



Transanal minimally invasive surgery is becoming more commonly used for rectal lesions

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Traditionally, rectal neoplasms were managed via transanal excision (TAE) with a retractor. However, TAE is limited to tumors that are located within the lower rectum, and lacks precision and visibility. Transanal endoscopic microsurgery (TEM) was introduced to improve the precise dissection and en bloc excision of tumors located in the mid to upper rectum, with stable visualization, in the early 1980s by Buess *et al.* (1). Transanal minimally invasive surgery (TAMIS) was subsequently developed as a novel approach for rectal lesions in 2009 (2). This procedure offered a feasible alternative to TEM and is becoming more commonly performed worldwide; in fact, several articles regarding this technique have been published. In particular, the article entitled “Transanal minimally invasive surgery for rectal lesions” by Silvia and colleagues revealed that TAMIS is a feasible and safe technique in benign and malignant tumors located in the mid to upper rectum (3).

Silvia and colleagues performed TAMIS in 31 patients with rectal tumors. They used a platform such as SILS PORT or Gelpath and laparoscopic instruments. The patients were placed in the Lloyd-Davis position and most received general anesthesia. The authors closed the surgical defect with interrupted or running barbed sutures. The study showed excellent results compared to previous studies. The postoperative complication rate was 9.6% (3/31) in that study, although previous studies reported an average rate of 16.5% (range, 0–23%). The R0 resection rate was 96.8% (30/31), and there was no local recurrence overall mean follow-up of 30 months. Thus, the study of Silvia emphasized the benefits of this new technique and indicates its potential. Our center reported the feasibility of TAMIS for mid rectal lesions 4 years previously (4).

There are similarities between these two studies in terms of indications, preparation, and surgical techniques; on the other hand, the differences include patient position and suture technique, depending on the surgeon's preferences.

One of the advantages of TAMIS is the use of accessory devices such as automated suturing devices and knot pusher. These devices offer significant aid during the more technically difficult parts of TAMIS, such as the closure of the surgical defect. When the rectal lesion site is surrounded by the mesorectum, the unsutured surgical defect can be considered safe (5). However, data on this topic are limited, and Carl *et al.* reported that open management of the rectal defect after TEM can lead to additional postoperative complications and readmission to hospital (6). In our experience with knot pusher, the surgical defect can be closed using interrupted absorbable sutures without difficulty, without any wound-associated complications. The pneumorectum had deflated during tying, but recovered quickly; thus, the procedure was tolerable.

Most of the reports on transanal endoscopic surgery involve TEM, and describe its advantages and disadvantages. TEM facilitates the local excision of large polyps and early rectal cancers located in the mid to even upper rectum. It provides the potential benefit of precise dissection and en bloc excision, aided by enhanced and stable visualization (7). Moreover, TEM obviates the need for radical resection in certain cases. Although TEM yields superior outcomes, it has not been universally adopted by colorectal surgeons due to the considerable cost of the apparatus and the steep learning curve required to master the TEM technique (8). Wound dehiscence occurs more commonly in TEM; in fact, the specific incidence remains unknown as most surgeons do

not routinely inspect the wound during the first 2 weeks, and the addition of neoadjuvant radiation therapy significantly increases the incidence of wound complications (9). Moreover, it has been reported that the dilatation of the anal canal due to the use of a rigid proctoscope and a prolonged operation led to short-term reduction in anorectal function (10).

TAMIS is a fairly new technique with short-term follow-up, with several advantages and disadvantages as compared to TEM. TAMIS does not offer stereoscopic visualization, and it is difficult to excise tumors beyond the upper rectum with this method. In contrast, the main benefit of TAMIS is the relatively low cost, as it involves the use of regular laparoscopic instruments. This also reduces the learning curve for surgeons due to the simplicity of the technique and its similarity with conventional laparoscopic surgery. Moreover, the platforms used for TAMIS are more pliable than the rigid scope and possibly result in reduced impairment of anorectal function. The minimal setup time is another advantage. The TAMIS platform is becoming more commonly used, primarily because it provides easy accessibility to the rectum, which enables its adoption in various other applications. Robotic TAMIS and transanal total mesorectal excision with TAMIS were recently introduced, and several reports involving modified versions of these procedures have been published. Nevertheless, the evolution of TAMIS and these new approaches over the next decade will be interesting, as they will change the way colorectal surgeons perform transanal surgery.

TAMIS is used for the local excision of rectal neoplasia, from benign adenomas to carcinomas. At present, the local excision of early rectal cancer is an attractive alternative to radical surgery, because it is less invasive and avoids the morbidity associated with radical resection. However, the local excision of early rectal cancer is controversial, due to the lack of adequate lymphadenectomy. Nevertheless, several studies have shown that the local excision of T1 cancer is effective (11,12). In addition, the role of local excision, including transanal endoscopic surgery, has expanded due to the use of neoadjuvant chemoradiotherapy. The application of chemoradiotherapy, followed by the local excision of T2 and T3 cancer, might improve the oncologic outcomes in responder patients (13-15). In addition, controlled trials on the use of TEM are currently ongoing, including the CARTS study and UK TREC trial. TAMIS can also be widely used for rectal cancers that show a good response to chemoradiotherapy. However, further clinical trials with long-term outcome are needed to determine the risk of local recurrence and distal metastases with these

organ-preserving strategies.

In conclusion, TAMIS cannot currently be considered equivalent to TEM, because of the short-term follow-up oncologic data. However, TAMIS is a promising technique, and can serve as a feasible and safe modality for rectal tumors in select rectal cancer patients. Both TAMIS and TEM are effective transanal endoscopic surgical techniques. However, TAMIS can serve as an alternative to TEM, and further developments are possible. Thus far, no clinical prospective studies have compared TEM and TAMIS. Hence, further multicenter prospective randomized studies are needed.

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