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FROM THE EDUCATION, TRAINING AND SIMULATION EDITOR

First international training and assessment consensus workshop on transanal total mesorectal excision (taTME)

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Total mesorectal excision

The interest and adoption of transanal total mesorectal excision (taTME) is growing rapidly worldwide. This new technique has arisen thanks to advances in minimally invasive surgery and transanal approaches. The ultimate goal of the procedure is to improve clinical, oncological and functional outcomes of rectal excision by obtaining a meticulous TME resection in cancer cases, whilst avoiding injury to surrounding pelvic structures. Transanal TME is a complex procedure and demands excellent, prerequisite surgical skills in order to complete the operation in a safe and efficient manner. The "bottom-up" approach also reveals a completely new viewpoint of the pelvic anatomy for most surgeons. The combination of complexity and unfamiliarity has triggered the occurrence of adverse events, such as urethral injuries [1, 2], which were rarely encountered previously in conventional laparoscopic or open resections. Uptake of a new operation is also associated with a proficiency-gain curve during which there is increased morbidity and mortality [3]. These adverse outcomes during the introduction and dissemination of taTME must be honestly reported, properly analysed and addressed accordingly. Only then can we avoid a "dip" in the adoption curve we saw early on in the laparoscopic experience due to port site metastasis.

Skills acquisition: lessons from the past

Although knowledge and sound clinical judgement are critical aspects of surgery, having the requisite technical skill is also imperative. Gaining surgical competence is a complex, multifactorial process that takes time and plenty of practice. With the introduction of new technologies and more intricate procedures, as well as a host of external constraints and concerns over patient safety, the doctrine of learning primarily through direct patient experiences has been superseded by efforts to firstly teach in nonclinical settings. The benefits of simulation-based training, including the use of inanimate models, virtual simulation and cadaveric courses, became very apparent during the 1990s when the introduction of laparoscopy required surgeons to develop new skills. Initially, surgeons were ill-prepared and lacked adequate training to become proficient in a totally new technique that included two-dimensional imaging, diminished tactile feedback and hand-eye coordination. Not surprisingly, complications, including common bile duct injuries in laparoscopic cholecystectomy, increased fivefold [4]. Serious concerns over patient safety led to the development of mandatory national laparoscopic

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training programmes, such as the LAPCO (laparoscopic colorectal surgery) national programme in the UK.

Furthermore, pelvic rectal surgery is notoriously complex requiring more focused training. This was acknowledged in 2010 when the National Development Programme for Low Rectal Cancer in England (LOREC) was set up in response to the poor oncological outcomes in patients undergoing low rectal cancer resections [5]. Unlike laparoscopic colectomy, taTME was first described and developed in animal models (swine) and cadavers for over 2 years before the first live case report in 2009. Likewise, introduction of taTME needs careful monitoring and adequate surgical preparation through structured and supervised training, which may flatten and shorten the learning curve for taTME. It is important to realise that both pelvic rectal surgery and advanced transanal techniques are not simple procedures and surgeons cannot just train themselves on patients without any prior training and practice on cadavers first.

First international TaTME educational workshop

On 12 October 2015, the first educational consensus workshop for taTME took place at the Vesalius Clinical Training Centre with cadaveric training facilities in Bristol, UK. Twelve international expert surgeons from Belgium, Italy, Spain, Netherlands, Ireland, UK and USA attended the workshop. The President and Chair of the Education and Training committee of the Association of Coloproctology of Great Britain and Ireland (ACPGBI) were also present. The aim of the meeting was to bring together international experts in taTME to discuss the need for an agreed curriculum and how this educational programme should be structured. The ultimate goal of the training programme will be to promote and deliver effective supervised teaching in order to ensure the safe introduction and dissemination of taTME in the clinical setting.

