

**COLORECTAL CANCER:
EVALUATION OF MODERN TRENDS
IN INVESTIGATIONS AND
TREATMENT**

AN ESSAY

**Submitted for Partial Fulfillment of
Master Degree In General Surgery**

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1993

*For my Parents, whose love and
encouragement made the beginning
possible, and*

*For my wife and daughter, whose
support and affection make
everything else possible.*

Ossama Hassan Abdeen



ACKNOWLEDGEMENT

I would like to express my deepest gratitude and sincere thanks to Prof. **Dr. Emad A. Hussein** for kindly accepting to supervise this work and for the valuable advice and encouragement he honestly offered throughout the course of this work .

Also, I would like to express my utmost gratitude and special grateful thanks and appreciation to **Dr. Hassan Z. Shaker**, whose sincere continuous help, true advice, invaluable guidance, kind supervision and constant purposeful encouragement provided me all facilities during the conduction of this work .

Finally, I would like to express my utmost appreciation and sincere thanks and gratefulness to my dignified late Prof. **Dr. Ibrahim A. Khamis**, who kindly suggested this interesting point of research. May Allah bless him with mercy and paradise .

Ossama Hassan Abdeen

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INTRODUCTION

Introduction

For at least a decade it seemed that the major advances in cancer biology and treatment would remain limited to hematologic malignancies and gestational and germ-cell tumours . In particular, it appeared that few, if any, advances were being made in the area of colorectal cancer . However, the past 5 to 8 years have witnessed a bountiful harvest of research in colorectal cancer, the results of which look promising .

As our knowledge of the pathogenesis of colorectal cancer increases, so do our opportunities for primary and secondary prevention. The development of improved surgical techniques and their optimal integration with radiation therapy and chemotherapy have improved quality of life as well as overall survival . The most recent advances in molecular oncology lead us to hope that this progress will continue.

However, this essay aims at reviewing the most recent literatures on colorectal cancer to evaluate the recent trends in the investigations and treatment of such condition and in addition, to highlight modern prognostic data .

ANATOMY

Surgical Anatomy of the Colorectum :

The colorectum is a muscular tube that, in its course, describes roughly an arch which surrounds the coils of small intestine .

For descriptive purposes, the colorectum comprises the following parts : (1) The cecum and appendix, (2) The colon proper which comprises the ascending colon, the hepatic flexure, the transverse colon, the splenic flexure, the descending colon, the iliac colon, and the sigmoid colon, and (3) The rectum .

The average length of the colorectum is about 132 cm. Its calibre varies, being maximal in the cecum and in the rectal ampulla (7-9 cm). Elsewhere it is more constricted particularly, in the sigmoid colon (2-3 cm).

The wall of the colorectum has both circular and longitudinal muscle layers . The circular muscle layer is continuous along the whole circumference of the colorectum . The longitudinal muscle layer is concentrated into three narrow bands called teniae coli, which are relatively shorter than the bowel itself, so that the latter is puckered with the production of the typical haustrations or succulations . The three teniae commence at the base of the appendix, which has a complete longitudinal muscle coat . They run the whole length of the colon and in the distal sigmoid they eventually coalesce to provide a complete longitudinal muscle coat for the rectum, though sometimes the process of fusion is complete before the rectum is reached . Between the teniae the colonic wall is extremely thin and this accounts for the great and sometimes amazing capacity of the colon to undergo distension when obstructed, especially the right colon and cecum .

For treatment purposes, it is important to consider the colorectum in terms of free intraperitoneal location versus extraperitoneal location. Treatment failure of intraperitoneal tumours is more likely to be expressed as peritoneal seeding, whereas treatment failure of extraperitoneal tumours manifests as local recurrence. Extraperitoneal sites of tumour include the pelvis and the abdominal retroperitoneum (*Cohen et al.*, 1989).

The cecum, the transverse colon and the sigmoid loop are mobile structures that lie free in the peritoneal cavity and are completely covered with serosa (visceral peritoneum). The dorsal or posterior aspect of the ascending and descending colon, and both flexures frequently lack serosa. Tumour spread from these segments may involve the retroperitoneal soft tissues, kidney, ureter and pancreas.

Although the rectum is frequently considered to be extraperitoneal, the anterior surface of the upper rectum is covered with serosa and is therefore intraperitoneal. Patterns of recurrence of high rectal cancer may depend on whether the location of the tumour is anterior or posterior (*Cohen et al.*, 1989).

General Topography of The Colorectum :

1 - The cecum and appendix :

The cecum is a blind pouch of the large intestine that projects downwards from the commencement of the ascending colon, below the ileocecal junction.

