ABSTRACT: Colon cancer is the third most commonly diagnosed type of cancer in the US. Life style and dietary patterns influence colon cancer risk. Screening programs are the challenge in the early detection of CRC in an early stage and this can reduce the mortality by about 50%. Colonoscopy is the most used screening and diagnostic test as it can diagnose and removal suspected polyps. A new methods like capsule endoscope play now days a role in diagnosis of cancer colon. Currently, surgery is the only radical therapy for colon cancer, while laparoscopic colectomy (LAC) has become another focus since studies reported LAC could improve the short-time outcomes and quick recovery of patients compared with open colectomy (OC). Robotic surgery in recent years becomes the focus of surgeons as a minimal access surgery with less blood loss and better outcome. Recently targeted therapy and immunotherapy play a role in treatment of cancer colon.

Keywords: colon cancer, diet, estrogen receptor, screening, open colectomy, laparoscopic colectomy,

Robotic surgery, target therapy, immunotherapy.

Introduction

INTRODUCTION

Colorectal cancer is a major public- health challenge in the Asia-Pacific region. It is the second most common cause of cancer related death in Europe and the US, and a major cause of mortality ***(Ferlay et al., 2010).***

The 5-year survival rate is 90.1%, if colorectal cancers are detected at localized stage. However, when it spread to regional lymph nodes and organs, the 5-year survival decrease to 69.2% ***(Siegel et al., 2012).***

Colorectal Cancer arises from adenomas presenting as luminal polyps, which are defined as protuberance of colonic wall mucosa. Adenomas are considered precursors of colorectal cancer, as they start at small lesions that progress to larger adenomas with dysplasia, finally to invasive colorectal carcinoma ***(Noffsinger et al., 2010).***

Colon cancer has a relatively complex pathogenesis. It was generally believed that diet of high acid and low cellulose which hinder bowl movement and increase absorption of toxin could lead to colon cancer ***(Cao et al., 2009).***

The challenge is screening and early detection which can reduce colorectal cancer by more than 50% ***(Zauber et al., 2012).***

Methods available for screening fall in to two categories: stool based testes, including guaiac-based FOBT, Immuno-chemical-based FOBT which done yearly and stool DNA panel; and endoscopic testes, including flexible sigmoidoscopy every 5 years, colonoscopy every 5 years and virtual colonoscopy every 1-2 years ***(Winwer et al., 2012).***

A screening approach using the stable miRNA molecules, which are non-degradable when extracted from non-invasive stool and semi-invasive blood samples would preferred to mutation DNA ***(Ahmed et al., 2012).***

Currently surgery is the only radical therapy for colon cancer, and laparoscopic colectomy(LAC) has been the focus of surgeons around the world because it provide shorter hospital stay and reduce symptoms comparing to open surgery ***(Zauber et al., 2012).***

Robotic surgery was introduced to cancer colon to overcome the challenge of minimally invasive dissection in the narrow deep pelvis with advantages: 3D, visual magnification, motion scaling, ergonomics and telesurgery with clinical advantages of: facilitating sphincter preservation in low rectal tumors, ease intracorporeal suturing and decrease rate of abdominal wall hernia ***(Steele et al., 2012).***

Aim of the Work

AIM OF THE WORK

Aim of this work is to offer a review about the recent trends in diagnosis and treatment of cancer colon.

Anatomy of the Colon and Rectum

ANATOMY OF THE COLON AND RECTUM

Originally a mid-line structure, the large intestine undergoes rotation during embryological development and as a result the ascending colon and the descending colon are essentially retroperitoneal structures. However, the degree to which the large intestine has a mesentery is highly variable as is its total length that average 1.5 m. The whole of large intestine is capable of considerable distention, although in an adult living in the western world the left side of the colon tends to be less distensible than the right owing to muscular hypertrophy ***(Williams et al., 2010).***

