ROLE OF LAPAROSCOPY IN MANAGEMENT OF COLORECTAL CARCINOMA

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Contents

Tables

Figures

List of Abbreviations

APC	Adenomatous polyposis coli
APR	Abdominoperineal resection
CD	Chron's disease
CDS	Complicated Diverticulosis of the Sigmoid
HLA	Human leucocytes antigen
UC	Ulcerative Colitis
NHMRC	National Health and Medical Research Council
AJCC	The American Joint Committee on Cancer
HALS	Hand-assisted Laparoscopic Surgery
LAC	Laparoscopic-assisted Colectomy
OC	Open Colectomy
TME	Total Mesorectal Excision
COLOR	Colon Carcinoma Laparoscopic or Open Resection

Introduction

Laparoscopy has improved the surgical treatment of various diseases due to its limited surgical trauma and has developed as an interesting therapeutic alternative for open colorectal surgery. The applicability of laparoscopy to colorectal diseases continues to expand. Laparoscopic approach should be mainly considered for patients with benign conditions, For colorectal cancer, results from randomized trials so far have been favorable.[1]

Laparoscopic colectomy for benign colorectal diseases was associated with significantly less disability than was laparotomy in terms of length of hospitalization as well as return to baseline partial and full activity and employment.[2]

Laparoscopic rectopexy improves rectal dyschezia and fecal incontinence as does the laparotomic approach, with the same risk of operative complications, but with shorter hospital stay and lower incidence of postoperative serious constipation. The recurrence rate is virtually the same. Laparoscopic rectopexy therefore is considerd the first surgical choice in patients with complete rectal prolapse with fecal incontinence.[3]

Laparoscopic-assisted ileocolectomy for primary Crohn's disease of the terminal ileum and/or cecum is safe and successful in most cases. Laparoscopic surgery for Crohn's disease should be considered as the preferred operative approach for primary resections. The total hospital charges were significantly less in favor of the laparoscopic group, despite the longer operative time and increased cost of surgical equipment, and can no longer be an argument for those who oppose a laparoscopic approach in this patient population.[4]

The reversal of Hartmann procedure can be difficult due tendency of Hartmann segment to become densely adherent deep in the pelvis. The laparoscopic reversal has made this major operation easier, safe and practical. As a majority of these patients is in the elderly age group, it has the advantage of early mobilization, less pain, short hospital stay and return to normal life.[5]

Laparoscopic colorectal surgery for advanced colorectal carcinoma is controversial because of the technical difficulties in lymph node dissection.[6] On the other hand, in stage IV colorectal cancer, patients who underwent palliative laparoscopic surgery, the laparoscopic surgery might facilitate effective palliation in selected patients, with the avoidance of a major laparotomy.[7]

There are three basic roles of laparoscopic surgery for patients with colorectal cancer. First, although infrequently needed prior to therapy, diagnostic or staging laparoscopy may be valuable in certain colorectal cancer patients. Second, the laparoscopic approach may offer several attractive features for the palliative management of patients with incurable colorectal cancer. Finally, although this issue is the most controversial, there are theoretic but unproved advantages of using laparoscopic techniques for curative colorectal cancer therapy. The concerted efforts of surgical oncologists and their colleagues must prove this theory in well constructed trials.[8]

Aim of the Essay

The aim of this essay is to evaluate the role of laparoscopy in surgery of colorectal carcinoma and the demonstrable decrease in the conversion and complication rates with increasing experiences.

Embryogenesis

Normal Development

During herniation of the intestines into the umbilical cord **(Fig. 1)**, a slight local enlargement of the portion posterior to the superior mesenteric artery marks the site of the future cecum. Growth and differentiation of this postarterial limb lags behind that of the proximal prearterial limb when the intestines return to the abdomen. [9]

