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Functional results of robotic total intersphincteric resection with hand-sewn coloanal anastomosis

F. Luca [a,*], M. Valvo [a], M. Guerra-Cogorno [b], D. Simo [c], E. Blesa-Sierra [d], R. Biffi [a], C. Garberoglio [e]

[a] *Division of Gastrointestinal Surgery, European Institute of Oncology, Milano, Italy*
[b] *Department of General Surgery, Centro Médico "Dr. Rafael Guerra Méndez" Valencia, Venezuela*
[c] *Unità Operativa di Patologia Chirurgica, Ospedale SS. Annunziata, Chieti, Italy*
[d] *Servicio de Cirugia General y Aparato Digestivo, Hospital Clinico San Carlos, Madrid, Spain*
[e] *Department of Surgery, Loma Linda University Medical Center, Loma Linda, CA, USA*

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Abstract

Background: In recent decades there has been an increasing trend toward sphincter-preserving procedures for the treatment of low rectal cancer. Robotic surgery is considered to be particularly beneficial when operating in the deep pelvis, where laparoscopy presents technical limitations. The aim of this study was to prospectively evaluate the functional outcomes in patients affected by rectal cancer after robotic total intersphincteric resection (ISR) with hand-sewn coloanal anastomosis.

Methods and procedures: From March 2008 to October 2012, 23 consecutive patients affected by distal rectal adenocarcinoma underwent robotic ISR. Operative, clinical, pathological and functional data regarding continence or presence of a low anterior resection syndrome (LARS) were prospectively collected in a database.

Results: Twenty-three consecutive patients were included in the study: 8 men and 15 women. The mean age was 60.2 years (range 28–73). Eighteen (78.3%) had neoadjuvant radiochemotherapy. Conversion rate was nil. The mean operative time was 296.01 min and the mean postoperative hospital stay was 7.43 ± 1.73 days. According to Kirwan's incontinence score, good fecal continence was shown in 85.7% of patients (Grade 1 and 2) and none required a colostomy (Grade 4). Concerning LARS score, the results were as follows: 57.1% patients had no LARS; 19% minor LARS and 23.8% major LARS.

Conclusions: Robotic total ISR for low rectal cancer is an acceptable alternative to traditional procedures. Extensive discussion with the patient about the risk of poor functional outcomes or LARS syndrome is mandatory when considering an ISR for treatment of low rectal cancer.

Keywords: Rectal cancer; Robotic surgery; Colorectal surgery; Da Vinci system

Introduction

The concept of radicality in the field of rectal cancer was completely changed by the introduction of Total Mesorectal Excision (TME)[1] and by evidence that the traditional 5 cm distal resection margin was excessive, leading to its progressive reduction to 1 cm.[2,3]

These two main principles provided the basis for the diffusion of surgical techniques that facilitate sphincter preservation, and even though abdomino-perineal resection is sometimes the only treatment indicated, the multimodal approach involving preoperative combined radiochemotherapy and intersphincteric resection of the rectum (ISR) has been proved to be oncologically safe, thereby giving both patient and surgeon an option to preserve the quality of life without increasing the risk of local relapse.

In fact, the advances in oncology of recent decades have led to an increasing trend toward sphincter-preserving procedures for the treatment of low rectal cancer as witnessed

* Corresponding author. European Institute of Oncology, Via Ripamonti 435, 20141, Milano, Italy. Tel.: +39 02 57489631; fax: +39 02 94379215.
E-mail address: fabrizio.luca@ieo.it (F. Luca).

