

Effect of prior biopsy sampling, tattoo placement, and snare sampling on endoscopic resection of large nonpedunculated colorectal lesions ^(CME)

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Background: Endoscopic manipulations, including biopsy sampling, tattoo application on the lesion itself, and sampling of the lesion with a polypectomy snare, are frequently performed on large nonpedunculated colorectal lesions ≥ 20 mm (LNCL) before referral for endoscopic resection.

Objective: To assess the effect of prior manipulations on the technical difficulty and recurrence rates of subsequent endoscopic treatment.

Design: Retrospective study.

Setting: Two referral centers.

Patients: Patients with LNCL referred for endoscopic resection.

Interventions: Endoscopic resection.

Main Outcome Measurement: En-bloc resection rate, rate of successful complete endoscopic resection without the need for ablation of visible residual, recurrence rate on follow-up, independent predictive factors for en-bloc resection, complete resection without ablation of visible residual, and recurrence.

Results: A total of 132 lesions was analyzed: 46 lesions without any prior manipulation, 44 with prior biopsy sampling only, and 42 with prior advanced manipulation including tattoo and/or snare sampling. The en-bloc resection rate was 34.8% for nonmanipulated lesions, 15.9% for lesions with prior biopsy sampling, and 4.8% for lesions with prior advanced manipulation ($P = .001$). Complete endoscopic resection without the need for ablation of visible residual was performed in 93.5% of nonmanipulated lesions, 68.2% of lesions with prior biopsy sampling, and 50% of lesions with prior advanced manipulation ($P < .001$). Recurrence rates were 7.7%, 40.7%, and 53.8% in the 3 groups ($P = .001$). In multivariate analysis, prior biopsy sampling was an independent predictor for inability to perform complete resection without ablation of visible residual (odds ratio .24, $P < .05$) and for recurrence (odds ratio 11.5, $P = .004$) compared with nonmanipulated lesions. Prior advanced manipulation was an independent predictor for inability to perform en-bloc resection (odds ratio .024, $P = .001$), for inability to perform complete resection without ablation of visible residual (odds ratio .081, $P < .001$), and for recurrence (odds ratio 18.8, $P = .001$).

Limitations: Retrospective study.

Conclusions: Prior biopsy sampling and advanced manipulation have significant deleterious effects on endoscopic treatment of LNCL. (Gastrointest Endosc 2015;81:204-13.)

Abbreviations: APC, argon plasma coagulation; ESD, endoscopic submucosal dissection; LNCL, large nonpedunculated colorectal lesions ≥ 20 mm.

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Endoscopic resection of precancerous adenomas significantly reduces the incidence of colorectal cancer.¹⁻³ However, studies have highlighted deficiencies of both diagnostic and therapeutic colonoscopy by demonstrating a significant incidence of interval cancers in colonoscopy-based screening programs; a recent population-based study demonstrated that interval cancers account for 6% of all colorectal cancers in patients who have undergone colonoscopy.⁴ Interval cancers have been shown to occur because of several factors, including missed lesions and incomplete resection of adenomas. Incomplete resection is a particular concern with large nonpedunculated colorectal lesions ≥ 20 mm (LNCL) where residual/recurrent neoplastic tissue at the site of prior EMR has been reported to occur in approximately 20% to 30% of cases on follow-up colonoscopy within 6 months of the resection.⁵⁻⁸

Several endoscopic techniques have been developed to reduce the incidence of residual/recurrent neoplasia at EMR sites. Ablation therapy with argon plasma coagulation (APC) is used both prophylactically to ablate potential microscopic residual adenoma after piecemeal EMR and to ablate visible areas of adenoma that cannot be successfully excised.^{9,10} Ablation of visible areas of residual is undesirable because of the potential for understaging lesions if foci of invasive cancer are ablated rather than resected and submitted for histologic analysis. In addition, APC of visible lesions may not be efficacious because of the limited depth of ablation, leading to recurrence at the EMR site.^{8,11,12} Advanced resection techniques, including endoscopic submucosal dissection (ESD), pre-cut EMR (also called hybrid ESD), and underwater EMR, have been developed.¹³⁻¹⁶ ESD is technically demanding, particularly in the colon where long procedure times, a prolonged learning curve, and significant perforation rates have prevented widespread adoption in Western countries. Underwater EMR is a newly described technique that is not yet well established but appears to be particularly suitable for fibrotic lesions such as recurrences after standard EMR.^{17,18} Despite these advances, standard EMR with submucosal injection of fluid followed by snare resection in as few pieces as technically possible remains the dominant method for resection of LNCL in Western countries.

EMR is an effective technique with low rates of bleeding and perforation when used to treat lesions without significant fibrosis. During EMR, fluid is injected into the submucosa beneath the lesion to lift the lesion away from the muscularis propria and facilitate safe resection.¹⁹ Fibrosis prevents lifting of lesions. Nonlifting lesions are difficult to grasp and resect with a snare, potentially necessitating APC ablation of visible residual and increasing recurrence rates.¹⁹⁻²¹ When lesions are sampled by biopsy on the initial colonoscopy before referral to specialty centers for resection, fibrosis has been demonstrated to develop beneath the biopsy site within 21 days.²² Additional treatments performed on the initial colonoscopy before referral for resection can cause severe fibrosis,

such as snare excision of 1 or more pieces of the lesion to evaluate for malignancy and tattoo placement at the lesion itself rather than at a sufficient distance. Cautery effects from prior snare excision of pieces of the lesion and tattoo placement at the lesion can make standard EMR impossible to perform.^{23,24} Although previous reports have described an association between prior endoscopic manipulations and failure of EMR, the role of these factors has not been systematically analyzed.

In this study, we investigate the effects of prior biopsy and other endoscopic interventions on the ability to perform successful EMR. Specifically, we explore the effect of prior biopsy sampling and other endoscopic interventions on the ability to resect lesions by en-bloc EMR, to resect lesions completely without resorting to APC ablation of visible neoplasia, and to successfully resect lesions without recurrence on follow-up colonoscopy.

METHODS

Subjects

This 2-center, retrospective, cross-sectional study was approved by the Institutional Review Board of Stanford University and VA Palo Alto Health Care System. Electronic records of all patients referred to a single interventional endoscopist for treatment of LNCL (≥ 2 cm) between January 2011 and March 2014 were reviewed. We excluded pedunculated lesions removed by conventional snare polypectomy, lesions with characteristic features of deeply invasive cancer referred for surgical resection (ulcerated masses, excavated lesions, apple core lesions, etc.), patients with polyposis syndromes requiring surgery, and lesions deemed not amenable to endoscopic treatment (because of the endoscopist's perceived inability to resect safely or deep/circumferential involvement of the appendiceal orifice or ileocecal valve).

Procedures

Lesions were classified into 3 categories based on prior manipulation performed on the initial colonoscopy before referral for resection. The first category consisted of lesions without any prior manipulation (Fig. 1). The second category consisted of lesions with prior forceps biopsy sampling only (Fig. 2). The third group consisted of lesions that had undergone extensive manipulation: histologic sampling by snare polypectomy of parts of the lesion, tattoo injection involving the lesion itself, and/or partial resection before being deemed unresectable by the referring physician (Fig. 3).

All resection procedures were performed by a single endoscopist with extensive experience in EMR, having performed more than 1000 EMR procedures in the past 10 years. All procedures were performed on an outpatient basis. Colonoscopies were performed with moderate sedation using nurse-administered midazolam and fentanyl.

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