



LAPAROSCOPIC MANAGEMENT **OF RECTAL CANCER**

Essay

Submitted for Partial Fulfillment of
the Master Degree in General Surgery

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2014

Acknowledgement

I would like to extend cordial appreciation and infinite gratitude to his Excellency **Prof. Osama Ali Alatrash**, Professor of General Surgery, Faculty of Medicine, Ain Shams University, who allowed me to pursue this topic that helped me foresee new horizons.

I would like to express my deep gratitude and admiration to **Prof. Ali Mohamed Alanwar**, Assistance Professor of General Surgery, Faculty of Medicine, Ain Shams University, for his guidance and advice along the entire course of the study.

I have the greatest pleasure in acknowledging **Dr. Mohammad Abdel Monem**

Marzouk, Lecturer of General Surgery,
Faculty of Medicine, Ain Shams University,
for his willing assistance and continuous
encouragement.

Ahmed Aboarrosh

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List of abbreviations

Abb.

Full term

ACR	American College of Radiology
ACS	American cancer society
AICR	American Institute for Cancer Research
AJCC	American Joint Committee on Cancer
APC	Adenomatous polyposis coli gene
APR	Abdominoperineal resection
ASA	American Society of Anesthesiologists
BMI	Body mass index
CAP	College of American Pathologists
CEA	Carcinoembryonic antigen
CIA	Common iliac artery
CIN	Chromosomal instability
CRC	Colorectal cancer
CRM	Circumferential resection margin
CRT	Chemoradiotherapy
CT	Computed Tomography
CTC	Computed Tomographic colonography
DCBE	Double contrast barium enema
DRE	Digital rectal examination
EGFR	Endothelial (epidermal) growth factor receptor
ERUS	Endorectal ultrasound
FAP	Familial adenomatous polyposis
FDG	Fluoro-deoxy-glucose
FIT	Fecal Immunochemical Test
FOBT	Fecal Occult Blood Test
HNPCC	Hereditary Non-Polyposis Colorectal Cancer

List of abbreviations (continue)

Abb.	Full term
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IBD	Inflammatory bowel disease
IMA	Inferior mesenteric artery
IMV	Inferior mesenteric vein
ISR	Intersphincteric resection
LAR	Low anterior resection
LN	Lymph node
LOH	Loss of heterozygosity
MAC	Modified Astler-Coller classification
MBP	Mechanical bowel preparation
MMR	Mismatch repair genes
MRF	Mesorectal fascia
MRI	Magnetic resonance imaging
MSI	Microsatellite instability
NCCN	National Comprehensive Cancer Network
NPO	Nil per os, Latin for "nothing by mouth"
PET	Positron emission tomography
QOL	Quality of life
SSI	Surgical site infection
TGFβ	Tumor growth factor beta
TGFβRII	Transforming growth factor beta receptor type II
TME	Total mesorectal excision
TNM	Tumor-Node-Metastasis
VEGF	Vascular endothelial growth factor
WCRF	World Cancer Research Fund
WHO	World Health Organization
5-FU	5-Fluorouracil

Introduction

Worldwide, colorectal cancer (CRC) is the 4th most common cancer in males and the 2nd most common in females. Rectal cancer accounts for one third of all CRCs and in the USA 41,420 new rectal cancer cases were estimated in 2007 according to the American cancer society (ACS) **(Jemal et al. 2007)**.

In Egypt CRC is the 6th most common cancer in males and the 5th most common in females, with a relative frequency of 10-12% of gastrointestinal tumors where rectal cancer represents 51% of CRC cases according to the National Cancer Institution in Egypt **(Mokhtar 2004)**.

The history of modern rectal cancer resection dates back to 1884, when Czerny described the first abdominoperineal resection (APR). In 1908, Miles improved the APR. He emphasized the importance of performing a wide perineal excision including removal of the pelvic contents of the rectum, the abdominal attachments of the rectum with a high arterial ligation, and the iliac lymph nodes (LNs). During the last two decades, William Heald popularized the total mesorectal excision (TME) technique **(Dalal and Bleday 2007)**.

Treatment and surgical techniques for rectal cancer patients have rapidly changed over the last two decades in order to improve the therapeutic outcome. Many strategies have been introduced including radiotherapy, chemotherapy, and TME. In addition

function-preserving techniques have also been developed to preserve anal function by performing low anterior resection (LAR) instead of APR .This is supported by the development of auto sutures and double stapling techniques. Attempts were made to preserve urinary and sexual functions by changing radical LNs dissection to less invasive surgery in order to spare the autonomic nerves (**Nesbakken et al. 2000**).

