



Is a learning curve needed for transanal minimally invasive surgery for rectal lesions?

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The article “Establishing the learning curve of transanal minimally invasive surgery for local excision of rectal neoplasms,” which was published in *Surgical Endoscopy* on March 2018, investigated the learning curve for transanal minimally invasive surgery (TAMIS) in the treatment of rectal neoplasms, by using group-specific cumulative sum (CUSUM) analysis and moving average plots. The authors analyzed 254 TAMIS procedures, and their main proficiency outcome was the rate of margin positivity. All patients were divided into three groups according to surgeons (A: a single surgeon with experience in laparoscopic colorectal surgery, B: 2 other surgeons with experience in laparoscopic colorectal surgery, and C: 2 surgeons receiving fellowship training from the surgeons of groups A and B). Groups A and B surgeons did not receive any formal training in transanal endoscopic surgery including TAMIS or transanal endoscopic microsurgery (TEM). However, group C surgeons were trained in TAMIS at the study institution, which may account for the shorter learning curve. As a result, the proficiency scores of the 3 groups were not different (A: 24, B: 20, and C: 14) and stabilization of the mean operative time occurred before proficiency was reached in each group. On the basis of these results, the authors concluded that TAMIS for rectal neoplasms requires a minimum of 14–24 cases (learning curve) to achieve an acceptable R1 resection rate and shorter operative duration (1).

In rectal cancer, TAMIS has emerged as an important treatment option. This procedure has advantages over the conventional transanal local excision. For example, TAMIS provides clear margins, and results in less tumor

fragmentation and less frequent recurrence (2,3). Moreover, it uses a single-port system and standard laparoscopic instruments, which are not specialized platforms for TEM or transanal robotic microsurgery. Thus, it is economical, and more user friendly if the surgeon is an expert, or trained, in laparoscopy. However, no previous studies have evaluated the learning curve for TAMIS.

The subject of this editorial might have a clinical implication because it is not only the first report about the learning curve for TAMIS but it also enrolled a large population. The results were very impressive, including the low rates of margin positivity, complications, and tumor fragmentation. In addition, it compared the learning curve between the first-generation and second-generation TAMIS procedure (no difference was found). However, the surgeons included in the study are experts in laparoscopic procedures, which means that they have sufficient experience with using laparoscopic instruments, which are also used in TAMIS. This may have influenced the main outcome itself and could mean that there is no need to evaluate their proficiency in TAMIS. Furthermore, the main outcome was an oncologic outcome (rate of margin positivity), not surgery-related factors such as operation time and intraoperative or postoperative complications. The rate of margin positivity may not be an adequate criterion for evaluating the proficiency in the TAMIS procedure, because oncologic outcomes might be influenced by the specialization and experience of surgeons, not the new procedure itself (4). Barendse *et al.*, who reported about the learning curve for TEM in surgeons who were not inexperienced, concluded that the learning curve did not influence the oncologic

outcome (5). Accordingly, oncologic outcomes such as margin positivity might not represent the actual proficiency in performing the TAMIS procedure.

The CUSUM analysis could be a useful tool for evaluating competence in a new procedure (6). However, the result of CUSUM analysis in this study might provide an indirect evidence of the inadequacy of the main outcome. Acceptable and unacceptable failure rates need to be established, which were defined as 10% based on TEM and 26% based on conventional transanal excision in the meta-analysis, respectively. However, none of the groups showed an unacceptable failure rate. This might suggest that all participating surgeons already have a precise oncologic concept for laparoscopic surgery. Thus, surgery-related factors such as operation time and intraoperative or postoperative complications by using adjusted CUSUM analysis might be better outcomes than the rate of margin positivity in determining competence in the TAMIS procedure.

In general, laparoscopic abdominal surgery requires training for adopting special techniques, owing to characteristics such as decreased tactile sensation, different eye-hand coordination, and translation of dimension (7). The TAMIS procedure is similar to laparoscopic abdominal surgery, especially single-port laparoscopic abdominal surgery, because TAMIS uses the same instruments including a video-imaging system and a single-port system (8). Consequently, for a surgeon who is already an expert in laparoscopic surgery and specializes in colorectal surgery, the TAMIS procedure is not different from laparoscopic single-port surgery. This means that TAMIS is not a new procedure and, consequently, evaluation of competence might not be necessary.

Local excision have been performed in patients with benign and T1 rectal neoplasms. Recently, local excision is recommended as an organ-preserving procedure in good responders to chemoradiotherapy (CRT) for rectal neoplasms (9-12). In addition, prospective trials on the use of TEM are ongoing, including the STAR-TREC trial. Evidence on the oncologic outcome of local excision for rectal cancer is accumulating. Although previous studies focused on TEM, TAMIS has equivalent outcomes to TEM (13). Because TAMIS has a greater cost-benefit ratio and is more easily accessible than TEM (14,15), TAMIS might be more widely used in the clinical field in the future.

In conclusion, TAMIS is an important treatment option for all patients with rectal tumors (benign or malignant) including good responders to CRT. This is an attractive,

low-entry-barrier surgical option for the local treatment of rectal neoplasms.

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