

# A combination of transanal minimally invasive surgery and transanal technique to facilitate suturing during transanal minimally invasive surgery

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**Abstract:** Transanal minimally invasive surgery (TAMIS) is an effective option for the local excision of benign, non-invasive rectal lesions, or selected early stage rectal cancers. However, the suturing encountered in TAMIS remains technically challenging. A combination of TAMIS and transanal approach to suturing is demonstrated to address this challenge. A 64-year-old female with a T1N0 adenocarcinoma located in the anterior mid-rectum underwent TAMIS for resection of the lesion. Total operative time was 91 minutes. Free peritoneal defect was closed in two layers. The patient was discharged on postoperative day 1. Final pathology revealed a 0.7 cm T1 well-differentiated adenocarcinoma 0.8 cm from the closest resection margin. The patient remains free of systemic or local recurrence at 24 months. TAMIS is a safe and effective option for removal of benign rectal lesions or selected low grade T1 adenocarcinomas of the rectum. A hybrid TAMIS and transanal approach to suturing may often easily address the technical challenge of pure laparoscopic suturing in TAMIS.

**Keywords:** Transanal minimally invasive surgery (TAMIS); suturing; laparoscopy

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## Introduction

Rectal cancer accounts for approximately 28% of all colorectal cancers in the United States (1). Radical proctectomy with total mesorectal excision is the standard operation for most patients with rectal cancer as it ensures removal of the lymph nodes in the mesorectum (2,3). However, this approach can be associated with high morbidity and poor functional outcomes (4).

Alternatively, local excision is an option for patients with benign, noninvasive lesions, or selected early stage rectal cancers. Transanal minimally invasive surgery (TAMIS), introduced in 2009 Dr. Albert *et al.*, is a safe and effective option for local excision, as it provides direct visualization and precise dissection of the lesion (5-11). The use of standard or modified laparoscopic instruments along with

an easy set-up has made TAMIS readily available to a wide group of surgeons (11). One of the difficulties with TAMIS is suturing the defect closed and maintaining adequate suture tension due to the small work space with limited triangulation (7,12,13). Several attempts have been made to overcome this difficulty with the use of self-locking sutures (9,10), endo-GIA staplers (11), and intracorporeal suturing with the aid of knot pushers (7,8). Nevertheless, suturing in TAMIS remains challenging.

We present a 64-year-old female with a T1N0 adenocarcinoma located anteriorly in the mid-rectum 10 cm above the anal verge (7 cm above the sphincter). This case demonstrates a transanal suturing technique which can be used with TAMIS allowing the surgeon to avoid the maneuvering difficulties encountered with laparoscopic suturing.



**Figure 1** Video demonstrating the hybrid laparoscopic and open approach to suturing in transanal minimally invasive surgery (TAMIS) (14). Available online: <http://www.asvide.com/articles/1018>

### Patient selection and workup

A 64-year-old female was diagnosed with a 2 cm T1N0 adenocarcinoma located anteriorly in the mid-rectum 10 cm above the anal verge. The lesion was identified during a routine screening colonoscopy and confirmed on biopsy. Endorectal ultrasound revealed early submucosal invasion (sm1). Computed tomography (CT) of the chest, abdomen, and pelvis was negative for metastatic disease. An MRI of the pelvis showed no obvious mesorectal lymph node involvement. Pre-operative carcinoembryonic antigen was 0.6. Multiple surgical options were discussed with the patient; however, a TAMIS's excision of this early stage T1 mid-rectal lesion was agreed to be the best approach.

### Preoperative preparation

The patient received mechanical bowel preparation with polyethylene glycol one day prior to the procedure and was instructed to fast at least 6 hours prior to surgery. Prophylactic antibiotics (One gram of ertapenem) were administered within 30 minutes of the initial incision. The appropriate consent was obtained from the patient per the institutional protocol.

### Equipment preference card

- 30 degree 5 mm laparoscopic camera;
- Maryland forceps;
- Monopolar electrocautery hook;
- Self-retaining wound retractor;
- GelPOINT Path Transanal Access Platform (Applied

- Medical TM, Rancho Santa Margarita, CA, USA);
- 3–0 Vicryl sutures.

