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Transanal excision of benign rectal polyps: Indications, technique, and outcomes

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A B S T R A C T

Due to screening programs, rectal polyps are increasingly observed nowadays. Mostly, these are adenomas, which can contain or develop into invasive rectal carcinoma. All rectal adenomas should therefore be completely removed. Transanal endoscopic microsurgery is currently the treatment of choice for large rectal adenomas. This review will discuss the current literature regarding the pre-operative workup and staging of rectal adenomas considered for transanal excision, technical considerations, surgical outcomes as well as alternative approaches.

Introduction

The incidence of colorectal adenomas is estimated to be approximately 40% for advanced adenomas (severe dysplasia, large adenoma, and carcinoma in situ) in asymptomatic patients undergoing screening colonoscopy. In these patients, the majority (77%) of the adenomas are located in the sigmoid and rectum.[1,2] While often asymptomatic and only detected during screening colonoscopy, symptoms of distal adenomas may include rectal bleeding, altered pattern of defecation, fecal incontinence, and anal prolapse. Importantly, adenomatous polyps have the potential for malignant degeneration through a series of cumulative genetic mutations and levels of invasion.[3,4] Complete removal should therefore be performed in all patients with rectal adenomas, to both relieve symptoms and prevent future malignant growth. Smaller adenomas are usually removed during colonoscopy. Larger adenomas can be removed by either endoscopic submucosal resection (EMR), transanal local excision (LE), or transabdominal resection.

LE has been safely employed for rectal adenomas (RAs) for more than a century with much less morbidity when compared to transabdominal resection, although recurrence rates were usually high (up to 60%).[5,6] With the introduction of transanal endoscopic microsurgery (TEM®, Richard Wolf GmbH, Knittlingen, Germany) in the 1980s, which allowed for equally safe but more precise LE of larger and also more proximally located (up to 21cm from the anal verge) rectal tumors, recurrence rates have significantly dropped.[7–9] Since the development of TEM, several other transanal endoscopic surgery (TES) platforms, both rigid (transanal endoscopic operations, TEO®, Karl Storz GmbH & Co, Tuttlingen, Germany) and disposable (transanal minimally invasive surgery, TAMIS: SILS port™, Covidien, Mansfield, MA, GelPOINT Path®, Applied Medical, Rancho Santa Margarita, CA), have been introduced. TES has now become the surgical treatment of choice for RAs.

The aim of LE for RAs is to achieve a *complete resection* of the adenoma with *minimal surgical morbidity*. This is sometimes challenged by several factors. First, RAs can contain invasive carcinoma (pT1 or higher) which might require a completely different surgical approach. Thus, state-of-the-art pre-operative imaging to distinguish between tumors confined to the rectal mucosa (RAs or *in situ* carcinomas) and early invasive rectal cancer (T1 or more) is a *prerequisite* when evaluating rectal tumors for LE. Second, the risk of local recurrence significantly increases when adequate margins are not obtained or when RAs are fractionated peri-operatively,[8] underlining the need for careful selection of patients and adequate surgical expertise. Finally, as mentioned before, complications after LE are uncommon but can be severe (e.g., enterovisceral fistulae). Again, patient selection, surgical expertise, and access to current state-of-the-art techniques are paramount to prevent (and treat) these complications.

This article will discuss the most important aspects of LE (mainly by TEM) for RAs, as described above.

Diagnosis and staging

The pre-operative workup for new patients presenting with a histologically proven RA is aimed at (1) evaluating the eligibility

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for TES by assessing the longitudinal and circumferential extent of the RA and (2) the identification of RA-containing invasive carcinoma despite benign biopsy histology by macroscopic and endorectal ultrasonographic examination (ERUS).

Colonoscopy and histological diagnosis

Typically, RAs are diagnosed during colonoscopy or CT-colonography (followed by colonoscopy for histological diagnosis). When polyps are small and not too distally located, complete polypectomy or piecemeal polypectomy can usually be performed during colonoscopy. Larger RAs should be evaluated for TES or EMR.

Assessing longitudinal extent—Rectoscopy

Suitability for TES can be evaluated using rigid rectoscopy in the outpatient clinic. Rigid rectoscopy allows for full appreciation of the longitudinal extent, circumferential spread and distance from the anal verge of RAs. Also, the macroscopic appearance of rectal tumors (e.g., ulceration) can help to distinguish between RAs and invasive carcinomas. In case of suspicion for invasive carcinomas, additional tissue can be obtained for histological examination by clamshell biopsy. In our center, rectoscopy is performed using a 15-cm rigidrectoscope (Rectosolution, Richard Wolf, Germany). The patient lies in lithotomy position and has received an enema prior to the procedure. After digital examination, the rectoscope can be advanced into the rectum for further visual examination. The exact location of the RA, distance from the proximal and distal end of the RA to the dentate line, and circumferential extent are all carefully assessed and documented to plan future treatment.

