



Editorial

From Miles' Procedure to Robotic Transanal Proctectomy[☆]

De la operación de Miles a la proctectomía transanal robótica

The difficulty of rectal resection is determined by its anatomical relationships. It is located in a narrow, angled musculoskeletal tunnel with an abdominal entrance and an exit site that is the anal sphincter or, surgically, the perineum. Within this tunnel, and in close relationship with the rectum, are part of the male and female genitalia and other organs, including the bladder, seminal vesicles, prostate, urethra and vagina, as well as a network of nerves that control defecatory, genital and urinary functions. This makes it very difficult to visualize and dissect in the area. Conventional surgical techniques involve a series of complications derived from this difficulty, and the surgeon factor becomes a crucial element for clinical results. It is only possible to overcome these challenges with greater knowledge about the disease, improved imaging techniques such as magnetic resonance imaging¹ and, above all, the development of technologies that help resolve the barriers caused by this anatomical location.

On December 19, 1908, *The Lancet* published a paper by Ernest Miles entitled "A method of performing abdominoperineal excision for carcinoma of the rectum and of the terminal portion of the pelvic colon", which presented the successful results of 12 cases with a mortality of 41.6%.² The development of total mesorectal excision (described by Heald³) and preoperative radiotherapy very significantly diminished the rates of local recurrence to less than 10%. Nowadays, the results of abdomino-perineal resection including in the surgical specimen the resection of the levator muscle, as described by Miles, with a local recurrence rate between 5.7% and 14% is still a current surgery in the treatment of lower rectal cancer in patients with sphincter infiltration, serious comorbidity or clear risk of incontinence.⁴

In the last 30 years, improvements in surgical techniques and adjuvant therapies have been changing the mentality of many surgeons, who have abandoned the Miles procedure as the gold standard. They have developed rectal resection techniques with preservation of the sphincters based on the new knowledge about the distal wall extension of the disease.⁵

The applicable safety rule about 5-cm free resection margins was modified to 2 cm in the 1980s and to 1 cm more recently.⁶ The introduction of intersphincteric resection with coloanal anastomosis was published by Sir Alan Parks in 1972.⁷

Colorectal laparoscopic resection was described by Jacobs et al. in 1991.⁸ Several prospective and randomized multicenter studies⁹⁻¹¹ have demonstrated clear advantages in complications, shorter recovery and oncologic safety in the case of colon surgery (COST, COLOR and CLASSIC). However, there still is no clear clinical evidence that has been sufficiently proven in the case of rectal surgery. Many retrospective studies suggest it, but they lack solid data from more important scientific studies. The 3-year results were recently published from the COLOR II study,¹² which concludes that, in selected patients with expert surgeons, laparoscopic rectal surgery is equally safe and provides resection margins similar to open surgery as well as better postoperative recovery. The recurrence rate results were expected for the end of 2013. It should be emphasized that the conversion rate in this study is 17%, in spite of having been performed by selected surgeons; also, the study included tumors of the upper, mid and lower rectum.

One new technological advance is the Da Vinci robot, which provides surgeons with a three-dimensional view, magnification of the image up to 10 times and the ability to use articulated instruments. The possibilities for its use are greater, and the robot does not transmit the surgeon's trembling to the surgical field. These characteristics are potentially able to minimize the anatomical difficulties inherent to rectal surgery. Pigazzi published the first report of anterior resection with total exeresis of the mesorectum in 2006.¹³ The number of hospitals in the world that perform this surgery in the rectum is increasing. Many, however, are still learning, introducing and consolidating the technique, and there are very few that have sufficient accumulated experience.

