Recent Modalities in Management of OBSTRUCTING COLON CANCER

Essay
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Master Degree in General Surgery
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Introduction

Colorectal cancer is the fourth commonest cancer worldwide. Around two-thirds of a million people will present with the disease each year. ***(Jim et al.,*** ***)***, It's the most common malignancy of the gastrointestinal tract. ***(Charles Brunicardi et al., ٢٠٠٦)*** ,and is considered the second leading cause of cancer death in the US ***(Samuel et al., ٢٠٠٦)*** An American has approximately a ٥٪ probability of developing colorectal cancer during a ٧٠-year life span ***(Bruce et al.,*** ***)***

Sixteen percent of patients with colon cancer present with large bowel obstruction ***(Michael zinner et al., ٢٠٠٦)*** Most cases of malignant large bowel obstruction involve the left side of the colon about ٧٠٪, predominantly the recto sigmoid region. Unfortunately, most patients (up to ٨٥٪) presenting with colonic obstruction are found to have advanced cancer, with the vast majority presenting with either Dukes' C or D disease ***(Edward et al., ٢٠٠٧).***

Patient with malignant large bowel obstruction complain of colicky abdominal pain, abdominal distension, vomiting, constipation, and occasionally, paradoxical diarrhea ***(Dauphine et al.,*** ***).***

The most common etiologies of MBO are colorectal and ovarian cancers, Retrospective reviews show that ١٠٪-٢٨٪ of patients with colorectal cancer will develop MBO in the course of their disease, where ٢٠٪-٥٠٪ of patients with ovarian cancer present with symptoms of bowel obstruction ***(Lucy and Alexandra,*** ***).***

Tumors cause obstruction in many fashions, intramural obstruction result from tumor growth within the bowel and Extramural obstruction as advanced ovarian cancer ***(Rmipamonti and Bruera,*** ***)***.

Mechanical obstruction of the large bowel causes bowel dilation above the obstruction. This causes mucosal edema and impaired venous and arterial blood flow to the bowel. Bowel edema and ischemia increase the mucosal permeability of the bowel, which can lead to bacterial translocation, systemic toxicity, dehydration, and electrolyte abnormalities ***(Adler,*** ***).***

Aim of the work

Is to review the subject of obstructing colon cancer, stressing on recent modalities and strategies to manage the disease.

ANATOMY OF THE COLON, RECTUM, AND PELVIC FLOOR

The colon and rectum constitute a tube of variable diameter about ١٥٠ cm in length. The terminal ileum empties into the cecum through thickened, nipple-shaped imaginations, the ileocecal valve. The cecum is a capacious sac-like segment of the proximal colon with an average diameter of ٧,٥ cm and length of ١٠cm. (figure I-١). ***(Wolff and Larson, ٢٠٠٧)***

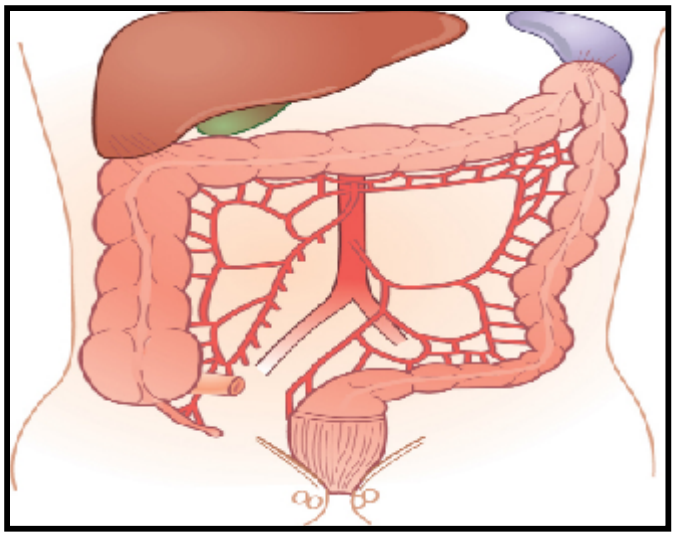

Figure I-١: Anatomy of the colon and rectum: coronal view. The diameter of the right colon is larger than the diameter of the left side. Note the higher location of the splenic flexure compared with the hepatic flexure, and the extraperitoneal location of the rectum. ***(Wolff and Larson, ٢٠٠٧)***

The appendix extends from the cecum about ٣ cm below the ileocecal valve as a blind-ending elongated tube ٨ to ١٠ cm in length. ***(Lin and Xiong,*** ***)***

The ascending colon, about ١٥ cm in length, runs upward toward the liver on the right side; like the descending colon, the posterior surface is fixed against the retroperitoneum, whereas the lateral and anterior surfaces are true intraperitoneal structures. The white line of Toldt represents the fusion of the mesentery with the posterior peritoneum. This subtle peritoneal landmark serves the surgeon as a guide for mobilizing the colon and mesentery from the retroperitoneum. ***(Marcio and Jorg,*** ***)***

