

Combined endoscopic submucosal dissection and transanal minimally invasive surgery for the management of lower rectal adenoma extending above the dentate line

A case report

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Abstract

Rationale: Minimally invasive surgery is used to treat early colorectal tumors. Endoscopic submucosal dissection (ESD) for resection of tumors extending above the dentate line (particularly those with concomitant hemorrhoids) is technically difficult. We present a case of a patient with a lower rectal adenoma extending above the dentate line, which underwent combined ESD and transanal minimally invasive surgery (TAMIS) to achieve accurate excision and prevent complications.

Patient concerns: A 68-year-old man with a history of blood in stool over 2 to 3 years underwent colonoscopy, which revealed an adenoma measuring 3 cm in size in the lower rectum extending above the dentate line. The part extending above the dentate line was a type I_s lesion and that of oral side was a type II_a lesion. Histopathologically, the lesion was diagnosed as a low-grade intramucosal tubulovillous adenoma.

Diagnosis: Intramucosal low-grade adenoma with sessile polyp (type I_s).

Interventions: The cranial portion of the lesion was dissected via ESD and the anal portion via TAMIS with minimal bleeding. En bloc resection of the tumor was performed.

Outcomes: His postoperative period was uneventful, and he was discharged and regularly followed-up.

Lessons: Combined ESD and TAMIS is effective in patients with benign and early neoplastic lesions of the anorectum extending above the dentate line with concomitant hemorrhoids and can prevent complications.

Abbreviations: ESD = endoscopic submucosal dissection, JNET = Japanese narrow-band imaging expert team, TAMIS = transanal minimally invasive surgery, TEM = transanal endoscopic microsurgery.

Keywords: adenoma extending above the dentate line, adenoma with hemorrhoids, case report, combined ESD and TAMIS

1. Introduction

Minimally invasive surgery is the primary approach to treat non-invasive or superficially invasive colorectal neoplasms.^[1] Endoscopic submucosal dissection (ESD), a minimally invasive procedure enables en bloc resection of a tumor for accurate

histopathological assessment, as well as to achieve a resection margin to prevent post-procedure recurrence.^[2] However, ESD for lesions extending as far as or beyond the dentate line is technically challenging because such lesions are often fibrosed, and the anorectal lumen is narrowed owing to its proximity to the

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Informed consent was obtained from the patient to undergo the described procedure. No ethics approval was required for this study.

Informed written consent for the publication of this case report and the necessary images was obtained from the patient.

The data and materials can be made available if required.

The authors have no conflicts of interest to disclose.

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anal sphincter.^[3] Additionally, the rectal venous plexus often presents with hemorrhoids, and sensory nerves below the dentate line cause pain.^[3,4] Previous reports that have described ESD for lesions involving the dentate line or the presence of hemorrhoids failed to show a difference in operation time and the resection or complication rate. However, we can infer that this procedure is technically difficult and requires sufficient experience.^[4–6] Transanal minimally invasive surgery (TAMIS) was first reported by Atallah et al in 2010 as a hybrid procedure involving transanal endoscopic microsurgery (TEM) and single-port laparoscopy. The authors concluded that TAMIS is a feasible alternative to TEM to treat rectal neoplasms and provides all the benefits of the latter at significantly lower costs.^[7]

We report a case of a patient with an anorectal adenoma extending above the dentate line with concomitant hemorrhoids. The cranial part of the lesion was dissected using ESD and the anal portion using TAMIS. To our knowledge, this is the first report to describe combined ESD and TAMIS for patient with early neoplastic anorectal lesion extending above the dentate line.