Survey on taTME

Prior to the workshop an online survey was conducted in the UK to explore the perceptions of colorectal surgeons of various aspects of taTME training and dissemination of the procedure. Although the respondents (150 out of 600 surgeons) of the survey had limited experience, with only 14 % (17 surgeons) having performed the operation, their opinions provided important insight into general expectations regarding training and performance of this new technique. Sixty-two percentage of those surveyed felt that taTME should not be offered in every UK unit and a mean of 14 cases should be performed per year per unit in order to maintain competence. The majority of respondents believed that at least 30 cases of laparoscopic rectal resections should be performed independently prior to learning taTME. This is in agreement with the UK National Institute for Health and Care Excellence guidelines, which recommend that "taTME should only be done by surgeons who are experienced in laparoscopic and transanal rectal resection and who have had specific training in this procedure" [6]. NICE guidelines also encourage clinicians to enter all patients undergoing taTME onto the clinical registry, which was reported to be easy to use and provides the surgeon a complete record of patient cases and individual hospital outcomes. Key components of a training curriculum were also explored; the three most important elements selected were technical skills training in immersion courses, clinical mentorship and multidisciplinary team (MDT) training on indications for taTME. Ninety percentage of respondents believed mentorship programmes to be very important, and 44 % estimated 6–10 cases to achieve competency.

At present, there are no data on the learning curve or volume outcome analysis to support survey responses. Whilst pending further evidence from the international registry data and COLOR III randomised controlled trial, the survey will be repeated to compare the current results with the views of surgeons experienced in taTME. Their answers will act as a further guide for the development of the training curriculum. Inexperienced and untrained surgeons performing taTME, encountering high complication rates, must be avoided. Poor results may lead to misrepresentation of the true benefits of the procedure in trained hands and potentially inhibit the technique from advancing further. Comments in this regard were also shared from the survey respondents who stated that "taTME is an experimental surgical technique that should currently only be performed in 1 or 2 specialist centres and is dangerous to allow everyone to perform".

Assessment tool of taTME

The group discussed the standardisation of the technique and debated how to assess the different essential steps of the procedure. Global Assessment Scale (GAS) forms were successfully used and validated in the UK National Training Programme for Laparoscopic Colorectal Surgery (LAPCO) [7]. These assessment tools are generally designed to monitor trainee progression and promote reflective learning. The forms outline the main operative

steps, which can be used by both mentor and trainee in order to reflect and assess the degree of independence and competence demonstrated by the trainee for each step on a scale of 1–6. Key areas of difficulty that require further practice can be highlighted and, as the trainee becomes more experienced, so the global assessment score may improve. A GAS form to assess the performance of taTME during training was developed and agreed on by the experts at the workshop (Appendices 1, 2). The form was tested during a practical cadaveric taTME case during the workshop. The workshop group felt that the GAS form was a useful tool to assist training, easy to follow and covered the salient points of the operation. Further research, however, is required to validate these forms in clinical training for taTME.

Future directions in taTME training

TaTME has attracted substantial interest among colorectal surgeons, and the expectation is that it will improve short- and long-term outcomes of rectal cancer surgery. The introduction of this new advanced procedure, however, must be carefully planned to ensure well-trained surgeons that offer patients a safe operation. Hence, there was unanimous support from the group attending the workshop to progress and form an international taTME educational collaborative.

The aims of the collaborative are to: (i) provide shared communication platforms among all stakeholders in the field and relevant national and international societies to drive the educational standard for taTME; (ii) agree on the essential elements of optimum training curriculum for taTME and (iii) provide guidance on the implementation and assessment of a training curriculum for taTME.

Summary

This workshop enabled the initial steps towards developing a training curriculum for taTME. To ensure that the final system is fit for purpose, this work will develop further through the contributions of all stakeholders in education and training for taTME, including industry, training centres and surgeons. The ultimate goal is to promote and deliver effective supervised teaching in order to ensure the safe introduction and dissemination of taTME in the clinical setting.

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Compliance with ethical standards

Conflict of interest The workshop was funded by an educational grant from Olympus Medical (OKMEXP00001988).

Ethical approval The Vesalius Clinical Training Centre with cadaver facilities complies with ethical standards and regulations for the use of human cadavers for training.

Informed consent All workshop participants provided informed consent to attend the cadaveric workshop.

Appendix 1

The Global Assessment Score (GAS) form for taTME used to reflect upon and assess the performance of the trainee carrying out the procedure. Trainee GAS form.

FILL IN IMMEDIATELY AFTER THE OPERATION

TaTME Global ASSESSMENT SCORE (GAS) FORM

BY TRAINEE

A. SURGEON

A1. Name of Surgeon

A2. This is my th Transanal TME case th within the TaTME registry

A3. Operating date / /

A4. Name of Hospital ……..

A5. Was the case mentored Yes No

A6. Trainer ……

A7. Was this a shared procedure? ……..