The primary aims of rectal cancer surgery are to achieve oncological clearance of the tumor, to minimize local recurrence and to prolong survival. Accurate preoperative staging and precise surgical technique using the principles of TME are instrumental in achieving this goal. Postoperative urinary and sexual dysfunction resulting from damage to the pelvic hypogastric and splanchnic nerves are recognized complications of rectal resection (**Jayne et al. 2005**).

Recently, laparoscopic surgery in various gastrointestinal diseases including rectal cancer is increasingly popular because it can provides less pain, shorter hospital stay, faster postoperative recovery, and better cosmetic appearance compared to open surgery (**Strohlein et al. 2008**).

Laparoscopic rectal resection is considerably more difficult than colon resection, due to the narrow confines of the bony pelvis, and the need to identify retroperitoneal structures such as the nerves that control sexual and bladder function (**Weiser and Milsom 2000**).

Laparotomy and TME, is currently the accepted standard of care for middle and low rectal cancers. This technique has consistently been associated with low recurrence and optimal survival. Nevertheless laparoscopic resection of rectal cancer must show equivalent results with open surgery in order to become an accepted surgical modality for rectal cancer (**Law and Chu 2002**).

Laparoscopic surgery for rectal cancer is yet a complicated operation requiring highly skilled surgeons and sophisticated instruments (**Bianchi et al. 2007**), and its oncological outcomes remain questionable (**Miyajima et al. 2009**). It is currently an active field of research.

Aim of the essay

The aim of this essay is to evaluate the role of laparoscopic surgery in rectal carcinoma and demonstrate the advantages and disadvantages in comparison with the open technique.

Surgical anatomy of the rectum

Location and description

The rectum is approximately 5 inches long and begins in front of the 3rd sacral vertebra as a continuation of the sigmoid colon. It passes downward, following the curve of the sacrum and coccyx, and ends in front of the tip of the coccyx by piercing the pelvic diaphragm and continuous with the anal canal (**Snell 2007**).

The first 4 cm from the anal verge comprise the anal canal; the next three 4 cm sections make up the lower, middle, and upper thirds of the rectum. These dimensions are approximately correct when the rectum is either stretched from above or lifted with a rigid proctoscope. If the rectum is collapsed into the sacral hollow, however, these lengths are exaggerated, and 3 cm each would be a better estimate of the lower, middle, and upper thirds (Fig. 1) (**Staley and Wood 2010**).

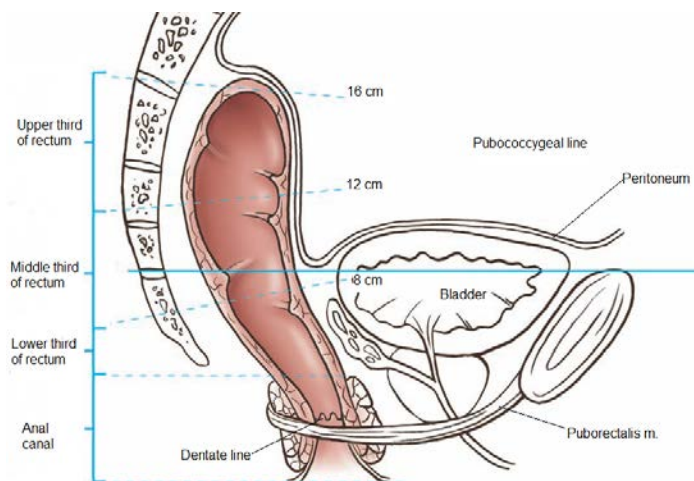


Fig. 1. Location and description of the rectum (Staley and Wood 2010)

The junction between the sigmoid colon and the rectum is at :
A point opposite the left sacroiliac joint, Level of the 3rd sacral vertebra, Level at which the sigmoid mesentery disappears, Level at which sacculations and epiploic appendages disappear and taeniae broaden to form a complete muscle layer (long transition), Level at which the superior rectal artery divides into right and left branches, Construction with anterior angulation (proctoscopy), Level of superior rectal fold (inconstant) (**Skandalakis et al. 2004**).

The rectum possesses three involutions or curves known as the valves of Houston. They are lost after full surgical mobilization of the rectum, a maneuver that may provide about 5 cm of additional length to the rectum, greatly facilitating the surgeon's ability to fashion an anastomosis deep in the pelvis (**Fry et al. 2008**).

Pararectal fascia

The endopelvic fascia is a thick layer of parietal peritoneum that lines the walls and floor of the pelvis. The portion that is closely applied to the periosteum of the anterior sacrum is the presacral fascia. The fascia propria of the rectum is a thin condensation of the endopelvic fascia that forms an envelope around the mesorectum and continues distally to help form the lateral rectal stalks. The lateral rectal stalks or ligaments are actually anterolateral structures containing the middle rectal artery. The stalks reside in close proximity to the mixed autonomic nerves (containing both sympathetic and parasympathetic nerves) (Fig. 2) (**Fry et al. 2008**).