2. Case presentation

A 68-year-old man presented with blood in stool that was noticed every day over 2 to 3 months and this symptom was observed occasionally over 2 to 3 years. He reported a personal history of hypertension and a family history of lung cancer in his father and elder brother. General physical and systemic examinations did not reveal any abnormality. However, digital rectal examination revealed a soft mass in the anterior rectal wall and freely mobile rectal mucosa. Colonoscopic examination revealed an adenoma measuring 3 cm in size along the right anterior wall of the lower

rectum extending above the dentate line. The part extending above the dentate line was a sessile polyp (type Is), and the part extending toward the oral side was a flat mucosal lesion (type IIa), based on the macroscopic classification of early colorectal cancer established by the Japanese Society for the Study of Cancer of Colon and Rectum.^[8] According to the Kudo pit pattern classification based on mucosal staining using crystal violet,^[9] the lesion was classified as a type IV lesion (intramucosal neoplastic type). Based on the Japan narrow-band imaging expert team (JNET) classification, it was categorized as a JNET 2A type lesion (low-grade intramucosal involvement).^[10] Figure 1 shows the colonoscopic findings. The biopsy revealed a low-grade tubulovillous adenoma. TAMIS was performed for the portion extending above the dentate line and ESD for the lower anal portion of the tumor.

The patient was placed in the dorsal lithotomy position. ESD procedure was performed using Q260J endoscopes with a dual knife (Olympus, Tokyo, Japan). The submucosal injection solution contained 0.05% epinephrine and 0.1% indigo carmine in 10% glycerin and 5% fructose (Glyceol; Chugai Pharmaceutical, Tokyo, Japan) or sodium hyaluronate (MucoUP, Johnson and Johnson, New Brunswick, NJ). A VIO300D (ERBE Elektromedizin GmbH, Tübingen, Germany) electrosurgical generator was used. The CO₂ gas was used for insufflation for the colonic lumen, since its effectiveness has been proven.^[11,12] The CO₂ insufflation can reduce the risk of pneumoperitoneum in cases of perforation as well as the occurrence of abdominal complaints before and/or after treatment. The incision site 1 cm away from the tumor margin was endoscopically tattooed. ESD was initiated from the oral aspect of the tumor, and dissection continued in a downward direction as far as the anorectal

