REVIEW ARTICLE

Use of the endoscopic powered resection device for the management of scarred polyps

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Background and Aims: The endoscopic powered resection (EPR) device (EndoRotor, Interscope Inc, Northbridge, Mass, USA) is a novel nonthermal device that can be used for polyp and tissue removal in the GI tract. Here, we review the EPR device and illustrate its use for resection of scarred or fibrotic lesions in the GI tract.

Methods: In this article and accompanying video, we describe the EPR device features, provide step-by-step instructions for device setup, and review case examples in which the EPR device was used for scarred polyp resection. We also review the current literature describing the use of the EPR device for scarred or challenging polyps.

Results: Four lesions with scarring or fibrosis were successfully resected with the EPR device, either with the EPR device alone or as an adjunct to conventional resection methods. No adverse events occurred. A follow-up endoscopy was available in 1 case, which demonstrated no endoscopic or histologic evidence of residual or recurrent lesion.

Conclusions: The endoscopic powered resection device can be used alone or as an adjunct to facilitate resection of lesions with significant fibrosis or scarring. This device serves as a useful addition to endoscopists' toolbox in the management of scarred lesions where other modalities might be technically challenging to use. (VideoGIE 2023;8:211-6.)

INTRODUCTION

Conventional endoscopic resection techniques, including EMR and endoscopic submucosal dissection, have made it feasible to endoscopically treat many large pre-cancerous and cancerous lesions in the GI tract. However, the presence of submucosal fibrosis or scarring can make resection using conventional methods challenging, and thus can increase the risk of incomplete resection or recurrence.[1,2] While endoscopic full-thickness resection using the full-thickness resection device (FTRD) is a viable option in complex cases with fibrosis and scarring, this technique has size limitations.[3]

The endoscopic powered resection (EPR) device (EndoRotor, Interscope Inc, Northbridge, Mass, USA) is a through-the-scope nonthermal endoscopic resection tool used for polyp and tissue removal in the GI tract. Since its U.S. Food and Drug Administration approval in 2017, the EPR device has quickly gained popularity for endoscopic pancreatic necrosectomy in cases of walled-off necrosis.[4,5] Additionally, preliminary studies suggest that it may be an effective tool for the resection of scarred or fibrotic polyps in the upper GI tract and colon.[6-8] The EPR device can be used to resect persistent or recurrent tissue after initial endoscopic therapy, or it can be used as an adjunct to conventional endoscopic resection therapies.

In this article and accompanying video (Video 1, available online at www.videogie.org), we describe the EPR device features, provide step-by-step instructions for device setup, and review case examples in which the EPR device was successfully used for complex polyp resection.

Abbreviations: EPR, endoscopic powered resection; FTRD, full-thickness resection device.

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Figure 1. The endoscopic powered resection system consists of a console, independent vacuum, and foot pedals.

DESCRIPTION OF TECHNOLOGY

How It Works

The endoscopic powered resection device system consists of a single-use metal catheter, console, independent vacuum, and foot pedals (Fig. 1). The catheter requires a minimum 3.2-mm working channel and is available in different lengths for upper endoscopes and colonoscopes. The outer portion of the catheter has a beveled tip which suctions tissue into the device and an inner rotating blade that cuts the tissue (Fig. 2). The 3- to 5-mm resected tissue fragments are collected in a specimen trap and can be sent for histopathological analysis.

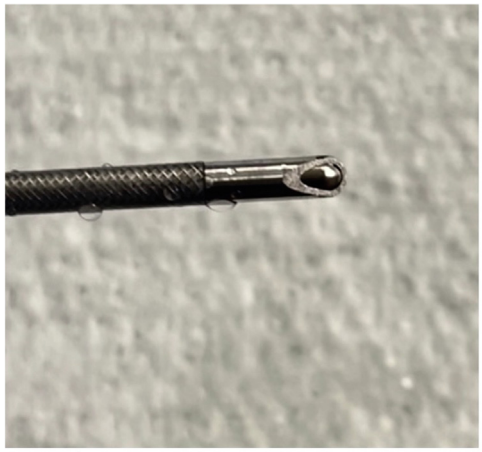

Figure 2. The tip of the endoscopic powered resection catheter has an outer beveled tip and an inner rotating cutting blade.

