ADVANCES IN ENDOSCOPY

Current Developments in Diagnostic and Therapeutic Endoscopy

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Endoscopic Mucosal Resection

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G&H How does endoscopic mucosal resection differ from standard polypectomy?

MC Endoscopic mucosal resection (EMR) allows the resection of large sessile polyps and lateral-spreading tumors, both granular and nongranular. However, en bloc resection, which is desirable for an accurate histologic assessment, can only be used for lesions 25 mm or smaller. Larger lesions must be removed piecemeal. Flat lesions can also be removed en bloc by endoscopic submucosal dissection (ESD). The use of ESD is not widespread in Western countries, as it is risky and requires much skill and experience; it is mainly used in the rectum, where the diameter of the lumen and the thickness of the bowel wall allow a margin of technical error.

G&H How does EMR of polyps differ when used in the duodenum as opposed to the colon?

MC EMR is similar in these 2 anatomic locations. EMR is usually performed with a polypectomy snare after the lesion has been lifted with a submucosal fluid injection (the "inject-and-cut" technique).

The duodenal wall is thin and floppy, and extreme caution is required when performing the resection. The wall of the cecum is also thin, but an unexpected complication such as perforation can be more easily managed in this location (because of better maneuverability of the endoscope due to the size of the lumen).

Submucosal injection is mandatory, as the lifting of the lesion allows better visualization and facilitates grasping with a polypectomy snare. The submucosal injection may also help to avoid entrapment of the muscularis propria, which can cause perforation. Finally, the injection can prevent the onset of delayed perforation caused by an inadvertent thermal lesion following deep resection.

I support the use of a plastic cap in both locations, even though its use has been limited by concerns of entrapping the muscularis mucosa in the snare. The endoscope tip is fitted with a plastic mucosectomy cap (MH-597, Olympus Optical Co). Inside the distal end of the cap is a gutter that positions the opened polypectomy snare. The lesion is first elevated by injecting a mixture of hydroxypropyl methylcellulose and poligeline with epinephrine (1:200,000) into and around the lesion. Indigo carmine is added to the solution to enhance the contrast between the fluid cushion and the polyp. The cap is applied against the lesion, which is aspirated by controlled suction. To minimize the risk of perforation, continuous suction is avoided by filling the cap with tissue. The opened snare is then firmly secured around the tissue, and resection is performed. A monofilament polypectomy snare is used for cap EMR (EMR-C).

However, it should be noted that a cap has been used only rarely in the colon and almost never in the duodenum due to the previously mentioned fear of entrapment.

G&H How safe and effective is EMR?

MC EMR is now routinely performed in most centers and has changed the management of lesions throughout the gastrointestinal tract by allowing many large lesions to be managed without surgery. When performed by an experienced endoscopist on an appropriate lesion, EMR is a safe and effective technique. EMR should not be attempted in ulcerated or depressed lesions without their being lifted after submucosal injection.

Intraprocedural bleeding has been reported in 2–24% of cases but is easily managed endoscopically. Perforation

is a rare complication if the procedure is performed correctly. Even this complication can be successfully treated endoscopically.

Occasionally, EMR may not allow a complete resection of lesions located in difficult-to-access places such as below and/or involving the ileocecal valve. Therefore, EMR-C offers the potential advantage over standard EMR of complete resection regardless of the location of the lesion in the colon. Our data demonstrate that EMR-C in the colon is safe and effective, with a low occurrence of residual or recurrent disease (4%). Residual or recurrent adenomatous tissue is then subsequently destroyed endoscopically.

It should be stressed, however, that EMR of large sessile and flat colorectal or duodenal polyps remains a challenge for many endoscopists and requires special expertise. Most of the published data come from referral centers, and these data do not represent everyday clinical practice.

G&H What is the role of endoscopic clip placement in the management of suspected or actual perforations complicating EMR?

MC "Through-the-scope" clips have further widened the therapeutic possibilities of EMR, allowing management of the most feared complications such as perforation. Standard clips allow closure of small perforations (usually up to 12 mm), although these tools have limitations. In order to use clips, the lesions should be located in an area that is easily accessible by an endoscope and the margins should be able to be joined, allowing the placement of several adjoining clips. However, not all endoscopists are capable of performing this technique.

A new "over-the-scope" clip system, OTSC (Ovesco Endoscopy), appears to be suitable for the closure of larger gastrointestinal leaks. Our group was the first to demonstrate the efficacy of this device, by closing perforations of up to 2 cm.

G&H What are the advantages of EMR over historically used procedures?