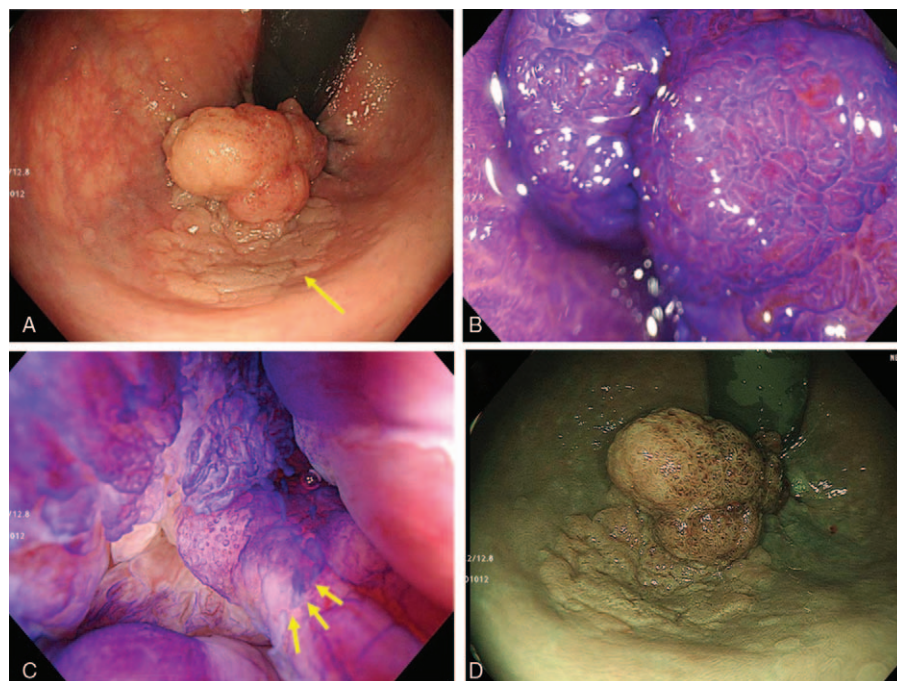


Figure 1. The image shows colonoscopic examination findings: A: An adenoma measuring 3 cm in size can be observed along the right anterior wall of the lower rectum involving the dentate line. Macroscopically, the lesion is observed to be a sessile polyp (0-Is) and a flat mucosal lesion (0-IIb). The dentate line is represented by a yellow arrow. B: The pit pattern of the mucosa shows a type IV lesion (intramucosal neoplastic type). C: The lesion is observed to have partly extended above the dentate line (arrow). D: Using narrow-band imaging, the lesion could be classified as a JNET Grade IV type lesion. JNET = Japan narrow-band imaging expert team.

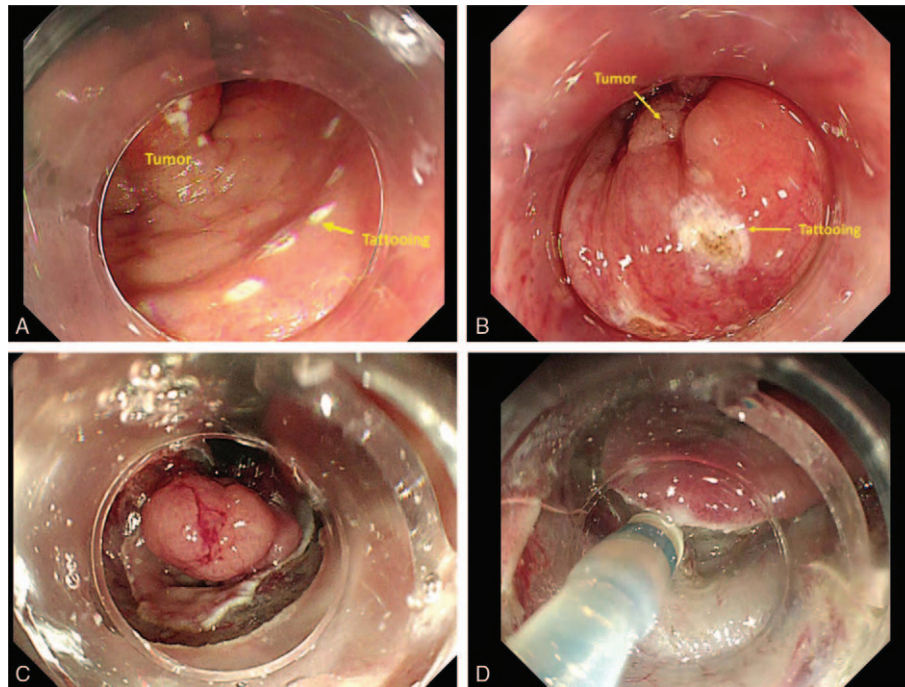


Figure 2. The image shows ESD performed for the lesion extending above the dentate line. A and B: Circumferential endoscopic tattooing of the lesion can be observed (labeled). C and D: Dissection is initiated from above in a downward direction laterally on both sides as far as the anorectal junction. ESD=Endoscopic submucosal dissection.

junction (Fig. 2). Anal dilation was performed using a self-retaining anal retractor (Lone Star Retractor, Cooper Surgical, Trumbull, CT). A transanal access platform (GelPOINT Path, Applied Medical, Rancho Santa Margarita, CA) was introduced for dissection of the distal portion of the tumor using TAMIS. A wet gauze was inserted above the lesion, and an AirSeal platform (AirSeal System, CONMED, Utica, NY) was used to maintain pneumorectum at 15 mmHg using carbon dioxide. Conventional laparoscopic instruments were used. Careful dissection was performed in an upward direction on both sides to avoid injury to the enlarged hemorrhoids. The tumor was peeled off above the internal sphincter and removed through the transanal access device. Intraluminal lavage was performed with saline, and hemostasis was confirmed (Fig. 3). Histopathological examination showed a low-grade tubulovillous adenoma with negative margins (Fig. 4). The patient's postoperative course was uneventful. He was discharged and is under regular follow-up for 1 year without recurrence of symptoms.

