



Transanal total mesorectal excision (TaTME): are we doing it for the right indication? An assessment of the external validity of published online video resources

Balaji Mahendran¹ · Anna Caiazzo² · Mark Coleman¹ · Valerio Celentano^{3,4}

Accepted: 23 August 2019 / Published online: 5 September 2019
© Springer-Verlag GmbH Germany, part of Springer Nature 2019

Abstract

Background The steep learning curve for safe introduction of transanal total mesorectal excision (TaTME) highlights the need for mentored training reserved for surgeons with expertise in minimally invasive colorectal surgery and transanal surgery. Video-based education in minimally invasive surgery is considered by surgical trainers as a useful teaching aid to maximize learning. This study aims to systematically assess the availability and quality of online TaTME videos.

Methods TaTME videos were systematically searched on [YouTube.com](https://www.youtube.com), Colorectal diseases video channel, [WebSurg.com](https://www.websurg.com), and AIS channel. Data collected included video characteristics, presence of supplementary educational content, patient details, indication for surgery, different steps of TaTME presented, and surgical outcomes.

Results Forty-six videos were included with a median of 92 views per month. Nineteen videos (41.3%) reported the age of the participants and 29 patients were male (63%). Body mass index (BMI) was reported in 20 videos (43.5%) with a median of 27 and it indicated obesity (BMI \geq 30) in 2 cases only. The use of neoadjuvant treatment was reported in 8 cases (17.4%). Eighteen videos (39.1%) reported the distance of the tumor from the anal verge, with a median of 6.4 cm and in 9 out of 18 cases, the tumor distance from the anal verge was 7 cm or higher. Pathological staging was reported in 17 videos (37.0%), with 1 T1, 3 T2, 10 T3, and 3 T4 tumors.

Conclusions There is considerable interest in TaTME videos. Lack of consensus on reporting of these videos limits the educational value of these resources, which are missing important patient details and postoperative outcomes.

Keywords Rectal cancer · TaTME · Transanal total mesorectal excision · Surgical videos · Surgical training

An abstract with selected data from this study was presented at the American Society of Colon and Rectal Surgeons Annual Scientific Meeting 2019.

Electronic supplementary material The online version of this article (<https://doi.org/10.1007/s00384-019-03377-0>) contains supplementary material, which is available to authorized users.

✉ Balaji Mahendran
balaji.mahendran@nhs.net

¹ Department of Colorectal Surgery, Derriford Hospital, University Hospitals Plymouth NHS Trust, Plymouth PL6 8DH, UK

² University of Campania “Luigi Vanvitelli”, Naples, Italy

³ Portsmouth Hospitals NHS Trust, Portsmouth, UK

⁴ University of Portsmouth, Portsmouth, UK

Introduction

Transanal total mesorectal excision (TaTME) is an innovative surgical approach gaining popularity for the treatment of rectal cancer in view of several perceived advantages such as control of the distal resection margin with avoidance of cross stapling for rectal division and facilitated access to the low pelvis [1]. Total mesorectal excision (TME) is a challenging but crucial technique to prevent local recurrence.

The steep learning curve of TaTME techniques highlights the need for mentored training reserved for surgeons with expertise in minimally invasive colorectal surgery and transanal surgery [2]. Video-based education in minimally invasive surgery is considered a useful teaching aid [3]. Consistent review of surgical videos could facilitate understanding of common errors in order to create awareness of potential injury mechanisms by acknowledging error-event patterns [4]. This is especially relevant

as the advent of TaTME places patients at risk of unexpected complications [5].

The aim of this study was to systematically assess the availability and quality of online TaTME videos.

Methods

Design

After establishment of the study protocol according to the STROBE reporting guidelines, two authors independently performed a broad search for all TaTME videos on [YouTube.com](https://www.youtube.com), Colorectal diseases channel, [WebSurg.com](https://www.websurg.com), and AIS channel, four of the most accessed video online resources according to a previous study [5]. The websites were systematically searched for all TaTME-related videos with the terms “TaTME,” “transanal total mesorectal excision,” “transanal TME,” “transanal rectal surgery,” and “transanal surgery.” The last search was run on 16 August 2018. The first 20 videos on each website were reviewed.

Selection criteria

Only TaTME videos with an English language title were included. Two reviewers independently assessed the videos for eligibility at title level and in case of discrepancies, a third author was consulted and agreement was reached by consensus. When the same author and institution published the same video on different websites, only the most recent video was evaluated.

Data extraction

Two authors independently retrieved the data from each included video completing an electronic database. Basic video characteristics (source, date uploaded, country, video metrics), presence of supplementary educational content (commentary, diagrams, screenshots, formal case presentation, preoperative imaging), patient details (if reported), steps involved in TaTME, and surgical outcomes (operating time, complications within and without the operation, 30-day morbidity, length of hospital stay, histopathology of specimen) were all recorded.