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The clinical results are still lacking conclusions derived from multicenter studies, which are currently in the development phase, such as the ROLLAR study.¹⁴ Meanwhile, the results of different publications from isolated centers, many of which are retrospective, indicate that it is a feasible and safe technique. It has very low rates of conversion to open surgery, with very limited blood loss, and is able to significantly reduce resections with mutilation of the sphincter apparatus. Some studies report that it achieves better results for genital and urinary function.¹⁵

Transanal endoscopic microsurgery was originally described by Buess and Mentges in 1980.¹⁶ The technological development in imaging techniques and devices makes it possible for certain tumors of the mid to lower rectum to be resected locally, even including the total thickness of the rectal wall, transanally and with preservation of the sphincter. Nowadays, it is indicated in uT1uN0 rectal cancers, while its use is controversial in uT2-3sN0 rectal cancers, associated with chemotherapy. There are some pending randomized prospective studies that will define the role of this technique in these cases.

The concept of minimally invasive surgery through natural orifices (NOTES) started to be applied in some surgical procedures, mainly in transvaginal cholecystectomy. In 2010 at the Hospital Clínic in Barcelona, the first successful transanal proctectomy was performed with total resection of the mesorectum, assisted by laparoscopy, due to a mid-rectal tumor.¹⁷ Although the technique does not strictly follow the NOTES concept, it has several potential advantages by being able to resect the rectum through 2 approaches: abdominal and transanal.

Recently, Lacy et al. have published their first 20 cases with this technique.¹⁸ They concluded that in expert hands it is safe, with better visualization and dissection of the pelvis; it provides resections that predict good oncological results, although long-term studies are needed to validate these provisional results. The possibility to carry out this technique with robotics would have the potential advantages of better vision and greater instrument maneuverability. Our group, using a platform that we have developed ourselves, has postulated its feasibility in porcine models and in human cadavers. In August 2013, Atallah described a robotic transanal coloproctectomy procedure done in a patient with familial polyposis.¹⁹ Our group has successfully begun a prospective pilot study of transanal proctectomy with total excision of the mesorectum, with completely robotic ultralow or coloanal anastomosis and with descent of the splenic flexure, using our platform.²⁰

The very rapid development of new technologies that offer the possibility for improved vision and dissection could allow the development of surgery with potentially faster recovery and possibly less functional mutilation. For the diffusion of these technologies, it is necessary to evaluate the reproducibility of their application and to demonstrate their advantages in terms of cost-effectiveness.

But this fast-paced technical progress barely gives us enough time to consolidate the use of each of the advances made. At this time, we must pause for reflection; the application of these technologies should not be either arbitrary or precipitated. We are becoming increasingly

aware that surgical treatment of rectal cancer should be concentrated in specialized units with surgeons who have passed an accredited learning program with audited results, and who have also had experience in technological and experimental research in animal and human cadaver models. In addition, prospective studies are necessary to compare the efficacy of these new approaches with those that are currently accepted by scientific evidence with regards to local recurrence, survival and quality of life, sexual function, etc. These specialized units should also provide structured training programs for the application of these new technologies.

Conflicts of Interests

There are no conflicts of interest to declare.

