalasia myotomy. Submucosal endoscopy with mucosal safety valve flap (SEMF) was pushed ahead of our initial resection investigations due to the rapid evolution of NOTES experiences [1,2]. With resumed animal experiments, we returned to our original plan, modifying SEMF into submucosal endoscopy with mucosal resection (SEMR), which may offer added safety, simplification, and ease for mucosal resection [3,4].

In live pigs, hypothesized lesions in the rectum and the distal colon were marked by mucosal burns. Submucosal fluid cushions were created, followed by a circumferential mucosal incision (IT knife, Olympus America, Center Valley, Pennsylvania, USA). After isolation of the targeted mucosa, balloon dissection was initiated. Blunt-tipped endoscopic retrograde cholangiopancreatography (ERCP) stone extraction balloons (11.5 mm; model no.B7-2LA, Olympus America, Center Valley, Pennsylvania, USA) were inserted deep into the submucosal fluid cushions (● Fig. 1). The balloon was repeatedly pulled back toward the endoscope tip to disrupt the submucosa and expose the muscularis (● Fig. 2). Residual strands of submucosa were cut (● Fig. 3). A total of 36 lesions, 5.4 ± 1.1 mm in size, were removed in 48.7 ± 23.2 minutes without major complications. ESD may be simplified and made safer by this hybrid technique.



Fig. 1 Blunt-tipped balloon was inserted into the submucosal fluid cushion parallel to the bowel wall just above the muscularis propria.

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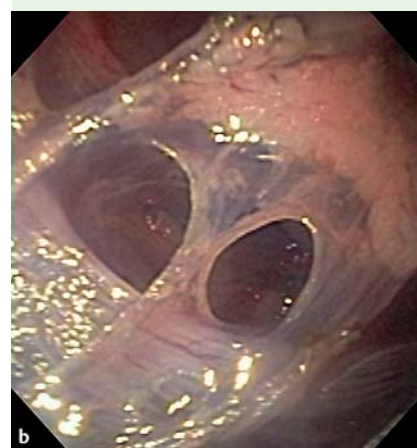


Fig. 2 **a** The balloon was inflated in the submucosal fluid cushion and then pulled back toward the endoscope tip to disrupt the submucosa. **b** After several balloon dissecting passes, persistent bridging strands of submucosal tissue were left connecting the mucosa with the muscularis propria.

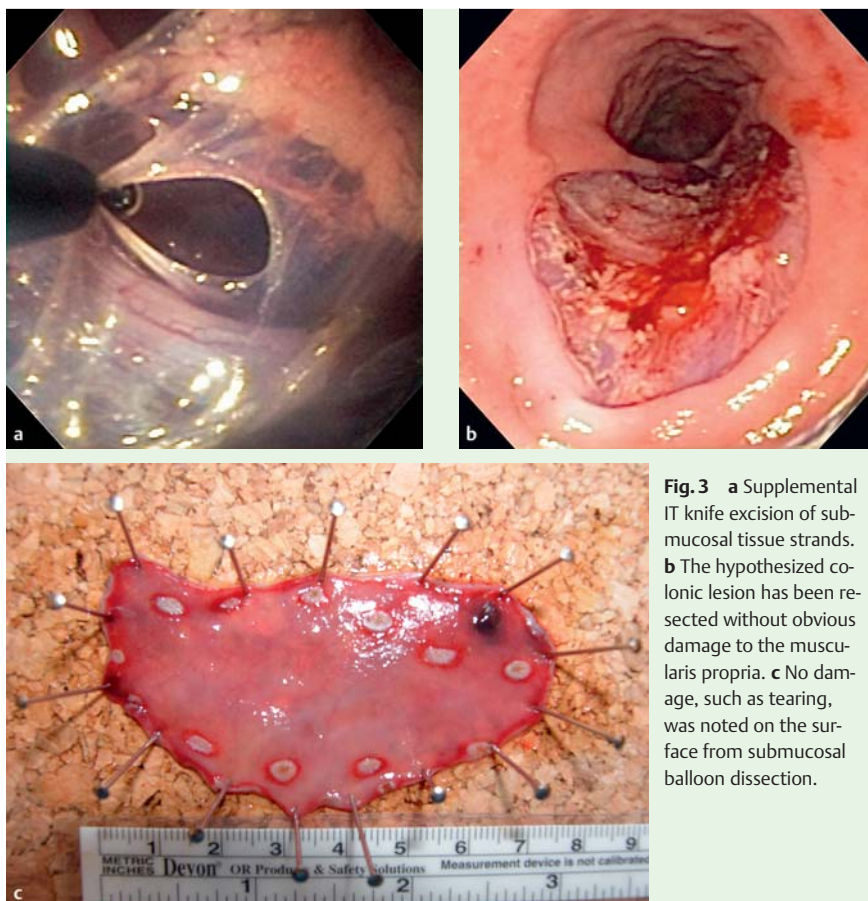


Fig. 3 **a** Supplemental IT knife excision of submucosal tissue strands. **b** The hypothesized colonic lesion has been resected without obvious damage to the muscularis propria. **c** No damage, such as tearing, was noted on the surface from submucosal balloon dissection.

Bibliography

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