

Transanal total mesorectal excision: Myths and reality

Nicolas C Buchs, Marta Penna, Alexander L Bloemendaal, Roel Hompes

Nicolas C Buchs, Division of Visceral Surgery, Department of Surgery, University Hospitals of Geneva, 1211 Geneva, Switzerland

Nicolas C Buchs, Marta Penna, Alexander L Bloemendaal, Roel Hompes, Department of Colorectal Surgery, Churchill Hospital, Oxford University Hospitals, Oxford OX3 7LE, United Kingdom

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Correspondence to: Nicolas C Buchs, MD, Department of Colorectal Surgery, Churchill Hospital, Oxford University Hospitals, Old Road, Oxford OX3 7LE, United Kingdom. nicolas.c.buchs@hcu.ox.ac.uk
Telephone: +44-1865-741841
Fax: +44-1865-235857

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Abstract

Transanal total mesorectal excision (TaTME) is a new and

promising approach for the treatment of rectal cancer. Whilst the experience is still limited, there are growing evidences that this approach might overcome the limits of standard low anterior resection. TaTME might help to decrease the conversion rate especially in difficult patients, and to improve the pathological results, while preserving the urogenital function. Evaluation of data from large registries and randomized studies should help to draw firmer conclusions. Beyond these technical considerations, the next challenge seems to be clearly the safe introduction of this approach, motivating the development of dedicated courses.

Key words: Transanal total mesorectal excision; Bottom up; TAMIS; Laparoscopy; Robotic; Outcomes; Rectal cancer

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Core tip: The experience and evidences regarding the use of transanal total mesorectal excision is still scarce but promising. Preliminary data showed excellent results, without sacrificing the pathological and oncological outcomes. Whilst still in its infancy, further investigations should be encouraged. Data from large registries and randomized trials are awaited before to draw definitive conclusions.

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There is no doubt that low anterior resection (LAR) and total mesorectal excision (TME) have revolutionized the management of rectal cancer and improved its oncological outcomes^[1]. On the other hand, the introduction of

minimally invasive surgery for oncological rectal resection has not yet completely convinced the most skeptical open surgeons. Whilst potentially better short-term outcomes have been published favoring laparoscopic approach^[2,3], the recent ALaCaRT and ACOSOG Z6051 trials failed to show the non-inferiority of laparoscopic LAR in comparison to open surgery^[4,5]. Indeed, there is still a degree of uncertainty, notably regarding the risk of incomplete TME specimen, positive margins, and worse long-term oncological outcomes. To fuel the debate further, other large randomized series did not show inferior pathological or oncological outcomes following laparoscopic LAR^[6]. Meanwhile, even the amazing introduction of robotics has not significantly improved the outcomes^[7].

To overcome the challenges posed by abdominal TME surgery, a transanal approach has been developed over the last decade, with promising early outcomes. There is growing evidence available including our recent review of transanal TME (TaTME) showing excellent results^[8]. However, TaTME is still in its infancy and definitively requires more robust data and longer follow-up. Since the first description of TaTME, a number of relatively large series have been published, showing not only the feasibility of the approach, but also its safety^[9,10] even in challenging patients. In our own experience, we have recently shown a low conversion rate, low R1 rate, and an excellent completeness of TME^[11-13].

Several parameters and factors pose technical challenges and need special consideration when considering planning TME surgery: (1) dealing with "difficult anatomy" (male, obese, narrow pelvis, post radiation); (2) increasing the sphincter-preserving rate; (3) performing a safe distal rectal stapling; (4) avoiding positive margins; (5) reducing the risk of incomplete TME; (6) improving the oncological outcomes; and (7) offering adequate functional outcomes.