Device Setup

After removing the catheter from its packaging, insert the blue end into the catheter interface on the console, ensuring the lever is set to the unlocked position. Once in place, switch the lever back to the locked position. Two connected tubing sets are attached at the bottom of the catheter interface. Press the vacuum control release button (second button from the left), and then take the shorter tube and stretch it across the vacuum control valve. Connect it directly to the top of the specimen trap. Open the irrigation pump hood and place the longer tube across the rollers. Use the spike on the end of the long tube to attach it to a bag of normal saline. Attach vacuum tubing to the suction canister at the foot of the device and connect the other end to the bottom of the specimen trap. Press the prime button. Once primed, the amber light on the console will turn green. The EPR device is now ready for use. See Video 1 for demonstration of device setup.

Procedural Considerations

In our practice, we perform submucosal injection with dilute epinephrine prior to resection to minimize intraprocedural oozing, which could deter visualization during resection. Additionally, blue dye is frequently added to aid visualization of the borders of the lesion during resection.

To adjust the position of the cutting window, use the external knob to rotate the catheter tip. The solid black line on the catheter tip is 180 degrees opposite the cutting window. The dashed lines on either side of the solid line are 90 degrees from the cutting window.

Once the catheter is in direct contact with the target tissue, suction is activated by pressing the orange foot pedal, which pulls the tissue into the device to be resected. Minimal pressure is needed to resect the tissue. The vacuum pressure can easily be adjusted during the procedure.

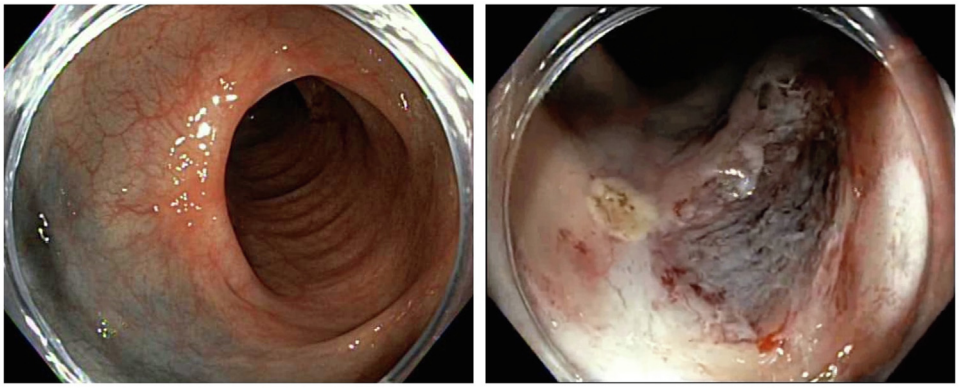

Figure 3. Recurrent colonic polyp before (*left*) and after (*right*) resection with the endoscopic powered resection device (Case 1).

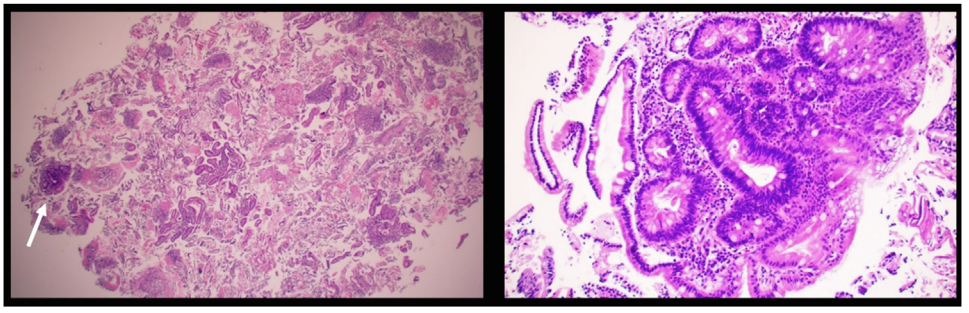

Figure 4. Case 1 postresection pathology shows fragments of colonic mucosa (*left*) with focal adenomatous change (*arrow; image on right*).

