Case Report

Combination of endoscopic submucosal dissection and transanal excision for the local excision of distal rectal cancer with deep submucosal invasion

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Abstract

Radical surgery with preoperative or postoperative chemoradiation is regarded as the standard treatment for locally advanced rectal cancer. However, despite the risk of recurrence, local excision after preoperative chemoradiation is another therapeutic option, especially in patients who are not candidates for radical surgery because of underlying medical conditions or who refuse radical surgery to avoid colostomy. Endoscopic submucosal dissection (ESD) and transanal excision (TAE) represent two options for the local excision of rectal lesions, each with its own advantages and disadvantages. For example, ESD is suitable for a broader and more superficial rectal neoplasia, whereas TAE is suitable for a relatively small and deeper rectal lesion. Here we describe the successful treatment and preservation of anorectal function of a patient by sequential ESD and TAE after neoadjuvant chemoradiation therapy for a locally advanced rectal cancer comprising central deep submucosal and peripheral broad superficial components.

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Introduction

Radical surgery with preoperative or postoperative chemoradiation is regarded as the standard treatment for locally advanced rectal cancer (T3, N0, or any T, N1-2 disease).1 However, it carries significant morbidity and mortality risks including anastomotic leakage, wound infection, wound dehiscence, frequent defecation, fecal and urinary dysfunction, sexual dysfunction, and even perioperative death.2–4 Moreover, the altered lifestyle and body image after abdominoperineal resection may cause psychological distress.5,6 Therefore, in spite of the potentially high risk of recurrence, local excision after preoperative chemoradiation therapy presents another therapeutic option, especially in patients who are not suitable for radical surgery or who refuse radical surgery to avoid a colostomy.7–10 Transanal excision (TAE) is a well-known local excision technique for less extensive, distal rectal lesions but has shown a relatively higher local recurrence rate compared with endoscopic submucosal dissection (ESD) in a retrospective study.11 ESD is a useful endoscopic local excision technique especially for broad, superficial neoplastic lesions ranging from adenoma to superficial submucosal invasive cancer.12 Therefore, ESD may not be suitable for the excision of deep submucosal invasive cancer.

Here we report a case of locally advanced rectal cancer with a central deep invasive, peripheral wide superficial part that was successfully removed using the combination of ESD and TAE after neoadjuvant chemoradiation therapy.

Case report

A 51-year-old woman was referred by a physician after colonoscopy and diagnosis of rectal cancer. She had no family history of malignancy and no specific medical history except hypertension. A protruded mass was palpable at 2 cm from the anal verge by digital rectal examination. The colonoscopy showed a sessile mass in the background of a laterally spreading tumor (LST) (Fig. 1A). Histology of the biopsy specimen revealed a well-differentiated adenocarcinoma. An endorectal ultrasonogram suggested a hypoechoic mass confined within the third layer. Magnetic resonance imaging (MRI) revealed a rectal mass abutting the superior margin of the internal anal sphincter and several perirectal lymph nodes less than 7 mm in diameter (Fig. 1B). There was no evidence of distant metastasis.
by abdominopelvic computed tomography (CT), chest CT, or positron emission tomography-computed tomography (PET-CT). Based on these findings, the preoperative diagnosis was stage IIIA (cT1N1M0) distal rectal adenocarcinoma abutting the internal anal sphincter. The decision was made to perform neoadjuvant chemoradiation therapy followed by radical excision; the patient received infusional 5-fluorouracil (5-FU) and external beam radiation (50 Gy in 25 fractions). The follow-up colonoscopy showed moderate regression of the rectal mass, but the central invasive and background LST parts remained (Fig. 1C). The perirectal lymph nodes regressed significantly (Fig. 1D), but the primary mass was still located within 1 cm from the superior margin of the internal anal sphincter as seen on follow-up MRI. The patient refused radical surgery for fear of structural or functional loss of her anus and eagerly requested treatment to preserve normal anorectal function despite the high risk of recurrence. Therefore, transanal excision was considered as the second best option. However, anorectal dysfunction seemed to be unavoidable if the relatively broad remnant lesion, including the central invasive and peripheral LST parts, was removed by full-thickness local excision. We decided to remove the peripheral LST part first by ESD, followed by removal of the remnant central invasive part by TAE (Fig. 2). The area of the deep submucosal cancer was delineated by endoscopic ultrasound (EUS). After submucosal injection of sodium hyalurinate solution, a mucosal incision was performed along the periphery of the LST part with a 5-mm safety margin using a dual knife (Olympus Co., Tokyo, Japan), followed by submucosal dissection. The central invasive part of the lesion was not touched by the knife during the endoscopic procedures and was left with a peripheral rim of the noninvasive pit-patterned part of the lesion to avoid direct dissection of the cancer (Fig. 3). The EUS and ESD procedures took 30 minutes and 150 minutes, respectively, and all endoscopic procedures were completed in the evening. Transanal excision to

![Fig. 1. Diagnostic findings. (A) The initial colonoscopy revealed a protruded mass in the background of a thin laterally spreading tumor (LST). The arrowheads indicate the margin between the normal mucosa and LST. (B) The initial rectal magnetic resonance image revealed the enlargement of several perirectal lymph nodes. The white arrow indicates one enlarged lymph node on this cross-sectional image. (C) After neoadjuvant chemoradiation therapy, the protruded mass regressed moderately. A remnant deep submucosal invasive cancer part was suspected (indicated by two black arrows). The surrounding LST part remained present. (D) Follow-up rectal MRI revealed regression of enlarged lymph nodes (white arrow).](image1)