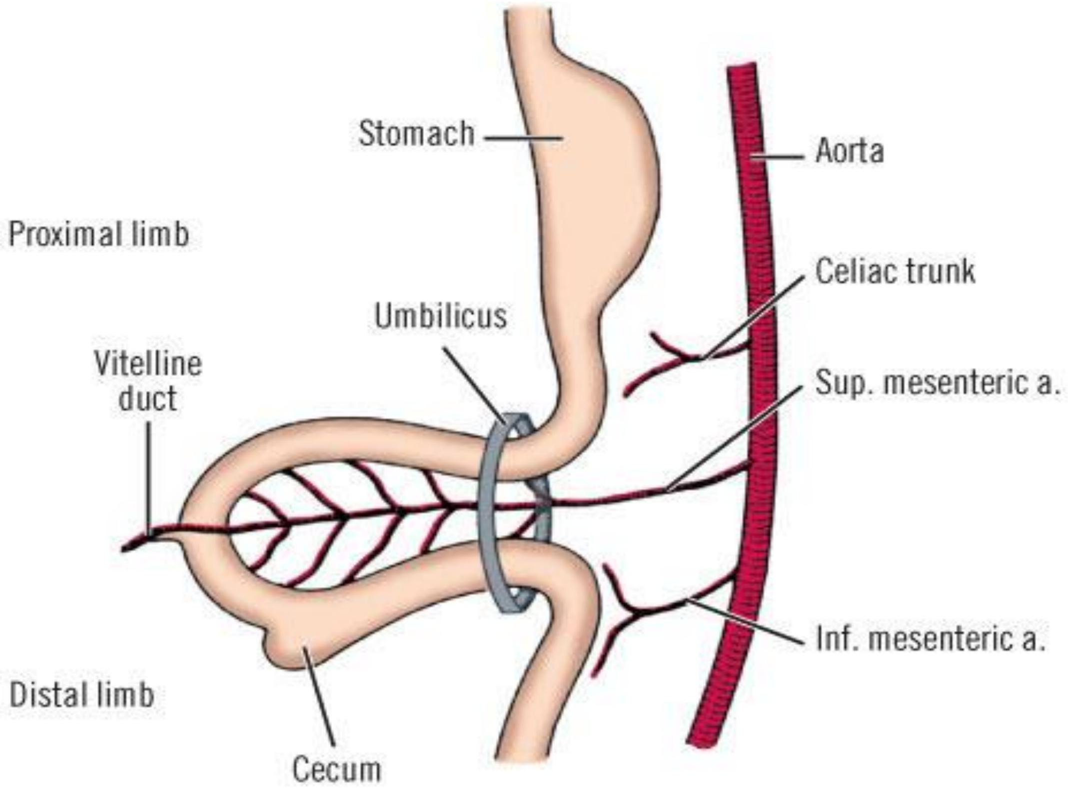

Fig. 1. Diagram of the growth of the embryonic midgut into the umbilical cord. Fifth week of gestation. The distal limb shows a swelling at the site of the cecum. The three great arteries supplying the stomach and intestines are remnants of the earlier vitelline arteries. [9]

Goblet cells and epithelial cells with a striate border may be found in the colon by the eleventh week. During the third month, villi and glands appear. The villi reach their maximum development in the fourth month and gradually shorten and disappear with the enlargement of the colon in the seventh and eighth months. [9]

Langman and Rowland[10] reported that the estimated total number of lymphoid follicles in the large intestine is between 12,761 and 18,432. The average follicular density is 18.4 per cm^2 in the cecum, 15.0 per cm^2 in the colon, and 25.4 per cm^2 in the rectum. Previously reported numbers were very low; perhaps these new numbers will remind the physician about the diagnosis of lymphoid hyperplasia.

The circular layer of muscularis externa appears caudally in the ninth week and spreads cranially. Ganglion cells of the myenteric plexus of Auerbach reach the colon in the seventh week, and innervation appears to be complete by the twelfth week.[9] The first longitudinal muscle fibers are present at the anal canal in the tenth week. Above the sigmoid colon, the longitudinal fibers extend cranially only along the mesenteric border of the colon, reaching the cecum in the eleventh week. By the fourth month, the entire colon is covered, but growth of the muscle coat does not keep up with increasing colon diameter. By the fourth month, the longitudinal muscle coat becomes separated into three bands, the taeniae coli. Meconium gradually fills the colon and the lower ileum until birth.

The colon is produced by both the midgut and the hindgut. The midgut is responsible for the genesis of the cecum, the ascending colon, and the proximal ⅔ of the transverse colon. The hindgut is responsible for the remainder of the colon, the rectum, and the proximal part of the anus. To be more specific, the distal ⅓ of the transverse colon, the descending colon, the sigmoid colon, the rectum and the proximal part of the anal canal develop from the hindgut.

The distal part of the surgical anal canal is not related embryologically to the hindgut. It most likely originates from the anal pit, which is of ectodermal origin. As O'Rahilly and Müller[11] wrote, "the anal canal is probably derived from the cloaca." To be more anatomically correct but still speculative about the embryology of the anorectum, we present this information by Rowe et al.[12] about the cloacal region.

In the fifth week, the embryonic cloaca is an endodermal sac receiving the hindgut dorsally and the allantoic stalk ventrally. The cloaca **(Fig. 2A, B)** is separated from the outside by a thin cloacal membrane (proctodeum), which occupies the embryo's ventral surface between the tail and the body stalk. During the sixth week, a septum of mesoderm divides the cloaca into a ventral urogenital sinus and a dorsal rectum **(Fig. 2C)**. This mesodermic septum fuses with the cloacal membrane in the seventh week to form the perineal body. The cloacal membrane is divided into a larger, ventral urogenital membrane and a smaller, dorsal anal membrane. Externally, the anal membrane becomes slightly depressed, forming the anal dimple. [9]

By the eighth week, the anal membrane ruptures, leaving no trace of itself **(Fig. 2D)**. The pectinate line in the adult is often considered to be at the level of the anal membrane, but little evidence exists to either support or contradict this view. Whatever the exact line of demarcation, the rectum and the upper anal canal are endodermal and are supplied by the inferior mesenteric artery, while the lower anal canal is ectodermal and is supplied by branches of the internal iliac artery. [9]

On either side of the anal membrane, the somatic mesoderm forms a pair of anal tubercles. These tubercles fuse dorsally into a horseshoe-shaped structure. By the tenth week, the ventral tips of the horseshoe fuse with the perineal body. Striated muscle in this horseshoe-shaped structure will later become the superficial portion of the external anal sphincter. The anal sphincter will form at the normal location even if the rectum should end blindly or should open at another site. [9]

The superior mesenteric artery (SMA) and the inferior mesenteric artery (IMA) provide the blood supply of the entire colon. In the surgical anal canal, the branches of the internal pudendal artery participate. [9]