PENNSTATE HERSHEY
Milton S. Hershey Medical Center

Division of Gastroenterology and Hepatology

Endoscopic Mucosal Resection (EMR) and Endoscopic Submucosal Dissection (ESD) for the Safe and Effective Removal of Cancerous or Potentially Cancerous Lesions from the Gastrointestinal Tract

With advances in endoscopic equipment and techniques, endoscopic mucosal resection (EMR) and endoscopic submucosal dissection (ESD) have become established treatments for the safe and effective removal of mucosal lesions of the esophagus, stomach, duodenum and colon. The effective resection of these lesions allows for the endoscopic cure and/or definitive staging of gastrointestinal, mucosal, neoplastic lesions in these respective organs. EMR and ESD are now routinely performed at many large volume referral medical centers such as Penn State Hershey Medical Center and have changed the management of these lesions throughout the gastrointestinal tract by allowing effective resection without the need for major surgery. Indications for EMR and ESD include:

- Mucosal lesions of the esophagus (cancerous or potentially cancerous) including nodules or masses within Barrett's Esophagus and short segment Barrett's Esophagus with dysplasia.
- Gastric mucosal lesions.
- Duodenal lesions, including ampullary lesions requiring ERCP assisted ampullectomy.
- Adenomatous colon and rectal lesions which are not amendable to safe or complete removal during a screening a colonoscopy.
- Limited gastric and rectal carcinoid tumors.
- In highly selected cases, submucosal lesions may be resected by EMR or ESD with good results.

These procedures are highly effective and should result in endoscopic cure in amenable and properly staged lesions. Cure can be expected in a high percentage of cancerous lesions in the upper GI tract which have a stage of T1A and less (cancerous tissue does not invade through the muscularis mucosa). The criteria for endoscopic curative treatment of colon and rectal lesions has recently been proposed to be expanded to include lesions with limited submucosal invasion without certain high risk features.* Lesions more advanced then these will be effective staged, but should receive consideration of more definitive treatments, such as major surgery. A variety of techniques are used in EMR for complete removal of lesions depending on the nature of the tumor and its location. Typically at PSHMC, injection of an EMR cocktail of either normal saline or hydroxy propyl methylcellulose with dilute epinephrine and methylene blue is used to separate the lesions from the important muscularis propria, allowing better visualization and prevention of entrapment or damage to the muscularis propria by separating it from the resection plane and any thermal injury which could occur.

ESD is a more aggressive technique of using recently available tools to perform a dissection through the submucosal dissection plane and removing an entire lesion en block. This allows a thorough resection of larger flat lesions with more definitive histological assessments and lesion removal. However, this lesion is more technically demanding and time consuming with an increased rate of complications. However, ESD is considered in select cases at PSHMC where en block or a deeper resection is required.

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The benefits of EMR and ESD outweigh the risks when performed in a high volume center with an appropriate team with skilled interventional endoscopists who have the correct equipment and procedure volume, such as PSHMC. However, complications can occur and should be explained to the patient. Complications include bleeding which occurs in 5-10% of cases.** Sixty-five percent of these bleeding episodes will occur within 24 hours of EMR, and patients may be kept for that period of time for observation at PSHMC. Perforation has been known to occur in approximately 1% of EMR procedures and approximately 2-5% of cases for ESD. The estimated rates of lesion recurrence after EMR is estimated at 1 to 11%, and is felt to be less in ESD.*** In order to prevent incomplete EMR and ESD, it is important for referring physicians to know that previous failed attempts at lesion removal using electrocautery will increase the technical difficulty of EMR and increase the risk of incomplete lesion removal and/or complications. If a lesion is identified during a screening procedure and is not felt to be appropriate for complete removal during the screening procedure, it is best to leave the lesion alone, mark it appropriately, and/or biopsy the periphery (if histological confirmation is required) and then refer for EMR or ESD.

In order to assure abnormal tissue is not been left behind, patients will be brought back in 3-6 months for a repeat colonoscopy and possible argon photo ablation of any abnormal tissue that has been left behind, with a repeat surveillance colonoscopy typically done in one year's time. At that point, the patients will typically be referred back to their referral physicians to reenter a routine surveillance program. All three of the authors or this update are available to discuss cases that may be amendable for these procedures, and a referral physician should feel free to call the office for discussion. Any referral for this procedure can easily be done using the Open Access Form which is available by calling 717-531-8364. This form should be accompanied by the original procedure report and/or pathology report from the outside institution.

* *Journal of Gastroenterology and Hepatology* 27 (2012) page 1057-1062.
** Metz, et al. *Endoscopy*, 2011.
****Endoscopy*, 2011 November (43): page 941

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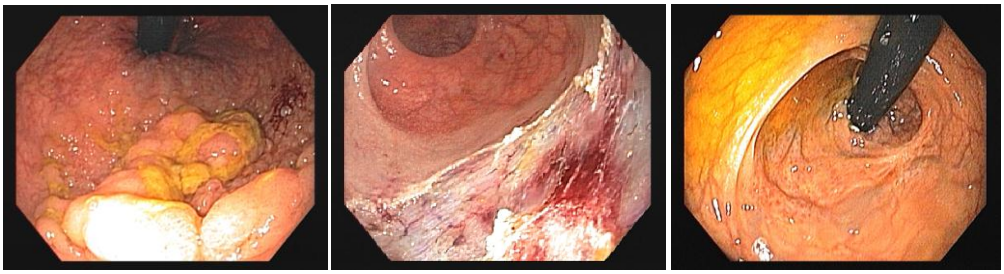
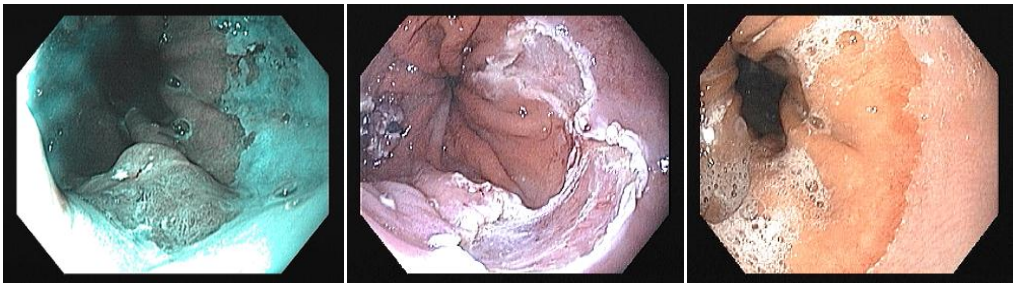


1. A large adenomatous polypoid rectal lesion resected by EMR. Shown are representative shots before, during and 6 months after the resection. Final pathology revealed tubulovillous adenoma with clear margins. Follow-up biopsies were normal.



2. A nodular lesion within a field of known Barrett's Esophagus with high grade dysplasia . This nodule was shown to be adenocarcinoma on targeted biopsy at the EGD-EUS staging procedure and was selectively resected by EMR technique. Shown are representative shots before, during and 19 months after the resection. Final pathology revealed intramucosal adenocarcinoma completely resected from a background of Barrett's Esophagus with focal areas of high grade dysplasia. The remaining field of Barrett's Esophagus was treated to resolution using endoscopically applied radiofrequency ablation at 3 mos intervals X 4.

3. A large tubulovillous adenoma of the colon, which was resected by EMR. Shown are representative shots before, during and 6 months after the resection. Final pathology revealed tubulovillous adenoma with high grade dysplasia with a complete resection.

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