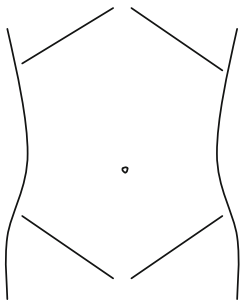
B. PATIENT

B1. Patient identification number

B2. Initials B3. D.O.B. / /

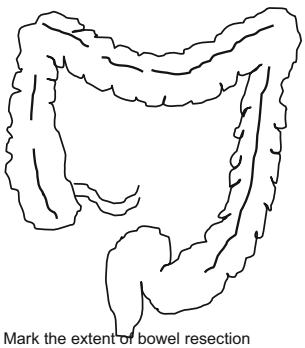
C.

C1. Abdominal port location



X main camera port
O Working ports

C2. Bowel resection



Mark the extent of bowel resection

C3. Male pelvis

Mark the point of connection between abdominal and transanal dissections.

C4. Female pelvis

Mark the extent of perineal dissection

D. SELF-ASSESSMENT (DOPS) ABDOMINAL PHASE

1 Not performed, step had to be done by trainer
2 Partly performed, step had to be partly done by trainer
3 Performed, with substantial verbal support
4 Performed with minor verbal support
5 Competent performance, safe
6 Proficient performance, couldn't be better

EXPOSURE

D1. Correct theatre setup	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐
D2. Appropriate patient positioning	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐
D3. Safe access technique	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐
D4. Exposure of operating field	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐

VASCULAR

D5. Safe dissection of vascular pedicle	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐
D6. Dissection of mesentry	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐
D7. Identification of ureter and gonadal vessels	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐
D8. Identification of hypogastric nerves	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐

MOBILISATION

D9. Dissection of hepatic or splenic flexure	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐
D10. Mesorectal dissection (where applicable)	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐
D11. Safe dissection of bowel	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐

LAP TME DISSECTION

D12. Safe entry of the TME plane to appropriate level	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐
D13. Preservation of autonomic nerves	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐

E. SELF-ASSESSMENT (DOPS) TRANSANAL PHASE

E1. Appropriate patient positioning	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐
E2. Correct Set-up of transanal platform	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐
E3. Pursestring	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐
E4. Marking and Full thickness rectotomy	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐
E5. Mucosectomy / Intersphincteric dissection	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐

COMPLETION TME DISSECTION

E6. Safe dissection of the posterior plane	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐
E7. Safe dissection of the anterior plane	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐
E8. Safe dissection of the lateral plane	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐

E9. TME dissection performed in a step-wise fashion in order to remove the specimen like a cylinder.

1☐ 2☐ 3☐ 4☐ 5☐ 6☐ N/A☐

E10. Connection between the abdominal and perineal teams

1☐ 2☐ 3☐ 4☐ 5☐ 6☐ N/A☐

ANASTOMOSIS (a. Handsewn or b. Stapled)

E11.Safe eversion/ delivery of proximal rectum without rupture

1☐ 2☐ 3☐ 4☐ 5☐ 6☐ N/A☐

E12. Handsewn coloanal / colorectal anastomosis 1☐ 2☐ 3☐ 4☐ 5☐ 6☐ N/A☐

E13. Stapled anastomosis: Insertion of Pursestring 1☐ 2☐ 3☐ 4☐ 5☐ 6☐ N/A☐

E14. Stapled anastomosis: Placement of stapling device through pursestring and firing of stapler

1☐ 2☐ 3☐ 4☐ 5☐ 6☐ N/A☐

F. QUALITY OF RESECTED TME SPECIMEN

F1. Specimen score by the surgeon 1☐ 2☐ 3☐

GRADE	DESCRIPTION
1	**INCOMPLETE** Little bulk to mesorectum with defects down onto muscularis propria and/or very irregular circumferential resection margin.
2	**NEARLY COMPLETE** Moderate bulk to the mesorectum but irregularity of the mesorectal surface. Moderate coning of the specimen towards the distal margin. At no site is the muscularis propria visible with the exception of the insertion of levator muscles. Moderate irregularity of CRM.
3	**COMPLETE** Intact mesorectum only minor irregularities of a smooth mesorectal surface. No defect deeper than 5mm. No coning of the specimen. Smooth CRM on slicing.