It lies in the right iliac fossa above the lateral half of Poupart's ligament . Usually it is entirely enveloped by peritoneum but in some 5 percent of individuals the peritoneal covering is deficient posteriorly and the cecum then rests in direct contact with the fascia overlying the iliacus .

The three teniae coli lie one anterior, one postero-medial, and one postero-lateral . They all converge on the base of the vermiform appendix which is attached to the postero-medial wall of the cecum, below the ileo-cecal opening .

The ileum joins the posterior and medial aspect of the cecum and the ileocecal junction is guarded by a valve consisting of an upper and a lower semilunar lips that may prevent reflux of the cecal contents .

2 - The ascending colon :

It extends upwards from the ileocecal junction to the right colic (hepatic) flexure . It measures about 15 cm long . It is invested with peritoneum on its anterior, lateral, and medial surfaces, but posteriorly is devoid of peritoneal covering as a rule and lies on the fascia iliaca and the anterior lamella of the lumbar fascia, being connected and fixed to them by fibrous tissue of the extraperitoneal fascial envelope . Also, it lies in direct contact with the iliacus, the quadratus lumborum and the aponeurotic origin of the transversus abdominis below, and at a higher level is closely applied to the lower pole of the right kidney . In front, it is in relation with coils of ileum, possibly

the right edge of the greater omentum and the anterior abdominal varieties .

The teniae coli of the ascending colon lie, in line with those of the cecum, anteriorly, posterolaterally, and posteromedially .

Bulbous pouches of peritoneum, distended with fat , project in places from the serous coat . These are “the appendices epiploicae” .

3 - The hepatic (right colic) flexure :

At this flexure, the colon turn sharply medially, and slightly forward and downward . This bend lies just below the right lobe of the liver, and slightly overlapped by it, immediately in front of the lower part of the right kidney, and behind the peritoneum of the posterior abdominal wall .

4 - The transverse colon :

It extends from the hepatic to the splenic flexure in a loop which hangs down across the upper and middle abdomen immediately below the greater curve of the stomach to a variable degree between these two fixed points .

It measures about 40–50 cm long (about 45 cm long in most subjects) . Its first 7.5–10 cm lie behind the posterior parietal peritoneum, closely applied to the front of the right kidney, the second part of the duodenum and the head of the pancreas to which it is connected by areolar tissue . This is a most important posterior relationship for, during a right hemicolectomy, the duodenum is drawn

up by its adherence to the right end of the transverse colon and may be damaged if care is not taken to separate it .

For the remainder of its course, the transverse colon has a complete investment of peritoneum and is connected posterosuperiorly by the transverse mesocolon to the lower border of the pancreas . This mesocolon is a double fold of peritoneum and the middle colic artery runs in it .

Behind, the transverse colon is related to loops of small bowel, including the duodenojejunal flexure . Immediately above this part of the transverse colon lies the stomach and, at its extreme left end, the lower pole of the spleen . The greater omentum hanging down from the greater curve of the stomach descends in front of the transverse colon and then ascends to be attached loosely to its anterior surface and to the upper surface of the transverse mesocolon .

The attachment of the omentum to the transverse colon and mesocolon is quite tenuous and can in most instances be readily divided at operation by a few touches of the scalpel without severing more than a few small vessels . The entire greater omentum and upper layer of transverse mesocolon can thus be stripped off in a relatively quick and bloodless manner, this process being known as décollement (French equivalent of ungluing).

The teniae coli continue from the ascending colon . Due to the looping downwards and forwards of the transverse colon from the flexures, which lie well back in the paravertebral gutters, some rotation of the gut wall occurs at the flexures, and the anterior tenia of ascending and descending colons lies posteriorly, while the other two lie

anteriorly, above and below .

The appendices epiploicae are larger and more numerous than on the ascending colon .

5 - The splenic (left colic) flexure :

It is a bend between the left end of the transverse colon and the descending colon . It is a much more acute angulation than the hepatic flexure . Also, it is situated at a rather higher level than the hepatic flexure and lies on a more posterior plane, more under the cover of the ribs and thus less accessible to surgical approach .

It is covered with peritoneum in front; posteriorly it is in direct contact with the outer border of the middle of the left kidney. There is a firm band of peritoneum extending from it laterally to the diaphragm and helps to support the colon and the spleen . It is called the phrenicocolic ligament . This ligament contains blood vessels which need ligating during the mobilization of the flexure (*Goligher, 1984*).

6 - The descending and iliac colon :

The descending colon extends from the splenic flexure to the iliac crest running downwards and slightly medially and then vertically, a distance usually of about 20 cm.

At the level of the iliac crest, it becomes the iliac colon, that proceeds downwards and medially across the left iliac fossa to the medial