MC The main advantages of EMR are maintenance of anatomic integrity and avoidance of unnecessary surgery. It has also been shown that EMR allows for better histologic assessment than obtaining multiple biopsies. Obtaining an adequate histologic evaluation is a challenge after piecemeal resection; however, in my opinion, piecemeal resection has been unjustly criticized. The most important information obtained in the histologic assessment of margins is the depth of neoplastic infiltration, which correlates with an increased risk of malignant invasion. The evaluation of margins can be performed at the end of EMR by using high-definition endoscopy, which confirms the eventual presence of residual adenomatous tissue. EMR also allows radical treatment of intraepithelial neoplasia and, in select cases, neoplastic lesions infiltrating the upper third of the submucosal layer.

G&H Have there been any head-to-head studies comparing EMR with other procedures?

MC ESD allows the en bloc resection of large flat lesions, but this procedure is difficult and time consuming, requires special skill, and is associated with a high risk of perforation. Japanese researchers have compared EMR with ESD in the colon, confirming the usefulness of both techniques. ESD should be limited to select lesions, where en bloc and deeper resection is needed. It would also be useful to compare different EMR techniques, for example, the "inject-and-cut" technique with the cap-assisted technique.

G&H What are the risks associated with EMR?

MC The benefits of EMR outweigh the risks when the procedure is optimally applied. Incomplete resections should be avoided, as the residual adenomatous tissue can grow, and scarring from the initial EMR may prevent definitive treatment. This can lead to an increased incidence of major complications, particularly perforation. Referral centers often receive patients who have undergone unsuccessful EMR. It is preferable for centers with the most expertise to perform the initial EMR to reduce complications and increase the likelihood of procedural success. In addition, a duodenal EMR of a large lesion can cause a deformity and stricture of the organ.

G&H What training is necessary for endoscopists wishing to perform EMR of large polyps in the duodenum and colon?

MC EMR is a technically demanding procedure that should only be undertaken by experienced endoscopists. This technique should be learned under the supervision of a senior endoscopist and, if possible, in a large-volume center.

In addition, it is essential to know the skill of the supervising endoscopist. Anyone who wishes to perform this technique must be capable of managing the potential complications, particularly bleeding. To remain technically proficient, it is necessary to regularly perform these procedures (I would suggest at least 60 colorectal EMRs and 15 duodenal EMRs per year). However, as already mentioned, not all endoscopists are equally proficient at the procedures.

G&H Do you perform EMR on an outpatient basis, or do you monitor patients overnight in the hospital?

MC In our hospital, after EMR is performed, almost all patients are hospitalized for 24–48 hours, and a liquid diet is given. Patients undergoing EMR-C are also hospitalized, as the resection is very deep. Bleeding usually occurs in the first 24 hours or 5–7 days postprocedure.

G&H How high is patient satisfaction for this procedure?

MC Before the procedure is performed, patients should be informed not only of the risks associated with EMR, but also of the benefits (eg, the avoidance of surgery). We perform endotherapy under deep sedation with propofol; EMR patients do not experience pain or discomfort following the procedure, which is important for patients.

After piecemeal EMR of large lesions, patients must undergo surveillance endoscopy at 3, 6, and 12 months. These follow-up procedures are performed on an outpatient basis, and even if minimal re-treatment is performed, patients can leave the hospital immediately afterward.

G&H In which patients is EMR most effective?

MC Every patient can potentially benefit from this treatment, including those patients whose age or comorbidities would contraindicate surgical treatment. In my opinion, the age of ablative treatments (laser or argon plasma coagulation) is over. However, argon plasma coagulation may still occasionally be used to aid treatment at the end of EMR or to destroy areas of minimal residual adenoma detected at follow-up.

EMR has many applications. For example, it is an extremely effective staging technique, particularly in patients with Barrett esophagus and early neoplasia. Another application involves large lesions of the large bowel and duodenum; these lesions should not be biopsied but immediately referred for EMR, which can provide definitive treatment. Biopsies can often miss foci containing intraepithelial neoplasia and may cause fibrosis of the submucosa precluding an easy EMR.

G&H Are there any new or emerging EMR techniques?

MC For an interventional endoscopist, ESD is an appealing technique, as there is no risk of recurrence. To become widely applied, however, the procedure must be simple, reproducible, and not lengthy.

We need new endoscopes as well as new, user-friendly instruments that could allow an easy and safe submucosal dissection. We are also anticipating data on the new EndoSamurai system (Olympus Medical Systems Corp).

Suggested Reading

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