Assessing invasive growth—Endorectal ultrasound

In most centers offering TES, patients presenting with a rectal tumor presumably eligible for TES will undergo rectoscopy followed by ERUS. In our center, we use a Pro-focus Ultrasound system equipped with a 5–12-MHz endorectal transducer (BK Medical, Denmark). The primary aim of ERUS is to confirm the absence or presence of invasive carcinoma in addition to tissue biopsy, since this may yield a false-negative result with regard to invasive carcinoma in up to 21% of larger rectal tumors.[10] ERUS is especially suitable for this purpose, since it allows for a detailed visualization of the rectal wall layers and the correlation of the tumor to these layers in real time. In RAs, the mucosal muscular layer will be preserved and traceable along the entire circumference of the rectal wall. In more advanced cancerous lesions, this layer will be compromised (Fig. 1). In addition, the echogenicity of rectal tumors may yield some information regarding the presence of invasive carcinoma; pure adenomatous polyps tend to have a homogeneous gray appearance, whereas early invasive rectal carcinoma is often characterized by a more heterogeneous appearance.[11,12]

Multiple series describing the additional value of ERUS over histology have been published. In 231 RAs resected in our own center, the rate of pre-operative missed carcinomas was reduced by ERUS from 21% to 3% with a corresponding sensitivity and specificity for the diagnosis of RAs of 89% and 86%, respectively.[10] In a 2004 review article, similar numbers were found. Pooled data of five studies on the sensitivity of ERUS revealed 62 biopsy-negative RAs with focal invasive carcinoma on histopathological examination. Of these, 50 (81%) were correctly diagnosed as invasive carcinoma by pre-operative ERUS.[13]

A frequent concern regarding ERUS in the examination of RAs is the risk of overstaging, when ERUS indicates the presence of invasive carcinoma where there is none. Indeed, overstaging occurred in 12% of RAs in the systematic review conducted by Worrell et al. The risk of overstaging seems to be especially present in RAs that have previously been endoscopically manipulated (biopsy) since scar tissue might mimic invasive growth. Also, RAs near the dentate line might be susceptible for overstaging since the anatomy of the rectal wall can be more difficult to appreciate on ERUS.[13] However, in our experience, overstaging is often mild (T1 instead of T0 or Tis), and although this certainly warrants additional imaging (MRI and CT-abdomen), it seldom changes surgical approach.

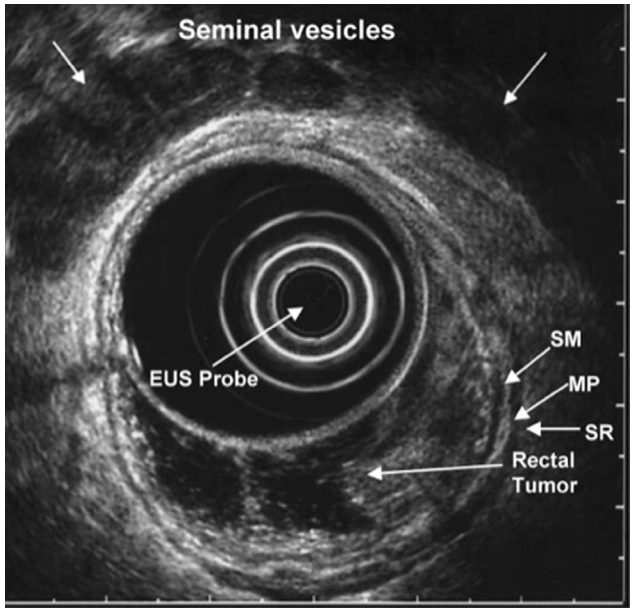

Fig. 1. RAs as depicted on ERUS. Note how all layers of the rectal wall have remained intact around the adenoma suggesting the absence of invasive growth. EUS probe, endorectal ultrasound probe; SM, submucosa; MP, muscularis propria; SR, rectal serosa.

Surgical technique

TES requires specific equipment and a specific set of surgical skills. TES is associated with a steep learning curve. Novel techniques such as single-port transanal surgery (SPTS) and harmonic shear devices might facilitate future use of this technique.[14]

Setup, anesthesia, and patient positioning

During TES, the patient is in lithotomy position, prone jackknife position with the legs spread, or right or left lateral position depending on the location of the tumor (Classical TES equipment only allows for a downward view). TES is performed under either general or spinal anesthesia. We perform all our TES procedures in a dedicated endoscopic suite, allowing for various positions of video projection screens. Usually, these are positioned above the patient for maximal ergonomics.

Access type

TES is a minimally invasive procedure. Most available data concerns patients operated with a rigid transanal endoscopy system (for instance, TEM, Karl Storz GmbH & Co, Tuttlingen, Germany). Using this setup, a rigid one-port system equipped with a rectoscope, stereoscopic optical system, insufflation device, and airtight working inserts for instruments is inserted transanally.[7,15] A documentation endoscope can be attached for video projection.