The caecum lies in the right iliac fossa and is approximately 7 cm in length and width. Proximally it becomes the ascending colon at its junction with terminal ileum. The caecum lies on the iliac and psoas muscles and on the genitofemoral, femoral and lateral cutaneous nerves. It also lies anterior to testicular or ovarian vessels and the ureter. The exact position of the caecum is variable and it may extend in to the true pelvis. The caecum is almost completely surrounded by peritoneum but it is often attached to the iliac fossa medially and laterally. This can produce a retrocaecal peritoneal reces which

may extend upwards posterior to the ascending colon ***(Ellis et al., 2009).***

The ileocaecal junction is extremely variable in appearance. In most circumstances the ileum enters obliquely in to the large bowl through a horizontal slit and ia partly invaginated into the caecum to form fold (the ileocaecal valve**).** Reflux of caecal contents in to the small intestine is prevented by contraction of this valve. However, the muscle in the valve is poorly developed and the ileocaecal valve is frequently incompetent (***Krough et al., 2010).***

The ascending colon varies from about 10 to20 cm in length. It lies on iliac muscle, the iliac crest and quadratus lumborum, crossing the lateral cutaneous nerve of the thigh. The ilioinguinal and iliohypogastric nerves. It ends at the hepatic flexure where the large bowel turns to the left on the lower portion of the right kidney inferior to the liver. Under most circumstances peritoneum covers the front and the sides of the ascending colon and fixes it firmly to the posterior sbdominal wall, but occasionally there is a short mesentery ***(Krough et al., 2010).***

The transverse colon is the longest section of colon varying from 40 to 70 cm in length. The transverse colon forms a loop that hangs down across the upper abdomen**.** The lowest point of the transeerse colon may reach below the umbilicus,

although it is usually just superior to it. The trasverse colon is suspended by the transverse mesocolon which is fused to the posterior surface of the grater omentum. This transverse mesocolon is attached to the descending part of the duodenum, to the head and the lower aspect of the body of the pancreas and to the anterior surface of left kidney. It contains both the middle colic vessels and branches of the right and left colic vessels with associated nerves and lymphatics. Thus the transverse colon starts immediately anterior to the descending part of the duodenum and the head of pancreas, descend anterior to the small intestine and ascend to the splenic flexure. At this point it is anterior to the left part of left kidney and immediately below the spleen. The splenic flexure is attached to the diaphragm by peritoneum (phrenicocolic ligament) and can be extremely close to the spleen. At this point the greater omentum frequently has attachments to the spleen and is closely associated with the colon. Traction on these splenic attachments may cause splenic bleeding in the course of mobilization of the splenic flexure (***Moore et al., 2009).***

The descending colon extends from the splenic flexure to the rim of true pelvis close to the inguinal ligament. The descending colon is attached by peritoneum to the posterior abdominal wall in the left paravertebral gutter and iliac fossa. Superiorly it is anterior to the lateral surface of left kidney and medial to the diaphragm, and then it lies on the same muscles and nerves as the ascending colon. At the anterior superior iliac

spine, the descending colon turns medially, superior to the inguinal ligament, and lies on the femoral nerve, psoas muscle and the genital vessels, and becomes the sigmoid colon immediately anterior to the external iliac vessels ***(Goligher et al., 2010).***

The sigmoid colon is the most variable part of the colonin terms of its length (50-80 cm) and its mobility. It extends from the end of the descending colon to the rim of the true pelvis where it becomes the rectum. It has long mesentery (the sigmoid mesocolon) which has quite a short base starting at the end of descending colon and ascending on the external iliac vessels to the mid-point of the common iliac artery. At this point it turns downwards and to the right to the rim of true pelvis. The mesocolon contains the sigmoid branches of the inferior mesenteric artery and associated nerves and lymphatics. Under normal circumstances the sigmoid colon lies entirely in the left iliac fossa and the true pelvis but it may also extend across to the right iliac fossa ***(Gilles and Jones, 2009).***

