Predictive Factors of Difficulty of Laparoscopic Management of Cancer Rectum

Thesis

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Michael Wagdy

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List of Abbreviations

Abb.	Full term
5FU-CI	*5-Fluorouracil Continuous Infusion*
BMI	*Body Mass Index*
CRM	*Circumferential Resection Margin*
DWI	*Diffusion-Weighted Imaging*
EGFR	*Epidermal Growth Factor Receptor*
EMVI	*Extra Mural Vascular Invasion*
EUS	*Endoscopic Ultrasonography*
GDP	*Guanosine Diphosphate*
GTP	*Guanosine Triphosphate*
HNPCC	*Hereditary Nonpolyposis Colon Cancer*
LN	*Lymph Nodes*
MRF	*Mesorectal Fascia*
MRI	*Magnetic Resonance Imaging*
pCR	*Pathologic Complete Response*
SPSS	*Statistical Package for Social Science*
TME	*Total Mesorectal Excision*

ABSTRACT

Laparoscopy has a lot of surgical advantages in the treatment of rectal diseases and with the publication of several multi- institutional prospective randomized trials, it became clear that laparoscopic anterior resection is equivalent to open intervention. However, many other prospective studies were done that showed that the previously mentioned factors may predict the difficulty of Laparoscopic anterior resection and that may aid to take precise decisions in cases with cancer rectum and that may decrease the rate of conversion from laparoscopic to open surgeries and postoperative complications and mortality rate.

In conclusion, laparoscopic resection for rectal cancers is a feasible technique and with proper training it can be performed safely with acceptable rates of overall morbidity and by taking into consideration the above mentioned factors that may predict the difficulty of laparoscopic intervention in order to have the best outcome from the decision of laparoscopic anterior resection for patients with cancer rectum. The limitations of this study include the relatively small sample size and the relatively short follow-up time, particularly for maintenance of oncologic issues. Planned randomised controlled trials addressing this issue with a larger sample size and long-term follow-up should be performed.

Keywords: Laparoscopic Management - Cancer Rectum - Lymph Nodes

INTRODUCTION

Rectal cancers compromise approximately 25% of all primary colorectal cancers and follow a different natural disease course compared to colonic tumours, also it is well established that surgical approach, local recurrence rates and associated complications of rectal tumours are distinct from colonic ones ***(American Cancer Society, 2010).***

Laparoscopic management for rectal tumours is widely used as being more advantageous than the open approach. Its benefits include less intraoperative blood loss, less postoperative pain, shorter hospital stay, faster return to work and fewer adhesions without compromising oncologic clearance ***(Van Gijn et al., 2010).***

Also it needs acquisition of advanced skills and taking into consideration the potential effects of the technique on tumour dissemination at the time of surgical procedure as well as rates of recurrence and overall survival ***(Milsom et al., 2008).***

A lot of studies were done in a retrospective way to build models to predict difficulty of laparoscopic anterior resection, some of them showed that prior abdominal surgery, preoperative chemoradiotherapy, tumour distance to anal verge, interspinous distance and Body Mass Index were predictors for the standardized operative times, gender and tumour maximum diameter were related to the standardized blood loss ***(Champagne and Delaney, 2007).***

Also we have to take into consideration that surgeon's advanced laparoscopic skills are one of the most important factors for operative success. Existence of learning curves suggests that surgeons develop laparoscopic skills through continuous repetition of surgical procedures ***(Laurent et al., 2007).***

Operative time as a standardized end point also influences the decision of conversion from Lap to open surgery. Many authors clearly emphasize that timely conversion wherever indicated is of almost importance in containing harm and shouldn't be perceived as failure, it also reflects surgical maturity. The mean operative time reported in previous studies varies from 153 to over 300 minutes related to the factors previously mentioned ***(Akiyoshi et al., 2009; Wang et al., 2014).***

Laparoscopic surgery for rectal cancer is performed within the pelvic cavity which limits vision, access and space. The anatomical parameters such as prominence of sacral promontory, degree of sacral curves and size of the pelvis are associated with operative difficulty ***(Ogiso et al., 2011).***

Also studies showed that Body Mass Index affect operative time, BMI doesn't consistently reflect body adipose tissue distribution. It has been observed that obese males have more visceral fat, where as obese females have more subcutaneous fat. However we have found that BMI is an easily obtainable and useful parameter in predicting operative difficulty ***(Denost et al., 2013).***

Preoperative chemoradiotherapy has been shown to reduce local recurrence and improve survival for rectal cancer patients. It considerably reduces tumour size and improves exposure of the surgical field thus helping obtain a safe resection margin. However it causes tissue oedema, fibrosis and may increase both operative time and blood loss during surgery ***(Denost et al., 2012).***

Similarly, prior abdominal surgery causes formation of adhesions and tissue fibrosis and conceivably increases the difficulty of laparoscopic resection ***(Franko et al., 2006).***

Also patients' comorbidities (Hypertension and/or Diabetes Mellitus) may slightly affect operative difficulty, patients with mild or moderate hypertension, drugs used in chronic treatment may increase the need for active management of hypertensive episodes, also some studies reported that Diabetes is a significant risk factor for incisional hernias ***(Targarona et al., 2015).***

Also one of the main factors of difficulty of laparoscopic management of cancer rectum is technical difficulties that can face the surgeon as assistant dependant unstable two dimensional view, inability to perform high precision suturing, poor ergonomics, all of these remain the most common technical challenges that may oppose the surgeon through prolongation of the operative time ***(Akagi et al., 2012).***

So the purpose of our study is to screen clinical, anatomical and pathological factors that contribute to the difficulty of Laparoscopic management of rectal cancer.

