

Promising Rectal cancer Sphincter Preservation Techniques

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Abstract

Background: A complete dissection of the mesorectum and rectum is made down to the pelvic floor. Transanal local excision can be used for management of selected rectal cancers for many decades. It allows removing rectal tumors through the anus. Transanal procedures have been performed with minimal morbidity and mortality rates. In addition, early discharge of patients and no requirement for permanent stoma also been contributing to its popularity among surgeons and patients. However, the oncological outcomes of the resection of the primary tumor without proper lymphadenectomy are related to the risk of lymph node metastases. Therefore, recognition of risk factors for lymph node metastases (LNM) after accurate staging is important for patient selection. Ideally, this procedure would be selected for patients with small primary tumors, low enough to be accessible through the anus with minimal or no risk for lymph node metastases as in cases of T1 and T2 rectal cancer especially if there is no lympho-vascular invasion. It is contraindicated especially in cases of T3 and T4, with lymphovascular invasion, and poor differentiation rectal tumor in histopathology. An anal retractor is used to dilate the anus and for better exposure. A lone-star retractor photo, may be used. Some surgeons prefer traction sutures to be used and placed laterally to the lesion to enhance exposure. A line of dissection with a margin of 1 cm is made with electrocautery circumferentially. The depth of resection should always reach the mesorectal fat to provide a maximal radial margin. The defect in the rectal wall is then closed in a running suture, preferably with an absorbable material.

Keywords: Rectal cancer, Sphincter Preservation

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Introduction:

The rectum has three lateral curves: the upper and lower curves are convex to the right, and the middle is convex to the left. On their inner aspect these infoldings into the lumen are known as the valves of Houston. Because of its curves, the rectum can gain 5cm in length when it is straightened (as in performing a low anterior resection); hence, a lesion that initially appears at 7cm from the anal verge is often found 12cm from that site after complete mobilization (1).

Colorectal cancer is the fourth most common non-cutaneous malignancy in the United States and the second most frequent cause of cancer-related deaths. Of these cancers, 70% will arise in the colon, whereas 30% will occur in the rectum. At diagnosis, 50% of cancers in the rectum exhibit this progression, with lymph node metastases seen in approximately two thirds of these cases (2).

The incidence of colorectal cancer starts to increase after age 35 and rises rapidly after age 50, peaking in the seventh decade. More than 90% of colon cancers occur after age 50. However, few cases have been reported in young children and adolescents (3). The incidence of colorectal cancer tends to be higher in Western nations than in Asian and African countries; however, within the United States, minor differences in incidence exist among whites, African Americans, and Asian Americans. Five-year survival rates are lower among blacks (55%) than whites (66%). Among religious denominations, colorectal cancer occurs more frequently in the Jewish population (4).

Local Excision of Rectal Cancer

Transanal local excision can be used for management of selected rectal cancers for many decades. It allows removing rectal tumors through the anus. (5) Transanal procedures have been performed with minimal morbidity and mortality rates. In addition, early discharge of patients and no requirement for permanent also been contributing to its popularity among surgeons and patients. However, the oncological outcomes of the resection of the primary tumor without proper lymphadenectomy are related to the risk of lymph node metastases. Therefore, recognition of risk factors for lymph node metastases (LNM) after accurate staging is important for patient selection. Ideally, this procedure would be Selected for patients with small primary tumors, low enough to be accessible through the anus with minimal or no risk for lymph node metastases as in cases of T1 and T2 rectal cancer especially if there is no lympho-vascular invasion .It is contraindicated especially in cases of T3 and T4 , with lymphovascular invasion , and poor differentiation rectal tumor in histopathology . (6).

Traditional or Standard Transanal Local Excision

An anal retractor is used to dilate the anus and for better exposure . A lone-star retractor [photo](#), may be used. Some surgeons prefer traction sutures to be used and placed laterally to the lesion to enhance exposure. (7) A line of dissection with a margin of 1 cm is made with electrocautery circumferentially. The depth of resection should always reach the mesorectal fat to provide a maximal radial margin. The defect in the rectal wall is then closed in a running suture, preferably with an absorbable material. (8).