Statistical analysis

Categorical data are presented as frequency counts and associated percentages; comparisons were made by means of Pearson’s chi-square test. Continuous data are presented as medians and ranges and were compared by using the Wilcoxon rank-sum test. A *p* value equal to or less than 0.05 was considered to be statistically significant. Statistical

analyses were performed using STATA 12 statistical software (STATA Corp, College Station, TX, USA).

Results

A total of 46 videos were included after duplicate removal (Appendix 1). The median number of views per month was 92 (2–926) and video length was 10.45 min (interquartile range [IQR] 8.5 min). Ten videos (21.7%) were recorded during live operating surgery. Nineteen videos (41.3%) reported the age of the participants, (median 64 years, range 32–81) and 29 patients were male (63%). BMI was reported in 20 videos (43.5%) with a median of 27 (range 23–34) and it indicated obesity (BMI \geq 30) in 2 cases. The use of neoadjuvant treatment was reported in 8 cases (17.4%), with 6 patients receiving preoperative radiotherapy. Eighteen videos (39.1%) reported the distance of the tumor from the anal verge, with a median of 6.4 cm (IQR 4.9 cm), and in 9 out of 18 cases, the tumor distance from the anal verge was 7 cm or higher. Initial staging was reported in 17 videos (37.0%), with 1 T1, 3 T2, 10 T3, and 3 T4 tumors.

A majority of the videos (84.8%) had audio commentary and 32 videos (69.6%) showed the laparoscopic part of the procedure. Twenty-six videos (56.5%) used diagrams and images accompanying the video to further explain the procedure. Mesorectal dissection was shown the most, appearing in 44 videos (95.7%), while specimen extraction was the least represented step (39.1%). Thirty-one videos (67.4%) showed the pneumorectum being established, while 37 videos (80.4%) demonstrated the rectotomy. Thirty-one videos (67.4%) also reported the initial purse-string placement. Twenty-four videos (52.2%) showed the anastomosis being performed.

Final histology was given in 19 videos (41.3%), with 9 cases of T3 tumors, and 3 T4 tumors. The postoperative outcomes of the patients were shown in 10 (21.7%) videos, with all patients having had no complications.

Discussion

There is a significant interest in TaTME videos across the colorectal surgery community as demonstrated by the high number of views per month for these videos when compared to median number of views of right hemicolectomy videos (Table 1) as found in a previous study [6].

The advent of TaTME was borne out of the necessity to improve oncological outcomes in rectal cancer. Low rectal cancers pose particular challenges with higher risk of conversions, positive CRM, and postoperative complications. This can be made more difficult to achieve in certain anatomical variations such as a narrow pelvis, obese male patients, and patients with prior radiotherapy. These challenges may be

Table 1 Comparison of between content presented online TaTME videos and right hemicolectomy videos

	TaTME (<i>n</i> = 46)	Right hemicolectomy ¹ (<i>n</i> = 182)	<i>p</i> value
Views per month	92 (2–929) ^a	23.1 (0.1–979.6) ^a	<i>p</i> < 0.0001
Video length (min)	10.45 (2.25–164) ^a	9.27 (1.05–155) ^a	NS
Audio/written narration	39 (84.8%) ^b	107 (58%) ^b	<i>p</i> < 0.0001
Male gender	29 (63%)	54 (39%)	<i>p</i> < 0.0001
BMI	27 (23–34)	23.5 (20–38)	NS
Age	64 (32–81)	62 (22–91)	NS
Presence of diagrams	26 (56.4%) ^b	59 (32.4%) ^b	<i>p</i> < 0.0001

¹ Data for right hemicolectomy videos adapted from Celentano et al. 2017 [6]

^a Data represented as median (range)

^b Data represented as *n* (%)

overcome by TaTME, in view of the potential advantages it provides. Interestingly, our study found that TaTME was often performed in non-obese patients, with only 2 cases presenting a BMI more than 30 in those that reported it. We found that 63% of the videos presented TaTME performed in male patients, while it was concerning to demonstrate a lack of data on neoadjuvant treatment which was discussed only in 8 videos (17.4%). Finally, it is unsure if TaTME was reserved for low rectal cancers, as distance of the tumor from the anal verge was only reported in 18 videos (39.1%) with 9 cases having a tumor height of 7 cm or higher. These findings raise the question if TaTME videos were demonstrating selected cases, performed in ideal conditions with potential lack of external validity.

The findings of our study are in keeping with the initial results from the TaTME registry [7], reporting that 62% of the procedures were performed for low rectal cancer (< 6 cm from anal verge), with 21.1% of cases presenting with a threatened CRM. Interestingly, in the initial results from the registry, TaTME was not exclusively offered to patients who were traditionally thought to require a difficult TME.

While there have been anecdotal accounts of an incomplete mesorectal specimen, non-randomized studies have reported no difference in specimen quality between TaTME and laparoscopic TME [8]. Another case series has reported two local recurrences in a series of 80 (2.5%) patients [9], one of which had a CRM of less than 2 mm, while another case series on the procedures performed up to 2015 showed a CRM involvement in 11.8% of specimens [10]. These results obtained from early adopters in high volume rectal cancer units must be verified with the long-term outcomes reported by the TaTME registry before advocating widespread use of TaTME technique.