The transverse colon is about ٤٥ cm in length. Hanging between fixed positions at the hepatic and splenic flexures, it is completely invested in visceral peritoneum. The nephrocolic ligament secures the hepatic flexure and directly overlies the right kidney, duodenum, and porta hepatis. ***(Paraskeva,*** ***)***

The phrenocolic ligament lies ventral to the spleen and fixes the splenic flexure in the left upper quadrant. The angle of the splenic flexure is higher, more acute, and more deeply situated than that of the hepatic flexure. The splenic flexure is typically approached by dissecting the descending colon along the line of Toldt from below and then entering the lesser sac by reflecting the omentum from the transverse colon. This maneuver

allows mobilization of the flexure to be achieved with minimal traction required for exposure. Attached to the superior aspect of the transverse colon is the greater omentum. ***(Bullard and Rothenberger , ٢٠٠٧)***

The descending colon lies ventral to the left kidney and extends downward from the splenic flexure for about ٢٥ cm. It is smaller in diameter than the ascending colon. At the level of the pelvic brim, there is a transition between the relatively thin-walled, fixed, descending colon and the thicker, mobile sigmoid colon. The sigmoid colon varies in length from ١٥ to ٥٠ cm (average, ٣٨ cm) and is very mobile. It is a small-diameter, muscular tube on a long, floppy mesentery that often forms an omega loop in the pelvis. The mesosigmoid is frequently attached to the left pelvic sidewall, producing a small recess in the mesentery known as the intersigmoid fossa. This mesenteric fold is a surgical landmark for the underlying left ureter. ***(Paraskeva, ~)***

The rectum, along with the sigmoid colon, serves as a fecal reservoir. There is some controversy in the definition of the proximal and distal extent of the rectum. Some consider the rectosigmoid junction to be at the level of the sacral promontory; others, at the point at which the taeniae converge. Anatomists consider the dentate line the distal extent of the rectum, whereas

surgeons typically view this union of columnar and squamous epithelium as existing within the anal canal and consider the end of the rectum to be the proximal border of the anal sphincter complex. ***(Lin and Xiong,*** ***)***

The rectum is ١٢ to ١٥ cm in length and lacks taeniae coli or appendices epiploicae. It occupies the curve of the sacrum in the true pelvis, and the posterior surface is almost completely extraperitoneal in that it is adherent to presacral soft tissues and thus is outside of the peritoneal cavity. The anterior surface of the proximal third of the rectum is covered by visceral peritoneum. The peritoneal reflection is ٧ to ٩ cm from the anal verge in men and ٥ to ٧,٥ cm in women. This anterior peritonealized space is called the pouch of Douglas or the pelvic cul-de-sac and may serve as the site of so-called drop metastases from visceral tumors. These peritoneal metastases can form a mass in the cul-de-sac (called Bloomer's shelf) that can be detected by a digital rectal examination. ***(Lin and Xiong,*** ***)***

The rectum possesses three involutions or curves known as the valves of Houston. The middle valve folds to the left, and the proximal and distal valves fold to the right. These valves are more properly called folds because they have no specific function as impediments to flow. They are lost after full surgical mobilization of the rectum, a maneuver that may provide about

٥cm of additional length to the rectum, greatly facilitating the surgeon's ability to fashion an anastomosis deep in the pelvis ***(Bullard and Rothenberger , ٢٠٠٧)***

The posterior aspect of the rectum is invested with a thick, closely applied mesorectum. A thin layer of investing fascia (fascia propria) coats the mesorectum and represents a distinct layer from the presacral fascia against which it lies. During proctectomy for rectal cancer, mobilization and dissection of the rectum proceed between the presacral fascia and the fascia propria. Total mesorectal excision is a well-described oncologic maneuver that makes good use of the tissue planes investing the rectum to achieve a relatively bloodless rectal and mesorectal dissection. The lymphatics are contained within the mesorectum, and total mesorectal excision adheres to the basic surgical oncologic principle of removal of the cancer in continuity with its blood and lymphatic supply. ***(Bullard and Rothenberger , ٢٠٠٧)***

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 sympathic and parasympathetic nerves), and division of these structures close to the pelvic sidewall may result in injury to these nerves, resulting in impotence and bladder dysfunction (figure I-٢). ***(Chang and Feig, ٢٠٠٦)***