Fig. 1 Standard local excision: the mesorectal fat can be seen after the excision of the surgical specimen

Minimally Invasive Options

There are two new techniques for trans anal excision of low rectal cancer with the use of rectal CO₂ distention (pneumorectum), endoscopic view and minimally invasive instrumentation :

1) Transanal Endoscopy Microsurgery (TEM)

The procedure is performed using a special proctoscope of 4 cm in diameter available in lengths of 12 and 20 cm. The rectum is insufflated with carbon dioxide at 10–15 mmHg. (9) The stability is provided, by its attached to the operating table ,and to allow for an excellent view of the rectum and lesion. The proctoscope is frequently repositioned to allow best visualization of the lesion during the procedure. Once setup is complete, special endoscopic instruments are introduced through the proctoscope (usually four ports for entry) and resection is performed. In addition to the scope and two instruments manipulated by the surgeon, suction may be used through the fourth portal entry for aspiration of the smoke created by cautery. Marking of 1 cm circumferential margins around the primary lesion prior to resection is advised to avoid disorientation. Full-thickness resection is performed using electrocautery avoiding direct manipulation of the tumor. (10) Alternative energy sources may be used for this resection including harmonic or sealing devices. Once the specimen is removed, final check for hemostasia is performed and bleeds are carefully dealt with. In most cases, attempt to close the rectal defect is done with the use of an absorbable running suture. (11).

2) TAMIS (Transanal Minimally Invasive Surgery)

More recently, a variation of the previous technique has been proposed to allow transanal endoscopic microsurgery with the use of standard laparoscopic equipment (12). This would potentially avoid the need of considerably expensive and exclusively dedicated TEM equipment. Instead, the use of simple and readily available laparoscopic equipment would allow similar efficacy with considerably lower associated costs. Also, learning curve of the procedure could be minimized by the use of routinely used as opposed to specific TEM instruments. Several transanal ports have been suggested for this approach including disposable or reusable single-ports. After connection with the regular laparoscopic insufflator, a 5 mm laparoscopic scope is inserted to provide endorectal view. In contrast to TEM, TAMIS requires an assistant to control camera and therefore, stability of the image is lost. (13) Once the additional instruments are inserted, the surgeon may perform the procedure very similar to the TEM technique. However, most single ports have only 3 portal entries and therefore, smoke aspiration is not continuous. Finally, access to the lower rectum may be difficult due to significant need for instrument angulation. On the other hand, access to the upper rectum may be limited by rectal folds in some patients. Middle rectal lesions are best suited for this technique. (14).



fig 2: TAMIS equi equipment (14).



Fig3 :The position of TEO/TEM equipment fixed to the surgical table and with instruments inserted (14).

laparoscopic or open intersphinctric resection : (14).

Intersphinctric resection of low recatal cancer (ISR) is an alternative to abdominoperineal resection for cancers of the lower third of the rectum . Usually such tumours can be reached by the finger and are accessible for a clinical staging. Even extensions into the anal canal are not contraindicated , provided they are superficial. Therefore, we determine the inclusion criteria for accepting patients with ISR treatment in rectal cancer :

- T1/T2 stage of ultra-low rectal cancer
- tumor diameter less than 5 cm'
- well-differentiated tumor
- good anal function confirmed by preoperative examination
- no distant metastasis not with intestinal obstruction. (14).

The exclusion criteria are:

- Tumor invasion of external anal sphincter
- tumor diameter greater than 5 cm
- poorly-differentiated tumor
- poor preoperative anal function. (14).

In the open laparotomy, we began dissection from the left lateral peritoneum and mobilized the colon from its attachment. In the laparoscopic approach, dissection began with the procedure medial to lateral or lateral to medial at the surgeon's discretion.

The colon was mobilized from its lateral attachment and high ligation of the inferior mesenteric vessel was performed. Whether the splenic flexure of the colon was mobilized depended on the length of the colon. The standard total mesorectal excision was then completely dissected down to the pelvic floor. Anteriorly, the Denonvilliers fascia was carefully dissected, and the seminal vesicles were exposed so as not to injure the neurovascular bundle.

Along the dissection plane, the intersphincteric space was entered from the posterior side of the rectum by separating the anococcygeal ligament. Then circular dissection of the intersphincteric space was performed from the bilateral lateral side to the anterior part. The dissection could be as low as possible for reducing difficulties of the perineal approach and facilitating tumor exteriorization (14).