TaTME seems to offer a solution for most of these parameters/factors. The narrow pelvis with a bulky irradiated specimen in an obese male patient is no longer a relative contra-indication to laparoscopic surgery. Starting the most difficult part of the dissection (the lowest part of the pelvis) from the distal end offers obvious advantages. First of all, the distal margin can be assessed precisely and secured with a purse-string before performing the rectotomy. This in turns avoids the need for distal cross-stapling, which can be laparoscopically challenging due to the limited angle of the endoscopic stapler and the pelvic morphology. This often results in multiple firing to complete the transection with the associated risk of anastomotic leak after more than 2 reloads^[14]. With TaTME, this is no longer a challenge. Different anastomotic techniques have been proposed, guaranteeing a safe and efficient way to rejoin the bowel^[15]. Although, this may increase the rate of sphincter-preserving surgery, it is at the cost of a higher rate of coloanal anastomosis.

Beyond these technical considerations, the interest to proceed with a complete TME is important.

The threat of incompleteness of mesorectal excision was recently shown to be significant after LAR and APE (36% and 13% respectively)^[16]. The lowest part of the mesorectum is at risk of being left behind, which is unacceptable from an oncological point of view. Again, starting the dissection from below might help to obtain a more complete TME specimen. Moreover, comparative studies have shown better pathological outcomes after TaTME in comparison to laparoscopic TME^[17,18]. The awaited results from the large multicenter registry study (LOREC) should hopefully help to draw more definitive conclusions.

The main challenges for the future of TaTME can be summarized in three different categories: (1) the long-term oncological outcomes; (2) the functional outcomes; and (3) the safe introduction of this approach.

Obviously, the technique is still in its infancy and long-term outcomes are not yet available. Early oncological data seem promising^[13], but it is too early to draw definitive conclusions. The COLOR III study^[19], evaluating TaTME vs laparoscopic TME, should provide a more comprehensive overview of the added value of the transanal approach. In addition, quality of life and functional outcomes will be assessed. Based on previous reports^[20-22], adequate function has been reported. However, still a high rate of coloanal anastomosis is performed and the risk of worse functional outcomes is possible.

As for any new surgical technique, the danger of widespread rapid and unmonitored adoption without proper training exists. The development of a dedicated curriculum should be established in order to avoid unnecessary preventable complications during the early phase of a surgeon's learning curve. As already mentioned for robotic surgery and other surgical innovations, training is probably the biggest challenge^[23]. Dedicated theoretical and practical courses including cadaver workshops as well as live cases proctoring are key to ensuring the safe introduction of a new surgical technique^[24].

In conclusion, TaTME is a promising approach, aiming to overcome the limitations of laparoscopic TME. So far, the published data support its use. Excellent pathological and acceptable short-term clinical outcomes have been reported, however long-term oncological and functional data are still awaited. There is no doubt that TaTME will play a significant role in the evolution of rectal surgery as the drive to perfecting TME and improving outcomes continues.

REFERENCES

- 1 **van Gijn W**, Marijnen CA, Nagtegaal ID, Kranenbarg EM, Putter H, Wiggers T, Rutten HJ, Pahlman L, Glimelius B, van de Velde CJ. Preoperative radiotherapy combined with total mesorectal excision for resectable rectal cancer: 12-year follow-up of the multicentre, randomised controlled TME trial. *Lancet Oncol* 2011; **12**: 575-582 [PMID: 21596621 DOI: 10.1016/S1470-2045(11)70097-3]
- 2 **van der Pas MH**, Haglind E, Cuesta MA, Fürst A, Lacy AM, Hop WC, Bonjer HJ. Laparoscopic versus open surgery for rectal cancer

