EPMR vs. ESD for Large Polyps: A Western Colonoscopist’s View

Ian Holmes, M.D. and Shai Friedland, M.D.
Department of Medicine, Stanford University and VA Palo Alto Palo Alto, CA, USA

Abstract

In Western centers, endoscopic mucosal resection (EMR) is the endoscopic treatment of choice for most non-pedunculated colorectal adenomas >2 cm. EMR is effective and safe enough to be performed without post-procedure hospitalization. Advances in EMR have led to reduced recurrence rates and recent studies have demonstrated excellent outcomes with endoscopic treatment of recurrent adenomas. While studies from Asia have demonstrated lower recurrence rates with endoscopic submucosal dissection (ESD) of colorectal adenomas, concern about the higher perforation risk of ESD and lengthy procedure time required for ESD are two of the barriers preventing widespread adoption of ESD in the West.

Key words: Colonic polyps; Colonoscopy; Colorectal cancer

Introduction

Endoscopic mucosal resection (EMR) is widely used in Western centers to treat non-pedunculated colorectal adenomas >2 cm, while colonic endoscopic submucosal dissection (ESD) is rarely performed outside of Japan and Korea. EMR is associated with a low risk of adverse events, rapid procedure times and a relatively low technical complexity; it is also suitable for outpatient treatment as patients generally only need to be observed for a few hours after the procedure and can go home the same day. ESD is technically complex, requires long procedure times and is associated with a significant risk of intraprocedure and delayed colon perforation; patients require admission to the hospital for observation after the procedure. The main advantage of ESD is the excellent rate of en bloc resection, which reduces local recurrence rates and ensures precise histopathologic staging if malignancy is detected. However, advances in endoscope optics have improved visual assessment of malignancy and improvements in endoscopic technique significantly reduce the local recurrence rate after EMR and facilitate treatment of recurrences. EMR is therefore likely to continue to be a widely used technique for treatment of large colorectal adenomas in the West.
Western Centers

1. Outcomes of EMR

Multiple large observational studies have documented the safety and efficacy of EMR of nonpedunculated colorectal adenomas >2 cm. The prospective multicenter Australian ACE study demonstrated an intention-to-treat 84% rate of successful EMR with a mean procedure duration of 25 minutes. Submucosal invasive cancer was found in 6.9%, and was generally treated with surgery. The adverse event rate was 7.7%; 2.1% required overnight hospitalization for post-procedure pain, 1.5% required a 3-5 day hospitalization and antibiotics for serositis, 2.9% required hospitalization for post-procedure bleeding, and 1.3% had a perforation. A subsequent publication that included more patients and more extensive follow-up demonstrated a local recurrence rate of 16% at 4 month follow-up, with an additional 4% recurrence rate found at 16 months.

Risk factors for recurrence include lesions size >40mm, use of argon plasma to ablate residual adenoma not amenable to snare resection, and prior manipulations leading to fibrosis, such as partial snare polypectomy, tattoo application at the site of the lesion or aggressive biopsies of the lesion.

2. New Advances in EMR

Increased experience and improved endoscopic imaging using higher resolution cameras, dual focus design allowing closer inspection, and proprietary imaging techniques (narrow band imaging, blue laser imaging and iScan) show significant promise in improving endoscopic differentiation of benign and malignant colorectal lesions. This may influence treatment planning, as piecemeal resection with EMR is generally considered acceptable for benign adenomas but en bloc resection should be performed for malignancies.

Avulsion, a newly described technique utilizing a hot biopsy forceps with cutting current, enables complete removal of many fibrotic islands of residual adenoma encountered during EMR. In a comparative analysis with argon plasma coagulation, the use of avulsion resulted in significantly higher rates of complete removal of all visible neoplasia during EMR and markedly reduced recurrence rates.

Underwater EMR is another recently described technique in which colorectal adenomas are removed by snare underwater without submucosal injection. Underwater EMR is particularly well suited for nonlifting lesions with fibrosis from prior incomplete resection attempts or other manipulations. In this setting, it increases the complete resection rate of visible neoplasia and reduces recurrence. Successful underwater snare en bloc resection of 2-4 cm adenomas has also been reported, challenging the conventional approach of avoiding en bloc snare resection of lesions > 2 cm due to the fear of perforation. If ongoing studies confirm the excellent efficacy and safety profile of this initial report, underwater en bloc resection may become more widely adopted.

Treatment of Recurrences after EMR

The majority of recurrences after EMR are unifocal and <5 mm. Over 90% of recurrences can be treated with conventional snare polypectomy, EMR or ablation. A second recurrence is found in 10-40% of patients after treatment of the first recurrence. Underwater EMR appears to be superior to conventional EMR for treating recurrences, with a higher rate of complete removal of visible neoplasia and a lower second recurrence
rate. Even lesions that recur two or more times can be treated successfully with additional EMR or underwater EMR. Treatment of recurrences with EMR or underwater EMR appears to be as safe as treatment of naive lesions, with a low risk of bleeding or perforation. Progression to malignancy during treatment is very rare.

**Comparison of EMR and ESD**

In expert centers, ESD enables complete en bloc resection of >85% of colorectal adenomas and superficial cancers. In contrast, en bloc resection rates for colorectal adenomas >2cm are typically 25% or less with EMR. Adenoma recurrence is significantly more common with EMR than ESD: recurrence rates for adenomas >2cm treated with EMR are typically approximately 16% in Western centers and 7% in Japanese centers, while recurrence rates with ESD are 1.4% in Japan. However, ESD requires significantly longer to perform than EMR: for example, the mean procedure time for EMR in a large Western study was 25 minutes while the mean procedure time for ESD in a large Japanese study was 116 minutes. In the same 2 studies, perforation occurred in 1.3% of patients undergoing EMR and 4.9% of patients undergoing ESD. Hospitalization was required in <10% of the Western EMR patients, while 100% of Japanese patients undergoing colorectal ESD are typically hospitalized for >3 days.

**Conclusions**

EMR is safe and effective for treatment of colorectal adenomas. Compared to ESD, EMR is significantly faster to perform, has a much lower perforation rate, and does not require post-procedure hospitalization. Advances in EMR technique have led to reduced local recurrence rates, and modern treatment of recurrences is technically simple, safe and usually effective. While ESD in expert centers still offers a superior technical result and lower recurrence rate, the procedural complexity, additional unreimbursed procedure time, perforation risk and requirement for post-procedure hospitalization make it unlikely to be widely adopted in the West for treatment of colorectal adenomas. Improvements in endoscopic visual assessment of early submucosal invasive cancer may enable identification of a limited number of patients who may be suitable candidates for ESD in Western centers, if additional data showing safety and long-term efficacy comparable to surgery become available.

**References**

on endoscopic resection of large nonpedunculated colorectal lesions. Gastrointest Endosc. 2015;81:204-213.