Perineal part in ISR :

A circular incision is made at dentate line for partial ISR and 1cm below dentate line for complete ISR. The underlying sphincter is identified as a white band of about 3mm in thickness. We lift the muscle fibres with a forceps so that we can enter the intersphincteric plane.

With gentle dissection the external sphincter, which has a reddish appearance, can be separated. As soon as a good dissecting plane is achieved , the internal sphincter is mobilized in the entire circumference. Following the intersphincteric plane we approach the lower pelvis and get in touch

with the abdominal team. The lower rectum is now dissected off the Waldeyers fascia. The dissection in the anterior part of the lower pelvis follows the intersphincteric plane, to avoid accidental injury of the urethra, the vagina or prostate. In case of difficulties to finish the anterior mobilization of the lower rectum it is helpful to pass the divided rectum through the anal canal with its upper end, then much easier to divide final adhesions to the anterior rectal wall.

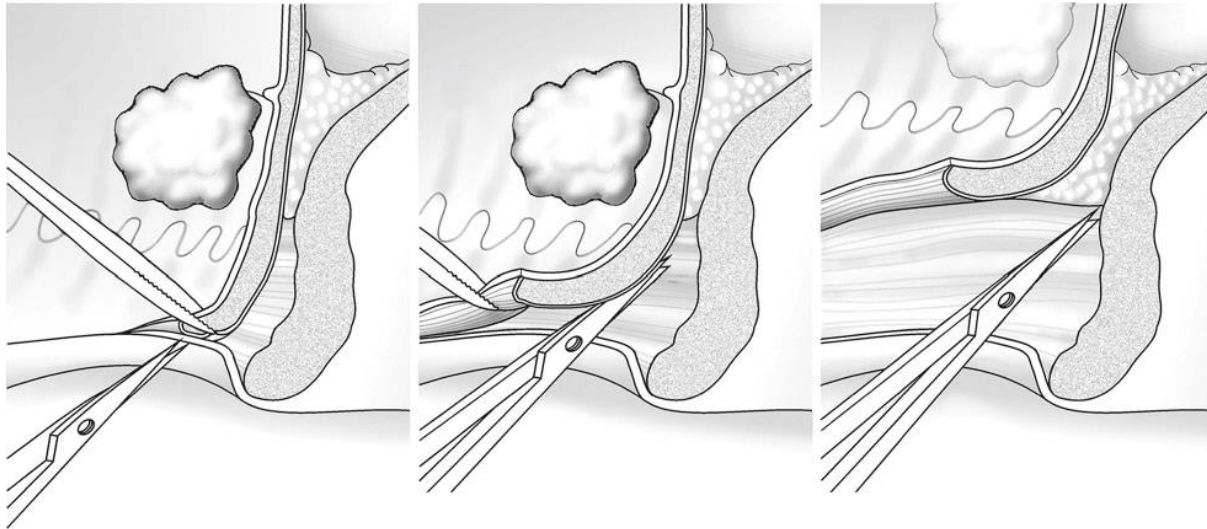


Fig. 4. Perineal part. (a) Identification of the internal sphincter; (b) Entering the intersphincteric space; (c) Circular mobilization of the internal sphincter (14)



Figure 5 : pull through of specimen from anal canal (14)