Typically, vacuum pressure is started at 50 mm Hg and should generally not exceed 250 mm Hg when the device is being used for polyp resection. Higher levels of suction are generally used with areas containing significant scarring or fibrosis.

CASES

Case 1 illustrates use of the EPR device to resect a recurrent polyp in the transverse colon after submucosal injection resulted in only partial lift of the polyp because of underlying submucosal fibrosis (Fig. 3). Defect closure was achieved using a through-the-scope tack-and-suture device and endoclips. Postresection pathology showed fragments of colonic mucosa with focal adenomatous change (Fig. 4).

Case 2 demonstrates use of the EPR device for resection of a duodenal polyp with areas of scarring from prior biopsies (Fig. 5). The postresection pathology was consistent with tubular adenoma and can be seen in Figure 6. The resection site was closed using a through-the-scope tack-and-suture device and endoclips.

Follow-up data were available for Case 2 (resection of a duodenal polyp). Surveillance endoscopy was performed 6 months after the initial resection and showed no visual evidence of residual or recurrent adenoma. Biopsy specimens were also taken and did not show recurrence.

In Case 3, the EPR device is used to facilitate complete resection of a recurrent colon polyp after only partial resection with conventional EMR could be achieved (Fig. 7).

In Case 4, hybrid EPR and full-thickness resection are used to achieve complete resection of a colon polyp with 2 prior failed resection attempts (Fig. 8). The latter resection had been performed using the FTRD alone and was only partially successful since the device cap was unable to completely capture the tissue. Thus, the EPR device was attempted for the subsequent resection. After resection of a majority of the lesion with the EPR device, a small area containing a fibrotic band was unable to be removed with the EPR device. To ensure a complete resection, the FTRD was used to remove this area of the lesion. The final pathology showed fragments of colonic mucosa with areas of adenomatous change (Fig. 9).

No adverse events occurred, including bleeding, perforation, or postpolypectomy syndrome. Each case took

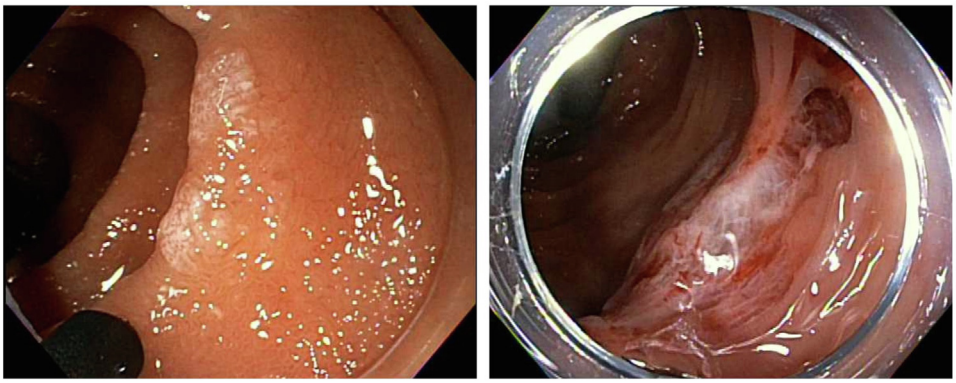

Figure 5. Duodenal polyp with scarring from prior biopsies before (*left*) and after (*right*) resection with the endoscopic powered resection device (Case 2).