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by a decline in the rate of abdominoperineal excision in Europe and North America.[4–6]

ISR is the ultimate sphincter-preserving surgery. This procedure is carried out by abdominal and perineal approaches and consists of an anterior resection with total mesorectal excision and the excision of a part (subtotal) or the entire (total) internal sphincter.[7]

The complete removal of the internal sphincter carried out in total ISR can result more frequently in severe bowel dysfunction with urgency, nocturnal leakage and fecal incontinence. The higher risk of poor functional results associated with total ISR has been reported to be one of the most important risk factors affecting the Quality of Life of patients after surgery.[8]

The feasibility and advantages of the use of minimally-invasive surgical techniques in colorectal cancer treatment has also been fully described, consisting of faster recovery, earlier return to a normal diet and less postoperative pain. However, laparoscopy has been relatively slow to be adopted for rectal cancer due to the complexity of these procedures. The technical difficulties of pelvic exposure and dissection entail a long learning curve.[9] Moreover some concerns still remain, in terms of results for sexual and urinary function.[10,11]

Robotic surgery is considered to be particularly beneficial for operating in confined spaces, such as the deep pelvis, where there is an improvement upon the limitations of laparoscopy: reduced degrees of freedom of the surgical instruments, increased hand tremor and unstable camera.[12] In particular, the results regarding nerve-sparing surgery and consequent preservation of sexual and urinary function have been reported to be promising when compared to open and traditional laparoscopic surgery.[13–15]

Functional outcomes after ISR reported in the literature show a great variability.[16,17] Some studies, in fact, have not only included ISR as defined by Schiessel but also ultralow anterior resections with stapled anastomosis. Moreover a great difference has been reported in terms of functional results between total, subtotal and partial intersphincteric resection, the length of the residual internal sphincter being one of the most important factors affecting functional results.[8]

The aim of our study was to evaluate the oncologic and functional outcomes in patients affected by rectal cancer after robotic total intersphincteric resection with hand-sewn coloanal anastomosis.

Patients and methods

At the European Institute of Oncology between March 2008 and October 2012, a total of 23 consecutive patients with histologically-confirmed rectal adenocarcinoma located in the distal rectum or anal canal, within 5 cm from the anal verge measured by rigid proctoscopy, underwent a robotic total intersphincteric resection with hand-sewn coloanal anastomosis. Operative, clinical, pathological and functional data were prospectively collected in a database. Ethical approval of the institutional review board was obtained and all patients received an extensive explanation of the procedure and provided informed consent.

Preoperative staging included colonoscopy, thoracoabdominal computed tomography and digital rectal examination. To evaluate local infiltration, pelvic magnetic resonance imaging and/or endorectal ultrasound was conducted in all patients. Indications to pre-op RT-CT were a radiographic tumor stage (T) $\geq$3 or with node-positive disease. When neoadjuvant radiochemotherapy was indicated, a 45–50 Gy dose during 4–5 weeks together with systemic 5-fluouracil-based chemotherapy was delivered. For all patients the final treatment plan was decided by a dedicated multidisciplinary team including surgeons, radiologists, medical oncologists and radiotherapists.

Clinical parameters analyzed included: patient characteristics, operative variables, pathologic examination, and short-term and medium-term oncologic outcomes.

Perioperative data included operative time, estimated blood loss (EBL), conversion rate, perioperative complications and length of hospital stay. Operative time was calculated as the time from pneumoperitoneum induction to trocar extraction and port-site closure; docking time is carried out after the laparoscopic exploration and is included in the operative time.

Pathologic examination included: stage of disease (TNM), number of lymph nodes harvested, and longitudinal and radial margins of resection.

Involvement of circumferential resection margin (CRM) was defined as CRM $\leq$ 1 mm.

Patients with T4 cancer at preoperative staging were excluded from the study.

Surgical technique

The surgical procedures were performed within 11 weeks after neoadjuvant therapy. The indication of intersphincteric resection (ISR) technique was given after locally restaging of the rectal cancer with MRI, EUS and digital rectal exploration. All the operations were robotically performed with the Da Vinci Surgical System.

We adopted a fully robotic single docking technique, as described previously.[18]

Pneumoperitoneum was established by the means of a Veress needle and a 12-mm optical trocar for the camera, which was inserted under direct vision, right lateral to the umbilicus. Three 8 mm trocars for the robotic arms were placed on the right, left iliac fossa and in the epigastrium. Another 12-mm trocar, for the assistant surgeon at the operating table, was inserted into the right flank. Once all trocars were inserted, we performed a routine intra-operative liver ultrasound. The patients were then placed in a lithotomy position, with a 30° Trendelenburg and the robotic cart was docked from the lower-left side of the patient, at an