

Introduction

In the US ~28,000 colectomies/year are done for colorectal adenomas. The associated mortality, as per the NCDB, is 1-1.5% (280-420 patients).¹ In Japan and Far East, these lesions are removed en bloc, colonoscopically, using Endoscopic Submucosal Dissection (ESD) methods & are outpatient procedures. ESD mortality is about 1/10,000 and the morbidity considerably less than for colectomy.² Colectomy costs are far greater than for ESD.³ In the US, despite the advantages of ESD the adoption rate is low and the majority of large sessile adenomas are removed via colectomy. There are many reasons for the slow acceptance of ESD methods including: 1) the hard to acquire advanced endoscopic skill set required, 2) considerable risk of perforation, 3) lack of a training model/rationale for Western endoscopists and 4) absence of specific billing codes that would reimburse hospital and endoscopists at reasonable rates. As regards technique, the standard endoscopic skill set of Western MD's does not permit safe ESD. A unique, hard to acquire, skill set is needed, in particular the ability to 1) reliably inject the submucosal plane to “lift” the lesion, 2) move the scope tip in a controlled fashion with hot needle knife extended to precisely incise mucosa & cut submucosal attachments, 3) maintain the submucosal lift and fully detach the lesion. Learning ESD by doing clinical cases alone is very difficult because case volume is usually variable or low. Training models are needed. Currently, there is no CPT code for ESD, therefore, other codes for lesser endoscopic procedures are used. Although the case length for most ESD cases is similar to colectomy, colectomy garners 22-26 RVU's vs 6.04-7.57 RVU's for ESD using existing endoscopic CPT codes(Fig 1). As regards equipment, specialized disposable tools (needle knife(s), coagulation grasper, sclerotherapy needle, lift solution, Roth net, clips, etc) are needed as well as a special electrosurgical generator. Presently, both hospital & MD lose money on these cases. This poster assesses/compares the codes used to bill for ESD, colectomy and presents billing strategies to raise the RVU totals AND also presents an ESD training program that utilizes both ex vivo porcine & bovine ESD models to provide endoscopists a means of acquiring the necessary advanced skill set.

Methods

Billing: CPT codes and their associated RVU totals were obtained from the Centers for Medicare & Medicaid. Current billing practices and options for ESD cases were obtained from US surgeons performing ESD; the various strategies were compared. **Training:** Ex vivo porcine stomach & bovine large bowel ESD models that are to be used in succession are presented (Figures 2 and 3). Lesions are simulated by making mucosal brands using a heated circular wire. **Porcine model:** ESD done via hard plastic tube (sponge with slit at end = anus) with window cut out over which a rectangle of stomach + bovey pad are placed. Scope is inserted and ESD performed using standard methods. Insufflation is not necessary. **Bovine model:** An intact large bowel with anus/sphincter is placed on PEG board (proximal end clamped); insufflation is necessary. For both models standard ESD tools & methods are used. The performance of 20-30 complete ESD's using the porcine model followed by 20-30 bovine model cases are meant to substitute for the 40-60 human gastric ESD cases required in Japan prior to embarking on human colon ESD cases.

Procedure	CPT code (# RVU's)	RVU total
EMR	45390 (6.04)	6.04
Snare polypectomy + submucosal injection	45385 (4.57) 45381 (3.56 x 0.5=1.78)	6.35
Snare polypectomy + ablation of tumor + submucosal injection*	45385 (4.57) 45381 (3.56 x 0.5=1.78) 45388 (4.88 x 0.25=1.22)	7.57
EMR + modifier 22	45390 (6.04 x 2)	12.08 (Lahey Clinic approach)
Unlisted procedure code	45399 (Triggers review of claim then assignment of RVU value)	18 RVU requested (Cleveland Clinic, OH approach)
Segmental colectomy	44204	26.42
Right colectomy	44205	22.95

Figure 1-CPT codes and RVUs for procedures related to removal of colonic adenomas
*justified if ESD performed but, in end, polyp is removed piecemeal & edges fulgurated. If ESD completed en bloc, there is no justification for addition of this code.