### Procedure

The operative procedure is demonstrated in *Figure 1*. After induction with general anesthesia the patient was placed in the prone jackknife position with the buttocks taped apart. The prone position was preferred in this patient because it places the anterior rectal lesion in the lower half of the visual field. The anal canal was prepped with povidone-iodine solution and the patient was draped in the usual sterile fashion. Digital rectal examination and anoscopy were performed to confirm anterior orientation of the lesion and its 10 cm distance from the anal verge.

A self-retaining wound retractor was placed in the anal canal followed by a GelPOINT Path Transanal Access Platform (Applied Medical TM, Rancho Santa Margarita, CA, USA). Pneumorectum was established with CO<sub>2</sub> insufflation to 15 mmHg. A 5 mm camera was inserted along with two additional 5 mm instruments. In our case, the operating surgeon was positioned to the left of the patient and the assistant was positioned between the patient's legs.

Initially, a 1 cm perimeter around the lesion was marked with electrocautery to delineate the resection margins. Subsequently, a full-thickness excision into the underlying mesorectal fat was performed. Careful dissection around the specimen was performed without direct manipulation of the tumor to avoid violation of oncological planes. Occasionally, the incision will extend into the free peritoneal space, as in this case. An adequate bowel preparation is thus essential to avoid peritoneal contamination. The specimen was then completely excised in a discoid fashion, while maintaining its orientation. It was extracted through the self-retaining wound retractor after removal of the gel-port. Gross inspection revealed a sufficient circumferential margin without tumor perforation.

At this point, we planned to close the defect transversely in two layers (peritoneum and full thickness bowel) with a hybrid TAMIS and transanal approach. We began by placing a midline stay suture across the distal and proximal edges of the defect using the TAMIS technique. Next, the GelPOINT cap was removed while the wound retractor remained in place. Using the midline stay suture, the defect was brought towards the surgeon to allow for further stepwise closure in the open technique. In our case, two layers of interrupted sutures (3–0 vicryl) were placed in a

figure-of-eight fashion to close the peritoneal and bowel layers. The sutures were tied via an open technique through the wound retractor, negating the need for knot-tying devices. Upon completion of the closure, the GelPOINT device was re-inserted and the rectum insufflated to adequately visualize the closure and ensure hemostasis.

Total operative time was 91 minutes. Final pathology revealed a 0.7 cm T1 well-differentiated adenocarcinoma 0.8 cm from the closest resection margin.

### Postoperative management

The patient was admitted for overnight observation post-operatively. On post-operative day 1, the patient was discharged after tolerating diet. Surveillance colonoscopy and CT of the chest, abdomen and pelvis were done at 1 year follow-up and revealed no evidence of local or systemic recurrence. The patient did not have any symptoms of incontinence or other bowel dysfunction at any time during her 24 months follow-up.

### Tips, tricks, and pitfalls

- Good bowel preparation remains crucial for the prevention of intraperitoneal contamination if entrance into the peritoneal cavity occurs;
- TAMIS procedure allows for a very controlled resection of selected rectal lesions. The midline stay suture, placed in the TAMIS, allows the defect to be approximated by the surgeon through the wound retractor after removal of the gel-port;
- With the defect brought through the wound retractor, the surgeon can close the defect via the standard transanal technique;
- The open modification of the suturing technique can be easily dispersed among surgeons who are familiar with transanal approaches yet are not facile with laparoscopic/TAMIS suturing;
- Closure of the defect with interrupted sutures facilitates closure of large rectal defects.

### Conclusions

TAMIS is a safe and effective option for removal of benign lesions and low grade T1 adenocarcinomas of the rectum. We have demonstrated a hybrid TAMIS and transanal approach which addresses certain challenges of laparoscopic suturing encountered in TAMIS.

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None.

### Footnote

*Conflicts of Interest:* The authors have no conflicts of interest to declare.

*Informed Consent:* Written informed consent was obtained from the patient for publication of this manuscript and any accompanying images.

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