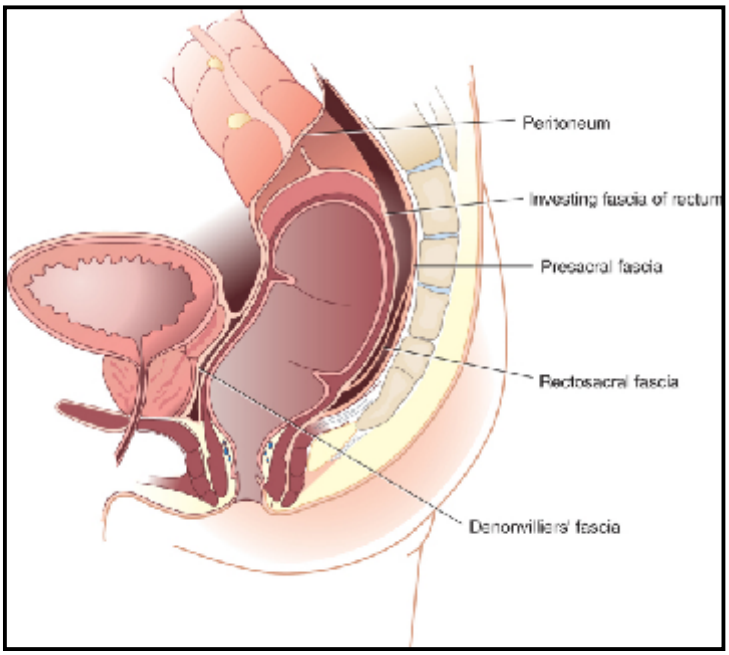

Figure I-٢: Endopelvic fascia ***(Chang and Feig, ٢٠٠٦)***

The rectosacral fascia, or Waldeyer's fascia, is a thick condensation of endopelvic fascia connecting the presacral fascia to the fascia propria at the level of S٤ and extends to the anorectal ring. Waldeyer's fascia is an important surgical landmark, and its division during dissection from an abdominal approach provides entry to the deep retrorectal pelvis. Dissection between the fascia propria and the presacral fascia follows the principles of surgical oncology and minimizes the risk for vascular or neural injuries. Disruption of the presacral fascia may lead to injury of the basivertebral venous plexus, resulting in massive hemorrhage. Disrupting the fascia propria during an operation for rectal cancer may significantly increase the incidence of subsequent recurrence of cancer in the pelvis if mesorectum is then left behind. ***(Marcio and Jorg ,)***

Pelvic Floor:

The muscles of the pelvic floor, like those of the anal sphincter mechanism, arise from the primitive cloaca. The pelvic floor, or diaphragm, consists of the pubococcygeus, iliococcygeus, and puborectalis, a group of muscles that together form the levator ani. The pelvic diaphragm resides between the sacrum, obturator fascia, ischial spines, and pubis. The levator hiatus is an opening between the decussating fibers of the pubococcygeus that allows egress of the anal canal, urethra, and

dorsal vein in men and the anal canal, urethra, and vagina in women. ***(Lin and Xiong,*** ˜ ˜ ˜ ˜ ***)***

The puborectalis is a strong U-shaped sling of striated muscle coursing around the rectum just above the level of the anal sphincters. Relaxation of the puborectalis straightens the anorectal angle and permits descent of feces; contraction produces the opposite effect. The puborectalis is in a state of continual contraction, a factor vital to the maintenance of continence. Puborectalis dysfunction is an important cause of defecation disorders. The pubococcygeus and iliococcygeus most likely participate in continence by applying lateral pressure to narrow the levator hiatus. (Figures I-٣ & ٤) ***(Lin and Xiong,*** ˜ ˜ ˜ ˜ ***)***