G. OVERALL GLOBAL ASSESSMENT SCORE

G1. Abdominal phase overall score: 1☐ 2☐ 3☐ 4☐ 5☐ 6☐ N/A☐

G2. Transanal phase overall score: 1☐ 2☐ 3☐ 4☐ 5☐ 6☐ N/A☐

G3. Level of case difficulty: (very easy) 1☐ 2☐ 3☐ 4☐ 5☐ (very difficult)

Appendix 2

The Global Assessment Score (GAS) form for taTME used to reflect upon and assess the performance of the trainee carrying out the procedure. Mentor GAS form.

FILL IN IMMEDIATELY AFTER THE OPERATION

TaTME Global ASSESSMENT SCORE (GAS) FORM

BY MENTOR

A. SURGEON

A1. Name of Surgeon

A2. Operating date / /

A3. Name of Hospital .....

A4. Name of Mentor .....

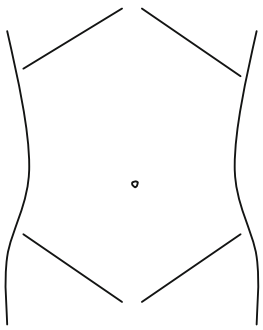
B. PATIENT

B1. Patient identification number

B2. Initials B3. D.O.B. / /

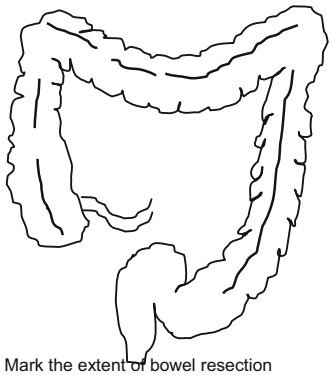
C.

C1. Abdominal port location



X main camera port
O Working ports

C2. Bowel resection



Mark the extent of bowel resection

C3. Male pelvis

Mark the point of connection between abdominal and transanal dissections.

C4. Female pelvis

Mark the extent of perineal dissection

D. SELF-ASSESSMENT (DOPS) ABDOMINAL PHASE

1 Not performed, step had to be done by trainer
2 Partly performed, step had to be partly done by trainer
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4 Performed with minor verbal support
5 Competent performance, safe
6 Proficient performance, couldn't be better

EXPOSURE							
D1. Correct theatre setup	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐
D2. Appropriate patient positioning	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐
D3. Safe access technique	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐
D4. Exposure of operating field	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐
VASCULAR							
D5. Safe dissection of vascular pedicle	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐
D6. Dissection of mesentry	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐
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MOBILISATION							
D9. Dissection of hepatic or splenic flexure	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐
D10. Mesorectal dissection (where applicable)	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐
D11. Safe dissection of bowel	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐
LAP TME DISSECTION							
D12. Safe entry of the TME plane to appropriate level	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐
D13. Preservation of autonomic nerves	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐

E. SELF-ASSESSMENT (DOPS) TRANSANAL PHASE

E1. Appropriate patient positioning	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐
E2. Correct Set-up of transanal platform	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐
E3. Pursestring	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐
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COMPLETION TME DISSECTION							
E6. Safe dissection of the posterior plane	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐
E7. Safe dissection of the anterior plane	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐
E8. Safe dissection of the lateral plane	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐
E9. TME dissection performed in a step-wise fashion in order to remove the specimen like a cylinder.	1☐	2☐	3☐	4☐	5☐	6☐	N/A☐

E10. Connection between the abdominal and perineal teams

1☐ 2☐ 3☐ 4☐ 5☐ 6☐ N/A☐

ANASTOMOSIS (a. Handsewn or b. Stapled)

E11.Safe eversion/ delivery of proximal rectum without rupture

1☐ 2☐ 3☐ 4☐ 5☐ 6☐ N/A☐

E12. Handsewn coloanal / colorectal anastomosis 1☐ 2☐ 3☐ 4☐ 5☐ 6☐ N/A☐

E13. Stapled anastomosis: Insertion of Pursestring 1☐ 2☐ 3☐ 4☐ 5☐ 6☐ N/A☐

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F. QUALITY OF RESECTED TME SPECIMEN

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G. OVERALL GLOBAL ASSESSMENT SCORE

G1. Abdominal phase overall score: 1☐ 2☐ 3☐ 4☐ 5☐ 6☐ N/A☐

G2. Transanal phase overall score: 1☐ 2☐ 3☐ 4☐ 5☐ 6☐ N/A☐

G3. Level of case difficulty: (very easy) 1☐ 2☐ 3☐ 4☐ 5☐ (very difficult)

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