



## Original article

# The Learning Curve of Laparoscopic Treatment of Rectal Cancer Does Not Increase Morbidity<sup>☆</sup>

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## A B S T R A C T

**Introduction:** The treatment of rectal cancer via laparoscopy is controversial due to its technical complexity. Several randomized prospective studies have demonstrated clear advantages for the patient with similar oncological results to those of open surgery, although during the learning of this surgical technique there may be an increase in complications and a worse prognosis.

**Objective:** Our aim is to analyze how the learning curve for rectal cancer via laparoscopy influences intra- and postoperative results and oncological markers. A retrospective review was conducted of the first 120 patients undergoing laparoscopic surgery for rectal neoplasia. The operations were performed by the same surgical team with a wide experience in the treatment of open colorectal cancer and qualified to perform advanced laparoscopic surgery. We analyzed sex, ASA, tumor location, neoadjuvant treatment, surgical technique, operating time, conversion, postoperative complications, length of hospital stay, number of lymph nodes, stage and involvement of margins.

**Results:** Significant differences were observed with regard to surgical time (224 min in the first group, 204 min in the second group), with a higher rate of conversion in the first group (22.5%) than in the second (11.3%). No significant differences were noted for rate of conservative sphincter surgery, length of hospital stay, post-surgical complications, number of affected/isolated lymph nodes or affected circumferential and distal margins.

**Conclusions:** It is possible to learn this complex surgical technique without compromising the patient's safety and oncological outcome.

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## Aprendizaje de la cirugía del cáncer de recto por laparoscopia sin aumento de la morbimortalidad

### RESUMEN

**Palabras clave:**  
Cáncer de recto  
Aprendizaje  
Laparoscopia

**Introducción:** El tratamiento del cáncer de recto por laparoscopia es controvertido por su complejidad técnica. Estudios prospectivos aleatorizados han demostrado claras ventajas para el paciente, con resultados oncológicos equiparables a la cirugía abierta, aunque durante el aprendizaje de esta cirugía puede existir un aumento de las complicaciones y peor pronóstico.

**Objetivo:** Nuestro objetivo es analizar cómo influye la curva de aprendizaje del cáncer de recto por vía laparoscópica en los resultados intra y postoperatorios, así como en los marcadores oncológicos.

**Pacientes y métodos:** Se realizó una revisión retrospectiva de los 120 primeros pacientes intervenidos de neoplasia de recto por vía laparoscópica. La población a estudio se ordenó cronológicamente por fecha de intervención y se dividió en un primer grupo que contenía las 40 primeras intervenciones, y un segundo grupo que contenía las 80 siguientes. Las intervenciones fueron realizadas por el mismo equipo quirúrgico con una amplia experiencia en el tratamiento del cáncer colorrectal abierto, además de estar capacitados para realizar cirugía laparoscópica avanzada. Se analizaron sexo, ASA, localización del tumor, neoadyuvancia, técnica quirúrgica, tiempo operatorio, conversión, complicaciones postoperatorias, estancia hospitalaria, número de ganglios, estadio y afectación de márgenes. **Resultados:** Se observaron diferencias significativas en cuanto a tiempo quirúrgico (224 min en el primer grupo, 204 min en el segundo grupo), con una mayor tasa de conversión en el primer grupo (22,5%) frente al segundo (11,3%). No se apreciaron diferencias significativas en cuanto a la tasa de cirugía conservadora de esfínteres, estancia hospitalaria, complicaciones posquirúrgicas, número de ganglios afectos/aislados ni márgenes circunferencial y distal afectos.

**Conclusión:** Es posible realizar el aprendizaje de esta compleja cirugía sin comprometer la seguridad y resultado oncológico del paciente.

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## Introduction

Several studies have demonstrated that laparoscopic treatment of colon cancer has oncologic results similar to open surgery, with no increased morbidity or mortality, and offers patients all the advantages of laparoscopic surgery.<sup>1-4</sup>

Laparoscopic surgery in rectal cancer, however, is more controversial because of its technical complexities due to the anatomical location, need for total mesorectal excision (TME) with adequate margins, continuity with the sphincters and its vicinity to the hypogastric plexus. Nevertheless, there are more and more studies demonstrating that laparoscopic surgery in rectal cancer has oncologic and functional results similar to open surgery.<sup>5-9</sup>

The learning curve of this procedure is technically more complex than colonic surgery, and the acquisition of advanced laparoscopic surgery skills is still one of the obstacles for the generalized application of colorectal laparoscopic surgery. This surgery requires the identification of tissue planes without injuring the neighboring structures, such as the prostate, vagina and hypogastric plexus, in addition to performing, in most occasions, a colorectal anastomoses, which can be sometimes very complex. An initial training period is necessary, and continuous repetition of the process provides surgeons with the experience necessary to safely perform these

complex procedures, without increasing morbidity or mortality or compromising long-term oncologic results. Higher rates of positive circumferential resection margins<sup>10</sup> and anastomotic leaks<sup>11</sup> have been described when laparoscopic surgery is used for rectal resection.

In this study, we present the short-term results from the learning process of laparoscopic rectal cancer resection and the effects of the surgeons' learning curves on patient results.

## Patients and Methods

We retrospectively reviewed the first 120 patients who had been treated at our hospital for rectal adenocarcinoma using the laparoscopic approach. The study population was organized chronologically according to the date of surgery, and it was divided into a first group of the initial 40 interventions and a second group that contained the following 80. At the start of the series, we excluded those patients with a body mass index (BMI) higher than 35 and patients with cancer in the lower third of the rectum; as the surgeons gained experience, these patients were later included. All patients were studied with physical examination, rectal exam, total colonoscopy with biopsy, rigid rectoscopy, anorectal ultrasound, thoracic and abdominal computed tomography, nuclear magnetic resonance imaging of the rectum and barium enema in patients without complete colonoscopy.

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