- (COLOR II): short-term outcomes of a randomised, phase 3 trial. *Lancet Oncol* 2013; **14**: 210-218 [PMID: 23395398 DOI: 10.1016/S1470-2045(13)70016-0]
- 3 **Kang SB**, Park JW, Jeong SY, Nam BH, Choi HS, Kim DW, Lim SB, Lee TG, Kim DY, Kim JS, Chang HJ, Lee HS, Kim SY, Jung KH, Hong YS, Kim JH, Sohn DK, Kim DH, Oh JH. Open versus laparoscopic surgery for mid or low rectal cancer after neoadjuvant chemoradiotherapy (COREAN trial): short-term outcomes of an open-label randomised controlled trial. *Lancet Oncol* 2010; **11**: 637-645 [PMID: 20610322 DOI: 10.1016/S1470-2045(10)70131-5]
 - 4 **Stevenson AR**, Solomon MJ, Lumley JW, Hewett P, Clouston AD, Gebbski VJ, Davies L, Wilson K, Hague W, Simes J. Effect of Laparoscopic-Assisted Resection vs Open Resection on Pathological Outcomes in Rectal Cancer: The ALaCaRT Randomized Clinical Trial. *JAMA* 2015; **314**: 1356-1363 [PMID: 26441180 DOI: 10.1001/jama.2015.12009]
 - 5 **Fleshman J**, Branda M, Sargent DJ, Boller AM, George V, Abbas M, Peters WR, Maun D, Chang G, Herline A, Fichera A, Mutch M, Wexner S, Whiteford M, Marks J, Birnbaum E, Margolin D, Larson D, Marcello P, Posner M, Read T, Monson J, Wren SM, Pisters PW, Nelson H. Effect of Laparoscopic-Assisted Resection vs Open Resection of Stage II or III Rectal Cancer on Pathologic Outcomes: The ACOSOG Z6051 Randomized Clinical Trial. *JAMA* 2015; **314**: 1346-1355 [PMID: 26441179 DOI: 10.1001/jama.2015.10529]
 - 6 **Bonjer HJ**, Deijen CL, Abis GA, Cuesta MA, van der Pas MH, de Lange-de Klerk ES, Lacy AM, Bemelman WA, Andersson J, Angenete E, Rosenberg J, Fuerst A, Haglund E. A randomized trial of laparoscopic versus open surgery for rectal cancer. *N Engl J Med* 2015; **372**: 1324-1332 [PMID: 25830422 DOI: 10.1056/NEJMoa1414882]
 - 7 **Buchs NC**. Robotic technology: Optimizing the outcomes in rectal cancer? *World J Clin Oncol* 2015; **6**: 22-24 [PMID: 26078918 DOI: 10.5306/wjco.v6.i3.22]
 - 8 **Buchs NC**, Nicholson GA, Ris F, Mortensen NJ, Hompes R. Transanal total mesorectal excision: A valid option for rectal cancer? *World J Gastroenterol* 2015; **21**: 11700-11708 [PMID: 26556997 DOI: 10.3748/wjg.v21.i41.11700]
 - 9 **Lacy AM**, Tasende MM, Delgado S, Fernandez-Hevia M, Jimenez M, De Lacy B, Castells A, Bravo R, Wexner SD, Heald RJ. Transanal Total Mesorectal Excision for Rectal Cancer: Outcomes after 140 Patients. *J Am Coll Surg* 2015; **221**: 415-423 [PMID: 26206640 DOI: 10.1016/j.jamcollsurg.2015.03.046]
 - 10 **Burke JP**, Martin-Perez B, Khan A, Nassif G, de Beche-Adams T, Larach SW, Albert MR, Atallah S. Transanal total mesorectal excision for rectal cancer: early outcomes in 50 consecutive patients. *Colorectal Dis* 2016; **18**: 570-577 [PMID: 26749148 DOI: 10.1111/codi.13263]
 - 11 **Buchs NC**, Kraus R, Mortensen NJ, Cunningham C, George B, Jones O, Guy R, Ashraf S, Lindsey I, Hompes R. Endoscopically assisted extralevator abdominoperineal excision. *Colorectal Dis* 2015; **17**: O277-O280 [PMID: 26454256 DOI: 10.1111/codi.13144]
 - 12 **Buchs NC**, Nicholson GA, Yeung T, Mortensen NJ, Cunningham C, Jones OM, Guy R, Hompes R. Transanal rectal resection: an initial experience of 20 cases. *Colorectal Dis* 2016; **18**: 45-50 [PMID: 26639062 DOI: 10.1111/codi.13227]