A formal training program for TaTME has been validated in the USA and the UK, [2] and this standardized approach to training is likely reflected in the high educational content we found in TaTME online videos, with a large proportion of videos showing many of the steps of the procedure and providing additional educational content such as commentary, imaging, and diagrams.

We found that a significant proportion of online TaTME videos were live-operating cases, which poses an interesting conundrum. The training gain of live-operating demonstrating complex procedures and providing live interaction with peers needs to be balanced with the possible risks for patients' safety, with the caveat that carefully edited videos may also achieve some of these goals, without the added pressure on the surgeon.

There can be a measure of heightened expectations in the introduction of a new technology and a previous study reported a significant spin in the reporting of outcomes of patients undergoing TaTME [11]. Interestingly, only 19 videos (41.3%) in our study reported the final histology of the tumors which seems to suggest a concerning element of selective reporting of outcomes. A full assessment of these cases undergoing TaTME will have to include appropriate short- and long-term follow-up, with inclusion of Patient-Reported Outcome Measures (PROMs).

A limitation of our study is that it did not consider the educational value of other training resources specifically developed for TaTME training, such as mobile phone applications with videos, illustrations, and expert opinions. Moreover, we only searched for TaTME videos on four websites assuming that all procedures were uploaded for educational purposes and we must recognize this as a limitation of our study. However, these websites have been reported among the most used by surgical trainees [5], and our search strategy is likely to represent the experience of a surgeon searching for such videos.

Conclusions

Our study demonstrates that there is considerable interest in TaTME videos. This is not a surprising finding, but there is, a lack of consensus on reporting of these videos, which are missing important patient details and postoperative outcomes, thereby limiting the educational value of these resources.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interests.

References

- Cassinotti E, Palazzini G, Della Porta M, Grosso I, Boni L (2017) Transanal total mesorectal excision (TaTME): tips and tricks of a new surgical technique. *Ann Laparosc Endosc Surg* 2:111–111
- Penna M, Whiteford M, Hompes R, Sylla P (2017) Developing and assessing a cadaveric training model for transanal total mesorectal excision: initial experience in the UK and USA. *Color Dis* 19:476–484
- Celentano V, Smart N, McGrath J, Cahill RA, Spinelli A, Obermair A, Hasegawa H, Lal P, Almoudaris AM, Hitchins CR, Pellino G, Browning MG, Ishida T, Luvisetto F, Cingilloglu P, Gash K, Harries R, Harji D, di Candido F, Cassinotti E, McDermott FD, Berry JEA, Battersby NJ, Platt E, Campain NJ, Keeler BD, Boni L, Gupta S, Griffith JP, Acheson AG, Cecil TD, Coleman MG (2018) LAP-VEGaS practice guidelines for reporting of educational videos in laparoscopic surgery: a joint trainers and trainees consensus statement. *Ann Surg* 268:920–926
- Koedam TWA, van Ramshorst GH, Deijen CL, Elfrink AKE, Meijerink WJHJ, Bonjer HJ, Sietes C, Tuynman JB (2017) Transanal total mesorectal excision (TaTME) for rectal cancer: effects on patient-reported quality of life and functional outcome. *Tech Coloproctol* 21:25–33
- Celentano V, Smart N, Cahill RA, McGrath JS, Gupta S, Griffith JP, et al. 2018 Use of laparoscopic videos amongst surgical trainees in the United Kingdom. *Surgeon*.
- Celentano V, Browning M, Hitchins C, Giglio MC, Coleman MG (2017) Training value of laparoscopic colorectal videos on the World Wide Web: a pilot study on the educational quality of laparoscopic right hemicolectomy videos. *Surg Endosc* 31:4496–4504
- Penna M, Hompes R, Arnold S, Wynn G, Austin R, Warusavitarne J, Moran B, Hanna GB, Mortensen NJ, Tekkis PP, TaTME Registry Collaborative (2017) Transanal total mesorectal excision: international registry results of the first 720 cases. *Ann Surg* 266:111–117
- Velthuis S, Nieuwenhuis DH, Ruijter TEG, Cuesta MA, Bonjer HJ, Sietes C (2014) Transanal versus traditional laparoscopic total mesorectal excision for rectal carcinoma. *Surg Endosc* 28:3494–3499
- Veltcamp Helbach M, Deijen CL, Velthuis S, Bonjer HJ, Tuynman JB, Sietes C (2016) Transanal total mesorectal excision for rectal carcinoma: short-term outcomes and experience after 80 cases. *Surg Endosc* 30:464–470
- Araujo SE, Crawshaw B, Mendes CR, Delaney CP (2015) Transanal total mesorectal excision: a systematic review of the experimental and clinical evidence. *Tech Coloproctol* 19:69–82
- Patel SV, Zhang L, Elsolh B, Yu D, Chadi SA (2018) Spin in articles about minimally invasive transanal total mesorectal excision: an assessment of the current literature. *Color Dis* 21(1):8–14

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.