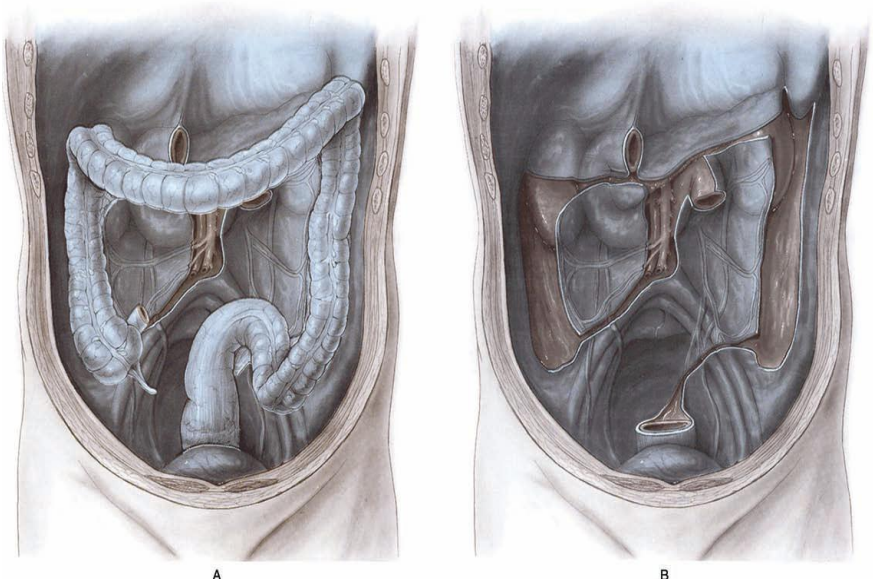

Fig. (1**): Large intestine (Bisset et al., 2010).**

The rectum is that part of large bowel which lies in the true pelvis at the point where the sigmoid mesocolon ends. Again, this is highly variable in length depending very much on the build of the individual but it is said to be 15 cm long as measured by rigid sigmoidoscope. It follows the curve of the sacrum and the coccyx and then runs anteriorly and inferiorly to the central perineal tendon lying on the anococcygeal ligament and the levator ani muscles. It then ends by turning posteriorly and inferiorly as the anal canal, immediately posterior to the central perineal tendon and to the apex of the prostate in males. The lowest part of the rectum is more capacious than the rest and is known as the ampulla. The rectum is not straight; in the sagittal plane it follows the curve of sacrum and coccyx and in

the coronal plane it is S shaped. This gives rise to prominent folds within the lumen of the rectum known as the valves of Houston. The front and sides of the upper third of the rectum are covered with peritoneum but this gradually moves anteriorly and turns off the front of the rectum at the junction between its middle and lower thirds. This forms the rectouterine or rectovesical pouch by passing upwards on the back of posterior fornix of the vagina or the back of the bladder respectinely in the female and male. In its lower third, the rectum lies behind the base of the bladder, the seminal vesicles and the prostate in male and behind the vagina in female. ***(Fozard and Pemberton, 2010).***

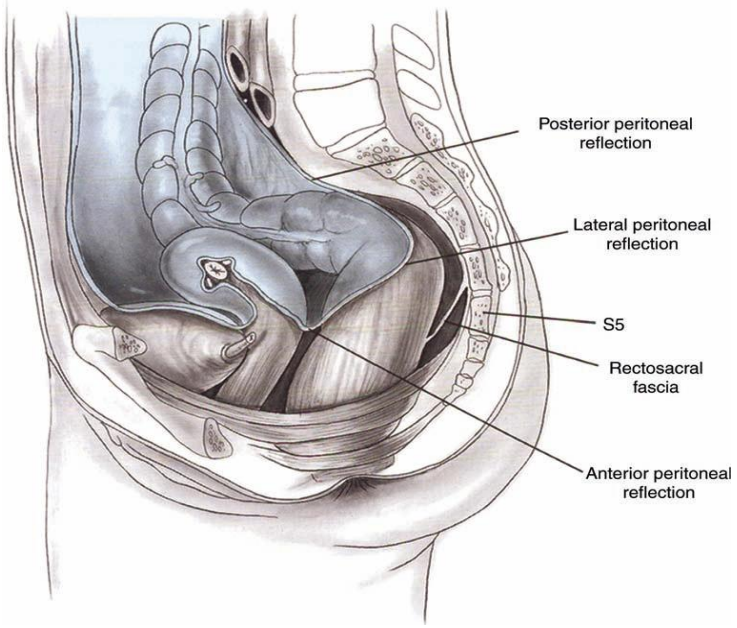

Fig. (2): Peritoneal reflections (Najarian et al., 2009).

