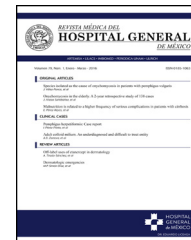




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MEDICAL EDUCATION

## Transanal-total mesorectal excision in cadaveric model



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### KEYWORDS

Cadaver;  
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Rectal neoplasms;  
Abdomen

**Abstract** Cadaveric models offer a realistic surgical procedure simulation platform in the operating theatre, which facilitate the learning of new techniques without inherent risks for the patient. The objective of this study is to report our experience using the TaTME (transanal-total mesorectal excision) approach in a cadaveric model in the Clinical Simulation Department of the Tecnológico de Monterrey School of Medicine, at the Monterrey Campus. A total of 5 laparoscopic abdominal and TaTME procedures were conducted simultaneously using the Gel-POINT Path platform<sup>®</sup> (Applied Medical, Rancho Santa Margarita, CA, USA). The average time for the abdominal procedure was 71 min, while the transanal procedure lasted 74 min. In 4 of the cadavers, a total mesorectal excision was achieved, with a near total mesorectal excision in the remaining cadaver. A conventional transabdominal procedure had to be conducted on one of the cadavers due to technical difficulties experienced in tissue manipulation. We conclude that the cadaveric model offers a suitable platform for learning new surgical techniques, with high a degree of similarity to the surgical procedures performed on living patients. A key factor is the tissue consistency of the cadaver for adequate manipulation.

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### PALABRAS CLAVE

Cadáver;  
Procedimientos  
quirúrgicos de  
mínima invasión;  
Neoplasias del recto;  
Abdomen

### Escisión mesorectal total transanal en modelo cadavérico

**Resumen** Los modelos cadavéricos ofrecen una plataforma muy cercana a la realización de un procedimiento real en los quirófanos, lo que facilita el aprendizaje de nuevas técnicas sin poner en riesgo a un paciente. El objetivo de este estudio es reportar nuestra experiencia en la realización del abordaje TaTME (Transanal-Total Mesorectal Excision) en modelo cadavérico en el Departamento de Simulación Clínica de la Escuela de Medicina del Tecnológico de Monterrey, Campus Monterrey. Se realizaron un total de 5 procedimientos, con abordaje transabdominal

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laparoscópico, y escisión mesorectal total transanal (TaTME) simultáneos, con la plataforma GelPoint Path<sup>MR</sup> (Applied Medical, Rancho Santa Margarita, CA, EUA). El tiempo promedio del procedimiento abdominal fue de 71 minutos, y del procedimiento transanal fue de 74 minutos. En los 5 cadáveres se obtuvo una escisión mesorectal completa macroscópica. En uno de los cadáveres se requirió realizar el abordaje abdominal de forma convencional debido a dificultades técnicas para la disección. Consideramos que el uso del modelo cadavérico en el aprendizaje de nuevas técnicas quirúrgicas ofrece una plataforma adecuada con gran similitud a los procedimientos que se realizan en los pacientes, sin poner en riesgo la integridad de las personas. Un punto clave es el estado de los tejidos de los cadáveres que permita la manipulación adecuada.

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## Introduction

Many surgical procedures have been performed as part of experimental laparoscopic training, mostly on animals. To our knowledge, in our field there is no practical training course for colorectal laparoscopic surgery that follows a cadaveric model.

The value of surgical training courses on human cadavers has been studied in other countries. Various conventional and laparoscopic surgical procedures have been performed using this type of model. In recent years, the TaTME approach has become more widespread in numerous countries as an additional rectal surgery approach to treat neoplastic or inflammatory diseases.

## History of the TaTME approach

Total mesorectal excision is currently considered to be the surgical approach of choice for the treatment of rectal cancer. Traditionally, open surgery was performed, but current studies like the COREAN trial and the COLOR II trial have shown that there are no statistically significant differences between open surgery and laparoscopic surgery groups in terms of the mesorectal excision of mid-rectal and proximal rectal tumours, while the laparoscopic approach was found to be superior in patients with lower rectal cancer. However, the main limitation of the purely laparoscopic approach is its inadequate reach in obese patients, patients with a narrow pelvis or patients undergoing conservative sphincter procedures.<sup>1</sup>

Although reports of transanal endoscopic microsurgery date back to 1985 by Bues,<sup>1,2</sup> the first laparoscopic-assisted transanal total mesorectal excision was reported by Sylla et al. in 2010,<sup>10</sup> in a patient with a rectal tumour 8 cm from the anal margin. Since then, numerous case series have been reported using these approaches, the largest of which were the 30-patient series by Rouanet (2013)<sup>3</sup> and the 20-patient series by Lacy (2013). In the Rouanet series, 29 of the 30 patients with lower rectal cancer had received neoadjuvant therapy, reporting a 6% conversion rate, no short-term mortality and 30% morbidity. R0 resection was achieved in 87% of patients and the mean 12-month and 24-month survival rates were 96.6% and 80.5%, respectively. The 12-month and 24-month disease-free survival rates were 93% and 88.9%,

respectively. The authors reported a selection bias in favour of high-risk patients, advising caution before generalising this approach.<sup>3</sup>

## Objective

The objective of this descriptive study is to report on a series of cases, as well as our experience in the implementation of laparoscopic transabdominal TaTME in a cadaveric model.

## Material and methods

Five human cadavers donated by the School of Medicine and Health Sciences of the Monterrey Institute of Technology and Higher Education (ITESM) were used. The cadavers were prepared using the Thiel embalming technique. Infectious/contagious disease was ruled out in the diagnosis and cause of death of all the cadavers. Two experienced colorectal surgeons supervised five colorectal procedures, each employing the TaTME (transabdominal-transanal) approach. Four of the operations were laparoscopic, while the fifth was conventional. Of the five anastomoses performed, four were manual and one mechanical. GelPOINT Path (Applied Medical, Rancho Santa Margarita, CA, USA) was used for transanal access. The procedures were conducted at the "Centro de Habilidades y Destrezas Médico-Quirúrgicas" (Centre for Medical-Surgical Skills and Proficiency) at facilities covering approx. 70 m<sup>2</sup> intended for the conduct of surgery simulations, experimental techniques and virtual laparoscopic simulators, as well as more basic surgical training.

Two sets of laparoscopic equipment were used simultaneously; one for the transabdominal approach and the other for the transanal approach.

The cadavers were placed in a modified lithotomy and slight Trendelenburg position, similar to TaTME surgery conducted on live patients (Fig. 1). In the four laparoscopic abdominal procedures, the following ports were inserted: an 11 mm umbilical port for the camera, an 11 mm port in the left flank and a 5 mm instrument port in the left hypochondrium. For dissection, the Enseal (Ethicon endosurgery, Johnson & Johnson, Somerville NJ, USA) and LigaSure (Covidien-Medtronic, Minneapolis, MN, USA) energy-based devices were used.

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