Aim of the Work

The aim of this study is to use the previously mentioned factors that can influence the difficulty of performing laparoscopic anterior resection. And by using standardized operative time as an end point to build reliable study models thys predicting operative difficulty for clinical use.

Chapter 1
ANATOMY OF RECTUM

The Rectum is the distal part of the **large intestine** between the sigmoid **colon** and the **anal canal**. In Latin, the word "rectum" means straight; but the rectum is straight in quadrupeds and not in men. In spite of the fact that the rectum is a part of the **large intestine**, it's devoid of taenia coli, sacculations and appendices epiploicae- the cardinal features of the large intestine ***(Skawina, 2016).***

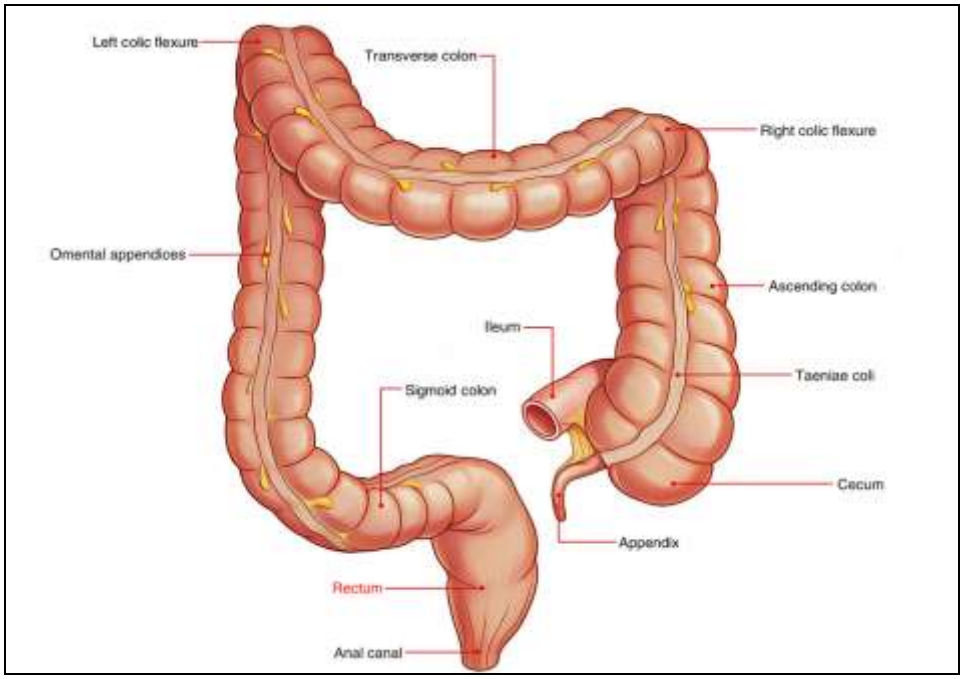

Figure (1): Parts of colon ***(Skawina, 2016).***

Location

Rectum is situated in the posterior part of the lesser pelvis in front of the lower 3 sections of the **sacrum** and the **coccyx** and behind the **urinary bladder** in the male and **uterus** in the female ***(Clemente, 2007).***

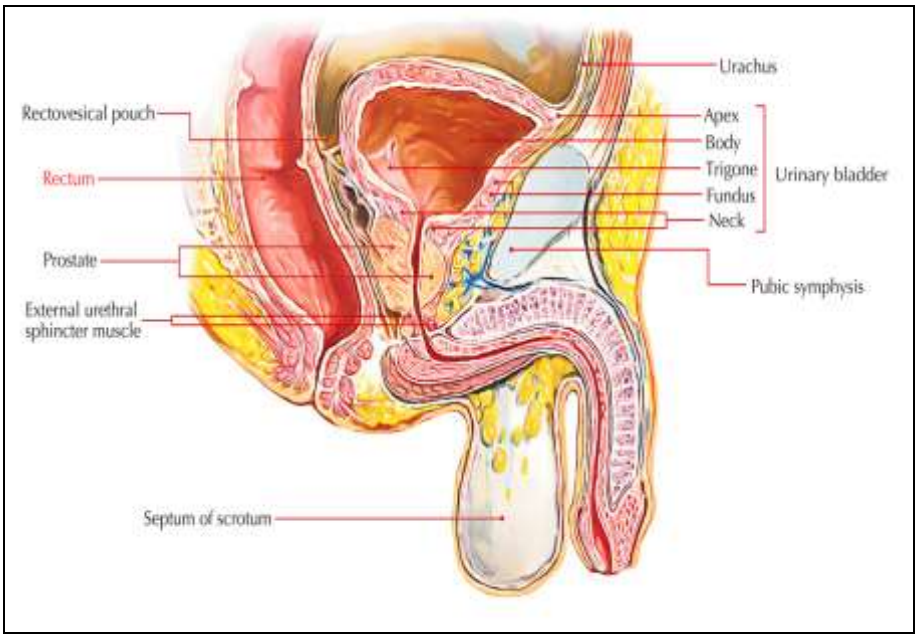

Figure (2): Anatomy of pelvis ***(Clemente, 2007).***

Measurements

The rectum is 5 inches (12 cm) long. The diameter of the rectum isn't uniform throughout. In the upper part, the rectum is 4cm as that of the sigmoid **colon**. In the lower part, rectum creates a dilatation referred to as rectal ampulla. When empty the anterior and posterior walls of the rectum are in contact and cross section of the rectum presents lumen in the create of a transverse slit ***(Dujovny et al., 2014).***