In both sexes the rectum and its surrounding areolar tissue is separated from the anterior structures by a fascial layer known as Denonvilliers's fascia. Posteriorly the rectum is separated from the sacrum and the coccyx and anococcygeal ligament and the muscles attached to these (piriformis and levator ani) by a layer of pelvic fascia. This fascia is known as Waldeyer's fascia. In its upper two-thirds the actual muscular wall of the rectum is separated from the pelvic fascia by a posterior cushion of areolar tissue which becomes circumferential below the rectouterine or rectovesical pouch. This carries the blood supply to the rectum and its lymphatic drainage and is known as the mesorectum. Inferiorly and posteriorly the mesorectum has a bilobed structure ***(Skandalakis, 2010).***

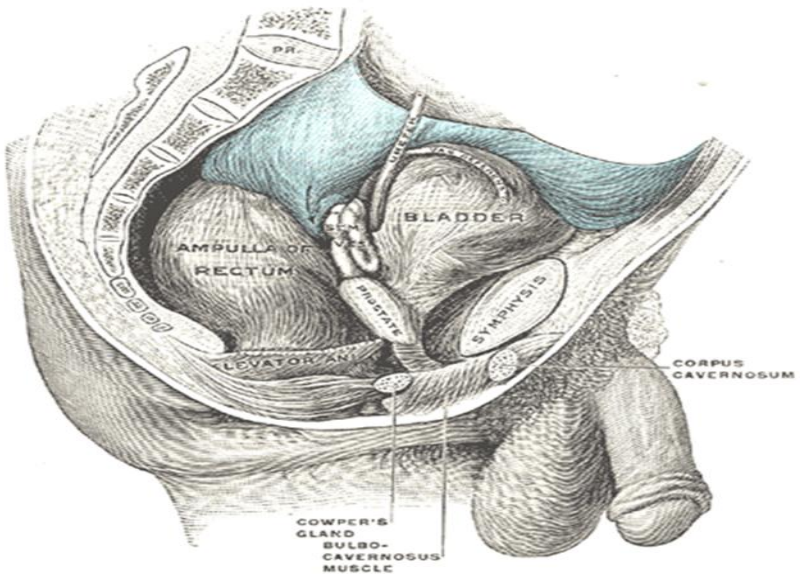

Fig. (3**):** Relations of rectum in male **(Bisset et al., 2010).**

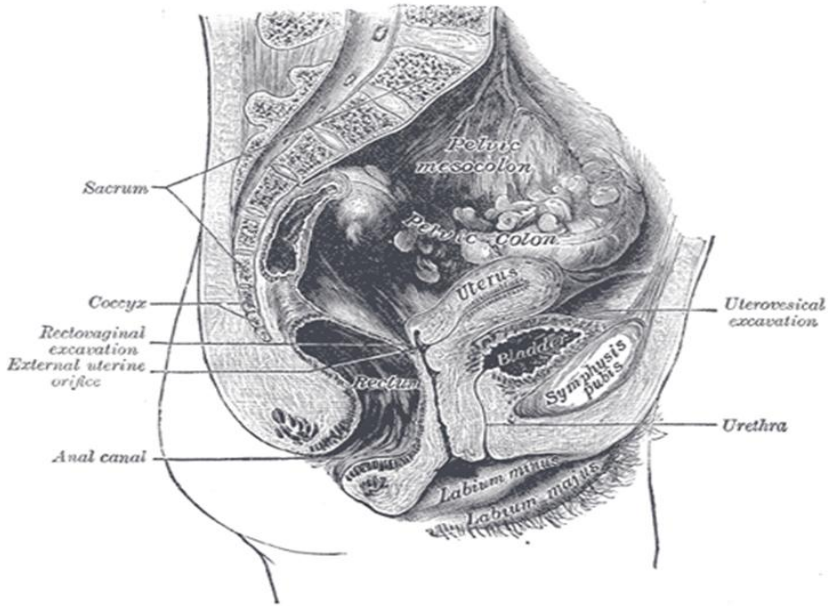

Fig. (4**):** Relations of rectum in females ***(Nano et al., 2011).***

Taeniae coli

The taeniae coli are three ribbon-like thickenings of the otherwise thin longitudinal muscle of the large bowel which arise from longitudinal muscle at the root of vermiform appendix and end by apreading out at the end of sigmoid colon to become continuous with the thicker longitudinal muscle of the rectum. These three taeniae are spaced out uniformly around the circumference of the colon and between them the wall of the colon bulges outwards forming pouches or sacculations. In the ascending colon and descending colon, the taeniae are anterior, posteromedial and posterolateral, whereas in the transeverse colon the position become posterior, superior and anterior.