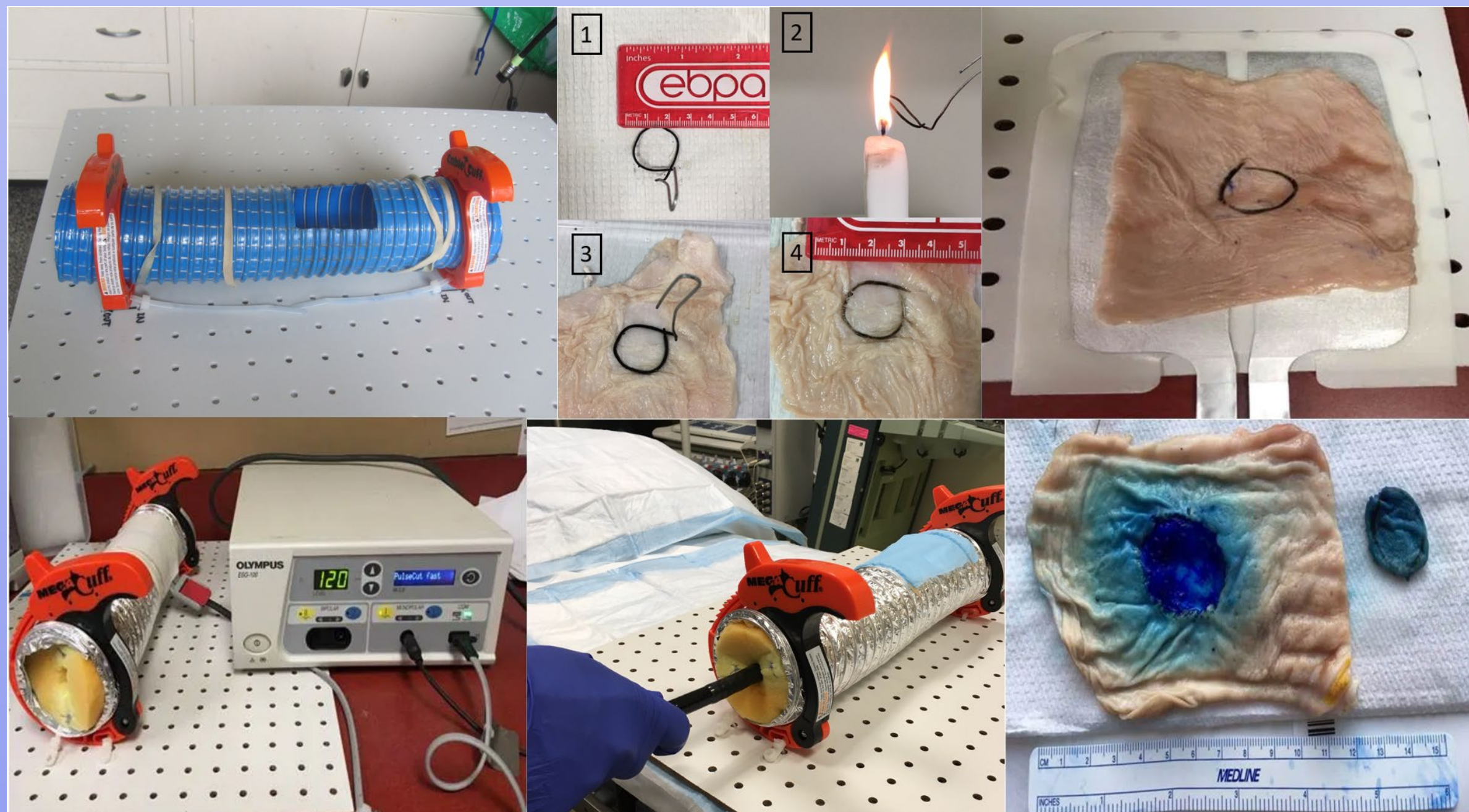


Figure 2-Ex vivo porcine training model

Ex Vivo Bovine Colon ESD Training Model

- Colon cleaned and prepped with antibiotics and protease inhibitor.
- Stored in -80° C. Frozen until use.
- “Lesions” branded into colon tissue via colotomy at 30-35 cm and 20-25 cm from anus.
- Typical metrics tracked are the quality of colon tissue, length of case, volume of injection solution used, quality of excised specimen and colon wall, among other factors.
- Simulation is easily reproducible provided there are dedicated resources available.