3. Discussion

ESD has shown promising results for the management of colorectal neoplasms. A systematic review and meta-analysis of 97 studies reporting ESD for colorectal neoplasms showed an R0 resection rate of 82.9%, an en bloc resection rate of 91%, and the need for surgical revision in 1.1% cases.^[13] Matsumoto et al reported a study involving ESD for anorectal tumors in close proximity to the dentate line and observed no significant difference between tumors extending to the dentate line and those away from the dentate line in terms of the en bloc resection, complete resection, and curative resection rates, as well as in the incidence rates of perforation. However, the incidence of intraoperative bleeding was 61% in patients with tumors in

close proximity to the dentate line.^[6] Similarly, in studies analyzing patients with tumors in close proximity to the dentate line with concomitant hemorrhoids, no difference was observed in the en bloc resection and complication rates and in postoperative anal pain between the groups with and without hemorrhoids. However, the authors observed lower postoperative bleeding rates than those in their previous study (28.6% vs 14%) owing to greater experience with the procedure.^[4] Thus, the consensus in such cases of anorectal tumors is that such procedures require considerable technical expertise.

TEM is a widely accepted and established transanal minimally invasive option. A study comprising 71 patients treated with ESD and TEM for benign and early rectal neoplasms reported no differences between ESD and TEM in terms of the en bloc resection, R0 resection, recurrence, and complication rates.^[1] Drawbacks of the TEM procedure are that the transanal port used for TEM is long and rigid, which decreases the working angle that is available to dissect distal anorectal lesions.^[14] The decrease in anal tone causing temporary incontinence, costs, and a steep learning curve are additional limitations. TAMIS scores over TEM in that surgeons' familiarity with laparoscopic surgery and the use of conventional laparoscopic instruments reduces the learning curve, it is cost-effective, the use of a shorter and softer transanal access device provides a good working angle (360 vs 220° for intraluminal rectal visibility), it is associated with a lower risk of anal sphincter injury, and the dorsal lithotomy position is a more comfortable position.^[7,14,15]

We chose a combination of ESD and TAMIS considering the technical difficulty associated with a narrowed lumen and the hemorrhoids and fibrosis observed in this patient. TAMIS was performed following intraluminal insufflation using the AirSeal platform for better visibility of the surgical field. The surgeon could use both hands for accurate dissection with minimal risk of