REFERENCES

1. Costa-Silva L, Brown G. Magnetic resonance imaging of rectal cancer. *Magn Reson Imaging Clin N Am.* 2013;21:385-408.
2. Miles WE. A method of performing abdomino-perineal excision for carcinoma of the rectum and of the terminal portion of the pelvic colon. *Lancet.* 1908;2:1812-3.
3. Heald RJ, Husband EM, Ryall RD. The mesorectum in rectal cancer surgery: the clue to pelvic recurrence? *Br J Surg.* 1982;69:613-6.
4. De Campos-Lobato LF, Stocchi L, Dietz DW, Lavery IC, Fazio VW, Kalady MF. Prone or lithotomy positioning during an abdominoperineal resection for rectal cancer results in comparable oncologic outcomes. *Dis Colon Rectum.* 2011;54:939-46.
5. Wai Lun L, Kin Wah CH. Anterior resection for rectal cancer with mesorectal excision: a prospective evaluation of 622 patients. *Ann Surg.* 2004;240:260-8.
6. Bujko K, Rutkowski A, Chang GJ, Michalski W, Chmielik E, Kusnierz J. Is the 1-cm rule of distal bowel resection margin in rectal cancer based on clinical evidence? A systematic review. *Ann Surg Oncol.* 2012;19:801-8.
7. Parks AG. Transanal technique in low rectal anastomosis. *Proc R Soc Med.* 1972;65:975-6.
8. Jacobs M, Verdeja JC, Goldstein HS. Minimally invasive colon resection (laparoscopic resection). *Surg Laparosc Endosc.* 1991;1:144-50.
9. Fleshman J, Sargent DJ, Green E, Anvari M, Stryker S, Beart Jr RW, et al. Laparoscopic colectomy for cancer is not inferior to open surgery based on 5-year data from the COST Study Group trial. *Ann Surg.* 2007;246:655-62. discussion 662-664.
10. Veldkamp R, Kuhry E, Hop W, Jeekel J, Kazemier G, Bonjer HJ, et al. Laparoscopic surgery versus open surgery for colon cancer: short-term outcomes of a randomised trial. *Lancet Oncol.* 2005;6:477-84.
11. Jayne DG, Guillou PJ, Thorpe H, Quirke P, Copeland J, Smith AMH, et al. Randomized trial of laparoscopic-assisted resection of colorectal carcinoma: 3-year results of the UK MRC CLASICC Trial Group. *J Clin Oncol.* 2007;25:3061-8.
12. Van der Pas MH, Haglind E, Cuesta MA, Fürst A, Lacy AM, Hop WC, et al. Laparoscopic versus open surgery for rectal cancer (COLOR II): Short-term outcomes of a randomised, phase 3 trial. *Lancet Oncol.* 2013;14:210-8.
13. Pigazzi A, Ellenhorn JD, Ballantyne GH, Paz IB. Robotic-assisted laparoscopic low anterior resection with total

- mesorectal excision for rectal cancer. *Surg Endosc.* 2006;20:1521-5.
14. Baek SK, Carmichael JC, Pigazzi A. Robotic surgery: colon and rectum. *Cancer J.* 2013;19:140-6.
 15. Luca F, Valvo M, Ghezzi TL, Zuccaro M, Cenciarelli S, Trovato C, et al. Impact of robotic surgery on sexual and urinary functions after fully robotic nerve-sparing total mesorectal excision for rectal cancer. *Ann Surg.* 2013;257:672-8.
 16. Middleton PF, Sutherland LM, Maddern GJ. Transanal endoscopic microsurgery: a systematic review. *Dis Colon Rectum.* 2005;48:270-84.
 17. Sylla P, Rattner DW, Delgado S, Lacy AM. NOTES transanal rectal cancer resection using transanal endoscopic microsurgery and laparoscopic assistance. *Surg Endosc.* 2010;24:1205-10.
 18. Lacy AM, Rattner DW, Adelsdorfer C, Tasende M, Fernandez M, Delgado S, et al. Transanal natural orifice transluminal endoscopic surgery (NOTES) rectal resection: "Down-to-up" total mesorectal excision (TME) – short-term outcomes in the first 20 cases. *Surg Endosc.* 2013;27:3165-72.
 19. Atallah S, Nassif G, Polavarapu H, de Beche-Adams T, Ouyang J, Albert M, et al. Robotic-assisted transanal surgery for total mesorectal excision (RATS-TME): A description of a novel surgical approach with video demonstration. *Tech Coloproctol.* 2013;17:441-7.
 20. Gómez Ruiz M, Manuel Palazuelos C, Martín Parra JI, Alonso Martín J, Cagigas Fernández C, Castillo Diego J, et al. Nueva técnica de proctectomía trasanal con escisión total del mesorrecto totalmente robótica en el tratamiento del cáncer de recto. *Cir Esp.* 2014 [in press].

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