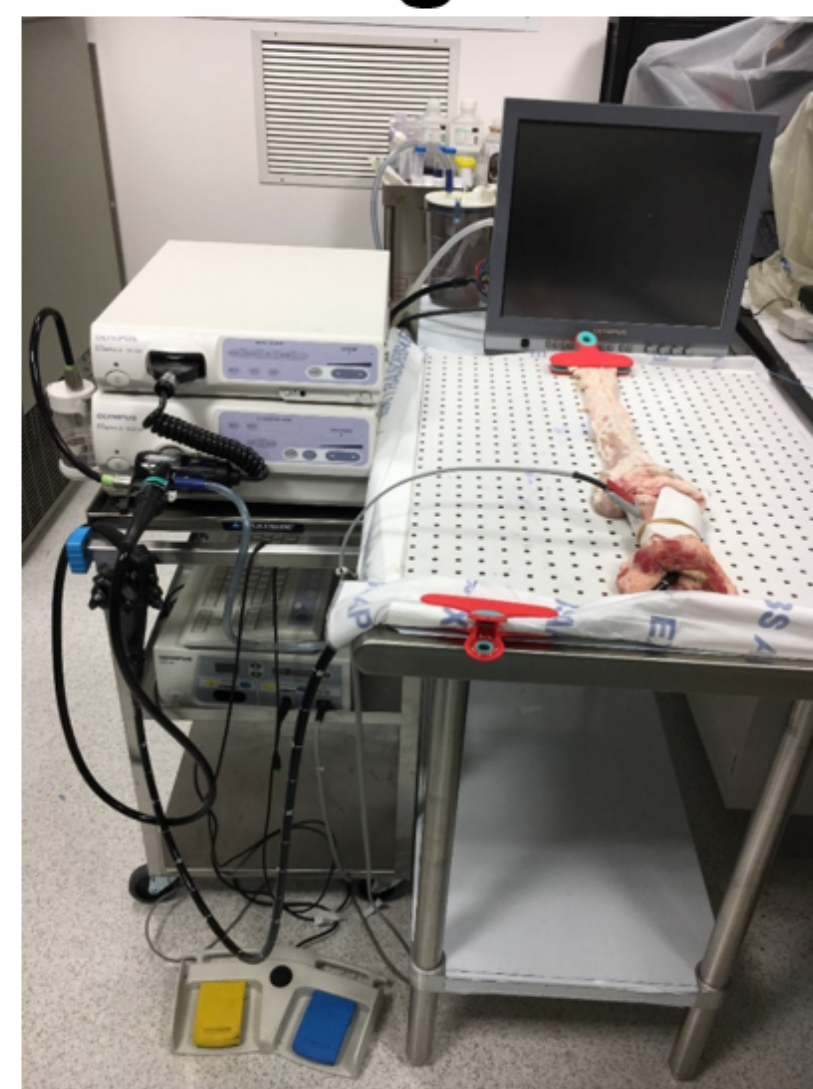


Figure 3-Ex vivo bovine colon ESD training model

Results

Billing: Versus colectomy, there is a 15.4-16.9 RVU discrepancy when ESD is coded using existing CPT codes (a single EMR code vs 2 or 3 lesser codes). One billing strategy being used is to add the modifier code 22 to the EMR code (when service rendered is notably greater than for code in question); this triggers a claim review. Using this approach at the Lahey Clinic 12 RVU's have been requested and awarded. Another approach is to use the unlisted procedure code (45399) which also leads to a review. The provider arbitrarily assigns an RVU value to the procedure that is either approved or adjusted down. Use of the latter 2 approaches requires thorough documentation, billing department guidance, and follow up with Medicare/Medicaid and other insurers. Clearly, the added time and specialized tools needed for ESD as well as the savings for the health care system associated with ESD and avoidance of colectomy justify a unique code for ESD RVU. Thus far, Medical Societies & Industry appeals to RUC to CPT code have been unsuccessful. **Training:** A Western ESD training model is needed since the Japanese clinical training model (based on doing gastric ESD cases prior to doing colon cases) is not feasible due to low gastric cancer volume. Current use of ex vivo models (centered on the colon) is limited to 1-2 day courses. Substitution of many ex vivo cases for clinical cases to train endoscopists should allow for timely completion of training (not dependent on case volume). An endoscopy tower, scope, and monitor dedicated solely to ex vivo ESD training is required for these training models. Early results suggest that performance of 20 porcine cases followed by 30 bovine ESD cases notably increases the clinical ESD success rate.⁵

Discussion

ESD methods are currently underutilized and poorly reimbursed. Until specific ESD CPT codes with RVU values in the 15-20 range are made, it will be hard for hospitals/MD's to justify widespread use of this method. Specific CPT codes are needed to further incentivize the training and use of ESD in the clinical space. Because of the relatively low volume of gastric cancer in the West, the goal of ESD training programs should be en bloc removal of sessile colonic polyps.