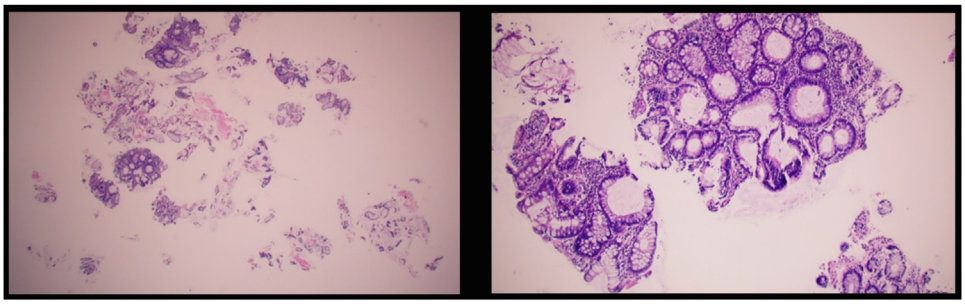

Figure 6. Case 2 postresection pathology shows fragments of resected duodenal tissue (*left*) consistent with tubular adenoma (*right*).

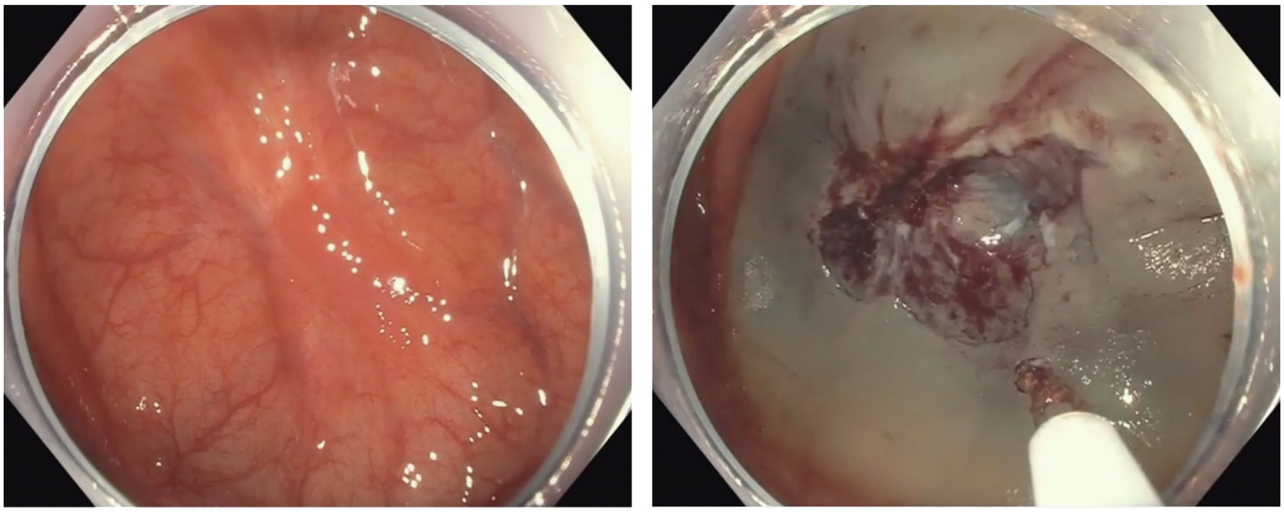

Figure 7. Recurrent colon polyp before (*left*) and after (*right*) hybrid EMR and endoscopic powered resection device (Case 3).

approximately 30 to 60 minutes to complete. Resection was deemed to be complete after all visible tissue had been removed. The use of submucosal injectate with blue dye and thermal marking of lesion borders was performed prior to resection to ensure that all visible polyp was resected.

