

Endoscopic full thickness resection in appendix, issues and solutions (a single center experience)

Rajko Knežević, MD

Diagnostic Center Bled Group, Bled, Slovenia

E-mail: rajko.knezevic@dc-bled.si

Gastroenterolog 2023; supplement 1: 25–27

Keywords: *Endoscopic full thickness resection*

ABSTRACT

Gastrointestinal neoplasms were traditionally treated by surgical resection. Endoscopic techniques such as endoscopic mucosal resection (EMR) and endoscopic submucosal dissection (ESD) have become conventional, effective and safe treatment methods in the last decades. However, those techniques are restricted to superficial neoplasms. Endoscopic full thickness resection (EFTR) is an emerging and evolving technique that can not only yield adequate tissue for histopathological diagnosis, but also spare surgical therapy in selected cases.

Standard and advanced endoscopic techniques (such as EMR and ESD) are sufficient for removal of most gastrointestinal neoplasms, which involve the mucosal and submucosal layer of the gastrointestinal wall, but they have some limitations. Non-lifting lesions, lesions arising from deeper layers, and lesions in difficult locations pose a significant challenge. Due to increased risk of perforation with the use of standard methods, endoscopic full thickness resection (EFTR) with secure gastrointestinal (GI) wall defect closure provides a safe and minimally invasive - compared to surgery - therapeutic option.

The first over-the-flexible-scope device for EFTR was introduced in 2001 by Schurr and colleagues (1), but it was cumbersome and never entered clinical practice. In the following years the extensive research in the field of Natural Orifice Transluminal Endoscopic

Surgery (NOTES) led to improved conservative endoscopic management of iatrogenic GI wall defects. The introduction of over-the-scope clip (OTSC) closure technique opened the door for the development of over-the-scope full-thickness resection device in 2011.

Since then, the method has been gaining ground in clinical use. Several EFTR devices were developed, all of which utilize either suturing or clipping the GI wall before resecting it, thus avoiding opening and contaminating the peritoneal cavity. The vast majority of published studies and reports were performed using the FTRD® System, developed by Ovesco Endoscopy, Tübingen, Germany.

The indications for use of EFTR are versatile and complement the spectrum of standard interventional endoscopic techniques: non-lifting adenomas (treatment naïve or recurrences), adenomas in difficult locations (diverticulum, appendix), re-resection of malignant polyps, subepithelial tumors, early carcinoma, and diagnostic full-thickness resection (e.g., for motility disorders).

Its use is contraindicated in case of known adhesions of GI wall with adjacent organs, near a stenosis, if it is clear that the target tissue cannot be completely excised, and when clipping or surgery is contraindicated due to patient comorbidities (e.g., immunosuppression, anticoagulation therapy).

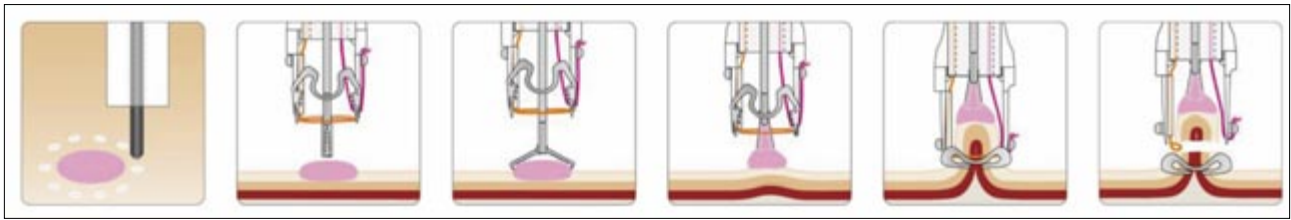


Figure 1. Procedural steps (source: Ovesco Endoscopy AG)

The procedural steps (Fig. 1) when using the FTRD System are: marking the lesion with the FTRD Marking Probe; inserting the endoscope with the mounted FTRD System to the resection site and adjusting the lesion; grasping and mobilizing the lesion with the FTRD Grasper; ensuring the lesion is completely in the cap; deploying the clip; resecting tissue and retrieving the specimen.

The clinical data published on FTRD show overall comparable results in terms of technical success, R0 resection rate and complications rate across different indications (2, 3, 4). The procedure was technically successful in 83–89%, R0 resection was achieved in 76–82%, and complication rate was 9–12%, with surgery due to adverse events needed in 2.0–2.7% of cases.

EFTR at the base of the appendix offers a minimally invasive method of resection and is technically feasible (5). However, the patients should be informed about the risk of possible appendicitis (occurring in 8–17% of cases) and subsequent need for surgical intervention. At present, prophylactic antibiotic therapy is usually administered over the course of three days for such interventions.

In Diagnostic Centre Bled we performed 41 FTRDs between January 2020 and June 2023, 14 of which were at the appendix (Fig. 2). Procedures were done by two endoscopists. 8 patients were female, and 6 were male. Their median age was 68.2 years. The median size of the lesion removed was 12.6 mm. Median procedure time was 51 minutes. The procedures were performed with conscious sedation, using intravenous combination of midazolam and piritramide or fenta-

nyl. Technical success rate, and R0 resection rate were all 85.7%.

Histologically, resected specimen were sessile serrated lesions in 8 cases, low-grade dysplastic tubular adenomas in 5 cases, and high-grade dysplastic tubular adenoma in one case. We performed one re-resection after previous R1 resection of low-grade dysplastic adenoma.

Duration of prophylactic antibiotic therapy administered was 1–3 days.

2 patients (14.3%) needed surgery due to postprocedural appendicitis. Surgery was also needed in two additional patients. One because of R1 resection of low-grade adenoma and one because of subepithelial mucinous neoplasm found at follow up.



Figure 2. Appendiceal EFTR (source: Diagnostic Center Bled)

Our series shows data comparable to reports found in the literature, which confirms the value of this method as feasible and minimally invasive alternative to surgical resection of neoplasms found at the appendiceal orifice.

The procedure is technically demanding, which can be alleviated by careful selection of suitable cases, obtaining a certification for use of the FTRD System and adhering meticulously to the procedural steps.

The location-specific, relatively higher rate of complications, compared to other EFTR procedures - namely appendicitis - calls for further look into the duration and choice of periprocedural antibiotic regimen and possibly use of prophylactic intraluminal appendiceal drainage.

References

1. Schurr et al. Full thickness resection device (FTRD) for endoluminal removal of large bowel tumours: development of the instrument and related experimental studies. *Minim Invasive Ther Allied Technol.* 2001; 10:301–309.
2. Schmidt A et al. Wall-Resect. Colonoscopic full-thickness resection using an over-the-scope device: a prospective multicentre study in various indications. 2018.
3. Zwager et al. Endoscopic full-thickness resection (eFTR) of colorectal lesions: results from the Dutch colorectal eFTR registry. 2020.
4. Meier et al. Efficacy and safety of endoscopic full-thickness resection in the colorectum: Results from the German colonic FTRD registry. 2020.
5. Schmidbauer S et al. Risk of appendicitis after endoscopic full-thickness resection of lesions involving the appendiceal orifice: a retrospective analysis. *Endoscopy* 2021; 53:424-428.
6. Bronzwaer MES et al. Endoscopic full-thickness resection of polyps involving the appendiceal orifice: a prospective observational case study. *Endosc Int Open* 2018; 9:E1112-E1119