 - 13 **Buchs NC**, Wynn G, Austin R, Penna M, Findlay JM, Bloemendaal AL, Mortensen NJ, Cunningham C, Jones OM, Guy RJ, Hompes R. A two centre experience of transanal total mesorectal excision. *Colorectal Dis* 2016; Epub ahead of print [PMID: 27218423 DOI: 10.1111/codi.13394]
 - 14 **Ito M**, Sugito M, Kobayashi A, Nishizawa Y, Tsunoda Y, Saito N. Relationship between multiple numbers of stapler firings during rectal division and anastomotic leakage after laparoscopic rectal resection. *Int J Colorectal Dis* 2008; **23**: 703-707 [PMID: 18379795 DOI: 10.1007/s00384-008-0470-8]
 - 15 **Penna M**, Knol JJ, Tuynman JB, Tekkis PP, Mortensen NJ, Hompes R. Four anastomotic techniques following transanal total mesorectal excision (TaTME). *Tech Coloproctol* 2016; **20**: 185-191 [PMID: 26754653 DOI: 10.1007/s10151-015-1414-2]
 - 16 **Bondeven P**, Hagemann-Madsen RH, Laurberg S, Pedersen BG. Extent and completeness of mesorectal excision evaluated by postoperative magnetic resonance imaging. *Br J Surg* 2013; **100**: 1357-1367 [PMID: 23939848 DOI: 10.1002/bjs.9225]
 - 17 **Fernández-Hevia M**, Delgado S, Castells A, Tasende M, Momblan D, Díaz del Gobbo G, DeLacy B, Balust J, Lacy AM. Transanal total mesorectal excision in rectal cancer: short-term outcomes in comparison with laparoscopic surgery. *Ann Surg* 2015; **261**: 221-227 [PMID: 25185463 DOI: 10.1097/SLA.0000000000000865]
 - 18 **Velthuis S**, Nieuwenhuis DH, Ruijter TE, Cuesta MA, Bonjer HJ, Sietes C. Transanal versus traditional laparoscopic total mesorectal excision for rectal carcinoma. *Surg Endosc* 2014; **28**: 3494-3499 [PMID: 24972923 DOI: 10.1007/s00464-014-3636-1]
 - 19 **Deijen CL**, Velthuis S, Tsai A, Mavrouli S, de Lange-de Klerk ES, Sietes C, Tuynman JB, Lacy AM, Hanna GB, Bonjer HJ. COLOR III: a multicentre randomised clinical trial comparing transanal TME versus laparoscopic TME for mid and low rectal cancer. *Surg Endosc* 2016; **30**: 3210-3215 [PMID: 26537907 DOI: 10.1007/s00464-015-4615-x]
 - 20 **Rouanet P**, Mourregot A, Azar CC, Carrere S, Gutowski M, Quenet F, Saint-Aubert B, Colombo PE. Transanal endoscopic proctectomy: an innovative procedure for difficult resection of rectal tumors in men with narrow pelvis. *Dis Colon Rectum* 2013; **56**: 408-415 [PMID: 23478607 DOI: 10.1097/DCR.0b013e3182756fa0]
 - 21 **Tuech JJ**, Karoui M, Lelong B, De Chaisemartin C, Bridoux V, Manceau G, Delpero JR, Hanoun L, Michot F. A step toward NOTES total mesorectal excision for rectal cancer: endoscopic transanal proctectomy. *Ann Surg* 2015; **261**: 228-233 [PMID: 25361216 DOI: 10.1097/SLA.0000000000000994]
 - 22 **Kneist W**, Wachter N, Paschold M, Kauff DW, Rink AD, Lang H. Midterm functional results of taTME with neuromapping for low rectal cancer. *Tech Coloproctol* 2016; **20**: 41-49 [PMID: 26561031 DOI: 10.1007/s10151-015-1390-6]
 - 23 **Buchs NC**. Training in Robotic General Surgery: The Next Challenge. *Adv Robot Autom* 2012; **1**: 1 [DOI: 10.4172/2168-9695.1000e104]
 - 24 **Penna M**, Hompes R, Mackenzie H, Carter F, Francis NK. First international training and assessment consensus workshop on transanal total mesorectal excision (taTME). *Tech Coloproctol* 2016; **20**: 343-352 [PMID: 27015679 DOI: 10.1007/s10151-016-1454-2]

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