OUTCOMES

Data regarding the use of the EPR device for the resection of scarred lesions are limited. A multicenter study by Kaul et al[6] demonstrated successful lesion resection in 40 of 41 cases using the EPR device. A total of 85.4% of these

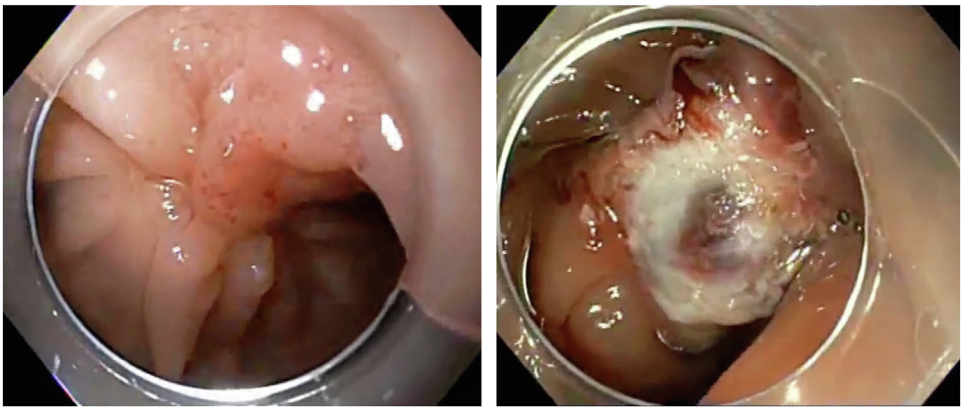

Figure 8. Scarred colon polyp before (*left*) and after (*right*) resection using hybrid endoscopic powered resection and full-thickness resection device (Case 4).

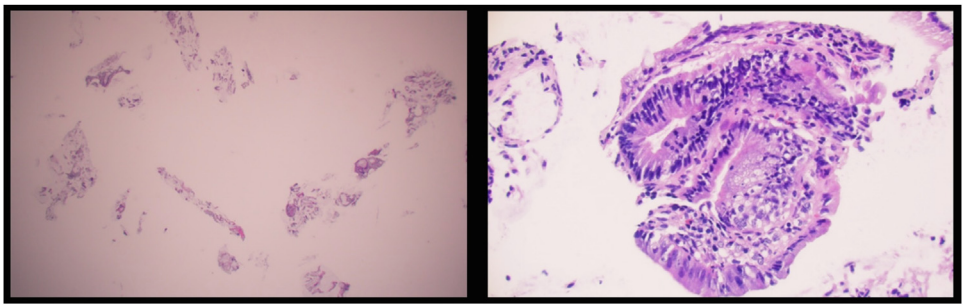

Figure 9. Case 4 postresection pathology shows fragments of colonic mucosa (*left*) with focal adenomatous change (*right*).

lesions had prior failed resection attempts. Three adverse events occurred in this study: 1 patient developed postprocedural chest pain that self-resolved, and 2 patients experienced delayed bleeding that resolved after placement of endoclips. Another study by Kandiah et al[7] included 19 colorectal lesions with scarring secondary to prior resection attempts. There was an overall 84% cure rate using the EPR device, with 6 patients requiring a second EPR procedure to achieve cure. There were no adverse events in this study. Further studies are needed to determine the long-term efficacy and safety of the EPR device for the resection of scarred lesions.

LIMITATIONS

One limitation of the EPR device is that it is not indicated for primary resection or biopsy of suspected malignant lesions as the tissue is resected in fragments and therefore the depth of invasion cannot accurately be determined for staging. The resected tissue fragments measure 3 to 5 mm in size and thus are adequately sized for histopathologic examination; however, more data are needed to evaluate whether the specimens are accurate to assess for malignant foci within the resected specimen.

Other limitations of the EPR device include compatibility with endoscopes with a 3.2-mm working channel or more, difficulty maneuvering the device in retroflexion or in positions with significant looping, and difficulty resecting lesions on a frontal plane given the side-facing cutting window. Lastly, the device can cause intraprocedural oozing, which can limit visualization. In our practice, dilute epinephrine is added to the injectate to help minimize intra-procedural oozing to help with visualization during resection.

CONCLUSIONS

The endoscopic powered resection (EPR) device can be used alone or as an adjunct to facilitate the resection of lesions with significant fibrosis or scarring. Further studies are needed to determine the long-term efficacy of this device for the management of scarred polyps. Overall, this device serves as a useful addition to endoscopists' toolbox in the management of scarred lesions where other modalities might be technically challenging to use.

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