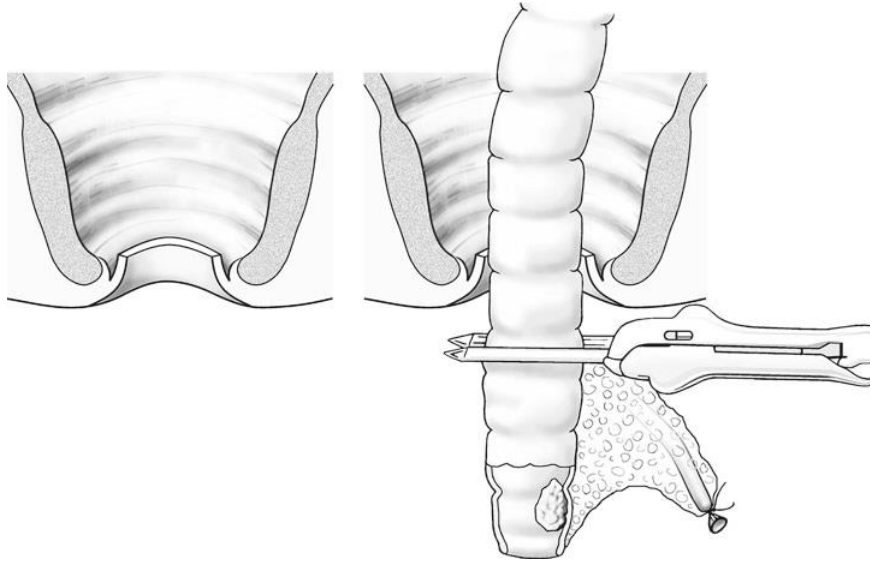


Fig. 6. Transanal pull through of the tumour bearing rectum and mesorectum. Transection with a linear stapler. (15).

Coloanal anastomosis can be achieved by putting the stitches first through the anal skin, then through the external sphincter and then through the full thickness of the colon. Before tightening the knots an exact adaptation of the mucosa to the skin is important. A release of the hooks of the Lone-Star retractor is helpful to get some skin into the new anal canal. When the anastomosis is finished, the retractor is removed . The patency of the anastomosis is tested by permission of thumb insertion. Finally, adequacy of the blood supply to the site of the anastomosis should be carefully inspected again. Instead of defunctioning stoma, the patient can be fed with total parenteral nutrition for seven to ten days after surgery. A defunctioning stoma should be considered if there is any suspicion regarding the technical imperfection of the anastomosis. Any peritoneal defect in the pelvis is closed with interrupted sutures. A drain may be inserted into the left side of the pelvis and brought out at the lower angle of the wound.(15).

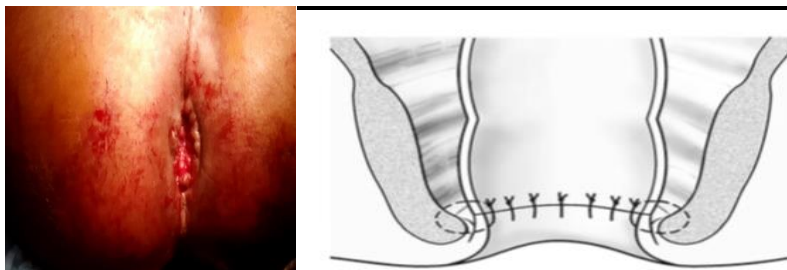


Fig 7 :coloanal anastomosis (15).

Transanal TME:

Transanal total mesorectal excision (taTME) is an emerging surgical technique for rectal cancer. However, the oncological and perioperative outcomes are controversial when compared with conventional laparoscopic total mesorectal excision (LaTME) (16).

The concept of a “down-to-up” procedure and transanal TME (taTME) has been proposed to give a new option in cases when laTME is difficult especially in narrow pelvis as in male patients and in high BMI patients. In fact, taTME is not a completely novel concept and it has benefited from previous experience of transabdominal–transanal (TATA) operations, transanal endoscopic microsurgery (TEM), transanal minimally invasive surgery (TAMIS) and natural orifice transluminal endoscopic surgery (NOTES) (17).

Since the first taTME resection assisted by laparoscopy was reported in 2010, taTME performed on patients with rectal cancer has showed promising results with regard to pathological quality, and short- and mid-term outcomes. Although taTME may improve the distal mesorectal dissection, which is the most technically challenging part of a transabdominal TME, whether the oncological and perioperative outcomes of taTME are better than those of laTME remains controversial. Hence, a quantitative analysis was necessary to provide direct evidence of the benefits of taTME (18).

One meta-analysis first provides that taTME can achieve comparable technical success in comparison with laTME, in the treatment of rectal cancer. Multicenter RCTs comparing taTME with laTME with long-term outcomes are required to evaluate the efficacy and safety of taTME further as a valid treatment for rectal cancer (19).

Sphincter manometry:

With a careful history and digital examination, we can exclude severe cases of faecal incontinence. Sphincter manometry gives an objective information about sphincter function and will help in difficult decisions. If there is fecal incontinence especially in old age, ISR is not advised. (15).

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