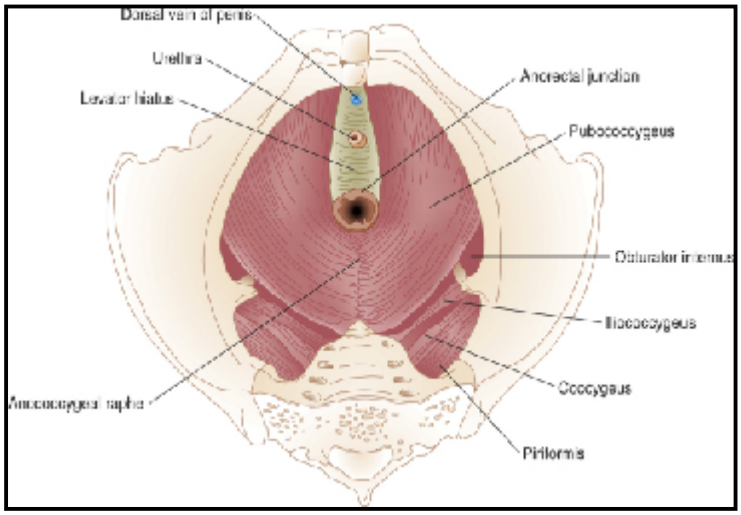

Figure I-٣: Levator muscles. ***(Lin and Xiong,*** ˜ ˜ ˜ ˜ ***)***

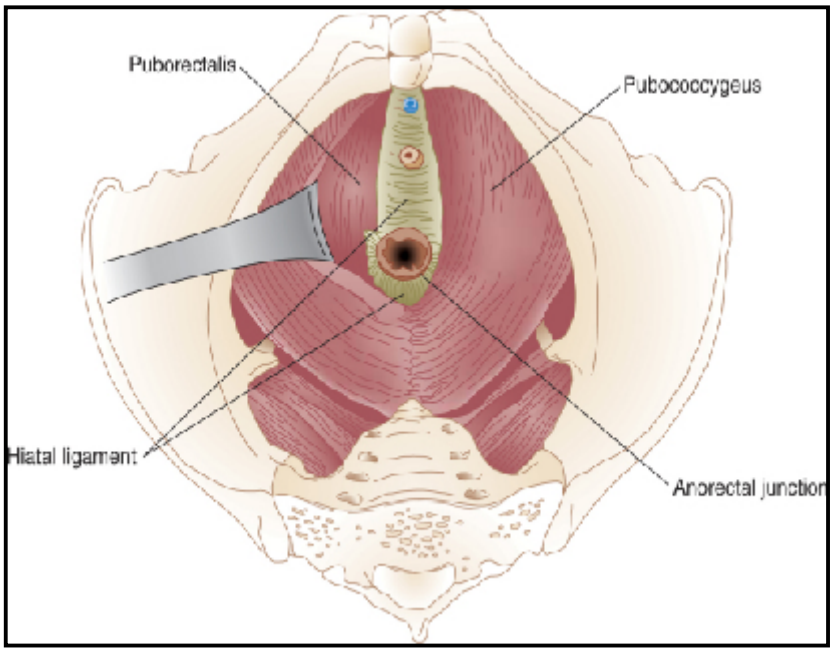

Figure I-٤: Hiatal ligament. ***(Lin and Xiong,*** ***)***

Arterial Supply and Venous Drainage of colon and rectum:

The midgut by the superior mesenteric artery (SMA) and the hindgut by the inferior mesenteric artery (IMA) (figures I-٥ and ٦). Anatomic redundancy confers survival advantages, and in the intestinal tract, this feature is provided by extensive communication between the major arteries and the collateral blood supply (figure I-٨). The territory of the SMA ends at the distal portion of the transverse colon, and that of the IMA begins in the region of the splenic flexure. A large collateral vessel, the

marginal artery, connects these two circulations and forms a continuous arcade along the mesenteric border of the colon. ***(Bullard and Rothenberger, ٢٠٠٧)***

Vasa recta from this artery branch off at short intervals and directly supply the bowel wall (figure I-٧). The collateral circulation in the area of the splenic flexure is the most inconsistent of the entire colon and has been referred to as a *watershed area*, vulnerable to ischemia in the presence of hypotension. ***(Bullard and Rothenberger, ٢٠٠٧)***

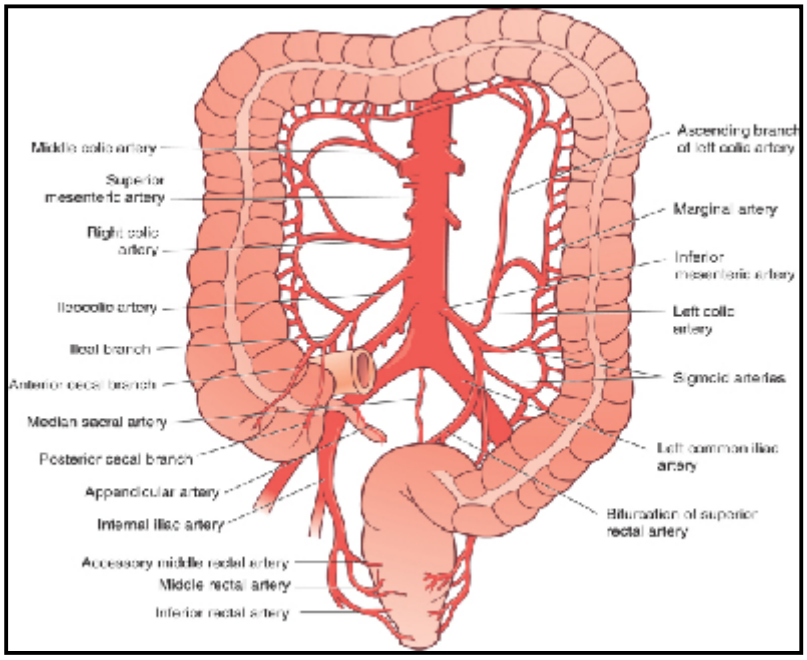

Figure I-٥: Arterial supply of the colon.

(Bullard and Rothenberger, ٢٠٠٧)