⁴ Training models should, similarly, be colon based. It is logical to turn to and rely on ex vivo models as training platforms where a trainee's first 40-60 cases are completed. Anecdotally, the advanced skill set needed for ESD can be obtained in the ex vivo setting. The trainee should start on the hard plastic tube porcine stomach model where insufflation is not an issue & cases can be completed despite perforation. Completion of 20 porcine cases introduces trainees to the skills needed and allows development of an approach and strategy. The bovine model cases, which are more challenging, allows trainees to further develop their skill set and increase distance of lesion from the anus. Validation of these ex vivo models is needed with a reasonable number of trainees is needed.

References

- 1- Peery, A. F., Cools, K. S., Strassle, P. D., McGill, S. K., Crockett, S. D., Barker, A., ... & Grimm, I. S. (2018). Increasing rates of surgery for patients with nonmalignant colorectal polyps in the United States. *Gastroenterology*, 154(5), 1352-1360.
- 2- Saito, Y., Bhatt, A., & Matsuda, T. (2017). Colorectal endoscopic submucosal dissection and its journey to the West. *Gastrointestinal endoscopy*, 86(1), 90-92.
- 3- Iqbal, S., Ali, A., Razzaq, A., & Shahzad, E. (2020). Lack of proper reimbursement is hampering adoption of minimally invasive gastrointestinal endoscopy in North America. *World Journal of Gastrointestinal Endoscopy*, 12(1), 49.
- 4- Rawla, P., & Barsouk, A. (2019). Epidemiology of gastric cancer: global trends, risk factors and prevention. *Przegląd gastroenterologiczny*, 14(1), 26.
- 5- Winkler, C., Sandhu, J., Yan, X., Pettke, E., Mudiyanseilage, C. H., Cekic, V., ... & Whelan, R. L. (2018). 551-Ex Vivo Bovine Large Bowel: An ESD Training Model. *Gastroenterology*, 154(6), S-1273.
- 6- Fuccio, L., Hassan, C., Ponchon, T., Mandolesi, D., Farioli, A., Cucchetti, A., ... & Repici, A. (2017). Clinical outcomes after endoscopic submucosal dissection for colorectal neoplasia: a systematic review and meta-analysis. *Gastrointestinal endoscopy*, 86(1), 74-86.