![Fig. 2. Illustrative scheme for the excision of primary lesion using the combination of endoscopic submucosal dissection (ESD) and transanal excision (TAE). The black dotted line indicates the scheme of ESD for the laterally spreading tumor part of the lesion and the red solid line indicates the scheme of TAE for the central deep submucosal cancer part.](image2)
remove the remnant central part of the lesion was performed on
the next day (Fig. 4). The pathologist reviewed both parts of
the lesion removed by the combination of ESD and TAE in a recon-
structive manner (Fig. 5). The TAE specimen was a well-
differentiated adenocarcinoma that extended to the sm2 layer. Its
deep margin was clear, but the lateral margin revealed villotubular
adenoma as we expected. The ESD specimen revealed well-
differentiated adenocarcinoma confined to the mucosal layer
with clear outer lateral and deep margins, but adenoma at its inner
lateral margin, as we expected. We therefore concluded that the
lesion was completely removed in two pieces, one by ESD and the
other by TAE. There was no evidence of lymphovascular tumor
emboli or perineural invasion. Because perirectal lymph node
involvement was suspected in the initial rectal MRL, adjuvant
chemotherapy was strongly recommended but refused by the pa-
tient. She complained of mild difficulty with defecation and inter-
mittent soiling immediately after surgery, but these problems
improved within 2 months after surgery. She has been followed for
1 year without recurrence of rectal cancer.

Discussion

Radical surgery with preoperative or postoperative chemo-
radiation is generally regarded as the standard treatment for locally
advanced rectal cancer. However, in clinical practice, local excision
of distal rectal cancer after downstaging by chemoradiation has
been another therapeutic option, especially for the patients with
serious medical illnesses or those who refuse the radical surgery
due to concerns about the loss of anorectal function. In this case
described here, the cancer was located very close to the internal
anal sphincter even after neoadjuvant chemoradiation, and so,
sacrificing the patient’s anus seemed to be unavoidable by radical
excision. In this case, local excision by TAE was thus considered as
an alternative therapeutic option. However, the patient did not
accept any risk of structural and functional loss of her anus, and thus full-thickness removal of the large remnant lesion, including both the central invasive and peripheral LST parts of the lesion, was less likely to guarantee the preservation of anal function. Finally, we decided to perform two-stage, lesion-customized surgical procedures to remove two parts of the lesion: ESD for the peripheral superficial part and TAE for the central invasive part. We reasoned that the combination of ESD and TAE for a lesion having both invasive and superficial parts that were grossly distinguishable could minimize the full-thickness or deeper thickness removal of the rectal wall and may be helpful to preserve anal function postoperatively.

Because of the limited field of view and approach range of the surgical device in TAE, TAE for large rectal neoplasms may carry relatively higher risk for piecemeal resection and local recurrence compared with ESD. A retrospective comparative analysis of the removal of noninvasive rectal neoplasia found that the ESD group achieved a higher histological en bloc resection rate than the TAE group (67% in the ESD group vs. 42% in the TAE group) and local recurrence developed only in the TAE group (0% in the ESD group vs. 15% in the TAE group). The combination of ESD and TAE is basically a type of preplanned piecemeal resection, but it nonetheless offers advantages compared to unplanned piecemeal resection using only the TAE technique; specifically, easier interpretation of histology and reduction of the risk of local recurrence.

Several studies reported that the recurrence rate was 6.2–15% after neoadjuvant chemoradiation and subsequent local excision after neoadjuvant chemoradiation in locally advanced rectal cancer. Although there was no evidence of local and distant recurrence at 1-year follow-up after treatment, our patient still carries substantial risk of recurrence because the cancer was staged as cT1N1M0 initially and showed a moderate response to chemoradiation therapy. Therefore, the patient should be followed up on a regular basis.

In summary, we successfully treated a wide locally advanced rectal cancer consisting of a central invasive part and a broad superficial part, using the combination of ESD and TAE techniques.

Fig. 4. The remnant of the lesion was removed by the surgeon with transanal excision following endoscopic submucosal dissection.

Fig. 5. Pathologic findings. (A,B) The endoscopic submucosal dissection (ESD) specimen was a well-differentiated adenocarcinoma confined to the mucosal layer. Its inner rim of lateral margin (asterisks in panel A and yellow dotted line in panel B) showed villotubular adenoma as expected. The deep margin was free from adenoma or adenocarcinoma. (C,D) The transanal excision specimen showed residual well-differentiated adenocarcinoma in the background of villotubular adenoma. The adenocarcinoma extended to the sm2 layer, but the deep resection margin was free from neoplastic tissue. Villotubular adenoma involved the lateral margin of the TAE specimen (asterisks in panel C and yellow dotted line in panel D) abutting the lateral margin of the ESD specimen, but the other lateral margin was free from adenoma and adenocarcinoma.
after neoadjuvant chemoradiation therapy with preservation of normal anorectal function.

Conflicts of interest

The authors report no conflict of interest.

References