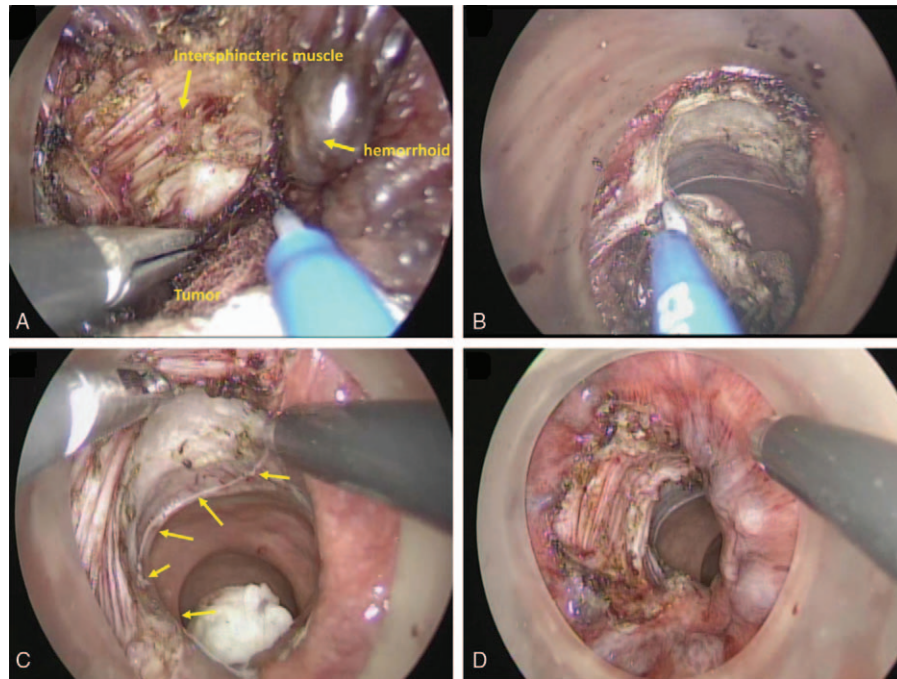


Figure 3. The image shows that the part of the tumor involving the dentate line is dissected using TAMIS. A: The mucosa is incised, and the tumor is carefully dissected above the internal sphincter to avoid injury to the hemorrhoids (labeled). B: Dissection is continued above the dentate line to reach the area that was treated with ESD. The tumor is peeled off and removed out of the transanal device. C: The incision line can be observed on the oral side (represented by the arrow). D: The image shows the appearance after tumor removal. ESD=Endoscopic submucosal dissection, TAMIS=transanal minimally invasive surgery.

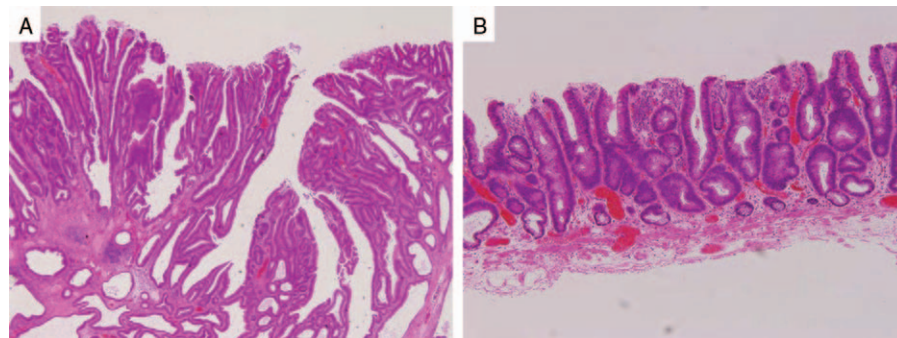


Figure 4. The image shows the histopathological findings of a low-grade tubulovillous adenoma. A: Image shows H&E staining of the sessile polyp. B: H&E staining of the flat mucosal lesion can be visualized. H&E=hematoxylin and eosin.

intraoperative bleeding and the ability to immediately control such hemorrhage should it occur. The time required to remove and re-insert the transanal device used during TAMIS is shorter than that required to assemble the TEM resectoscope.^[7,15] The lower R0 and en bloc resection rates and the higher recurrence and complication rates in non-Asian countries, as well as at low-volume centers indicate that ESD performed for anorectal lesions demands a high level of technical expertise and experience.^[13] Thus, TAMIS can replace or supplement ESD in technically demanding cases, particularly for tumors in close proximity to the dentate line, primarily because TAMIS uses conventional laparoscopic instruments and is a single-port surgery. In our view, anorectal lesions extending above the dentate line are best treated using a combination of ESD for the oral and TAMIS for

the anal aspect of the lesion. This treatment strategy provides better visualization of the surgical field to ensure accurate en bloc excision with a lower risk of intraoperative bleeding.

We conclude that a combination of ESD and TAMIS is a useful strategy associated with a low complication rate to treat benign and early neoplastic anorectal lesions extending above the dentate line with concomitant hemorrhoids.

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Author contributions

PN and SM conceived and designed the study and were involved in data collation. YK, KT, KB, YU, HK, TA, MS, and KM participated in designing the study, coordination, and data analysis. PN drafted the manuscript. SN participated in manuscript preparation and critical revision. All authors have read and approved the manuscript.

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