A Comparison between Open Surgery and Laparoscopic Techniques for Malignant Rectal Tumors

An Essay

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List of Abbreviations

APC.....: Adenomatous Polyposis Coli

BCG .....: Bacillus Calmette-Guérin

CEA.....: Carcinoembryonic Antigen

CLS .....: Conventional Laparoscopic Surgery

CRC .....: Colorectal Cancer

CT.....: Computer-Assisted Tomography

DSBE.....: Double contrast barium enema

EGFR.....: Epidermal Growth Factor Receptor

FAP .....: Familial Adenomatous Polyposis

FEVI.....: Forced Expiratory Volume In 1

FOBT.....: Fecal Occult Blood Test

FS.....: Flexible Sigmoidoscopy

FVC.....: Forced Vital Capacity

HER .....: Growth Factor Receptor

HNPCC .....: Hereditery Non polyposis Colorectal Cancer

IORT.....: Intraoperative Radiation Therapy

LR.....: Iocal Recurrence

MMR .....: Mismatch Repair

MRI.....: Magnetic Resonance Imaging

PCR.....: Pathological Complete Response

PET .....: Positron Emission Tomography

List of Abbreviations (Cont…)

SILS.....: Single-incision laparoscopic

SPA.....: Single-port Access

TME.....: Transanal Endoscopic Microsurgery

VEGF.....: Vascular Endothelial Growth Factor

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INTRODUCTION

Colon and rectal cancer incidence was negligible before 1900. The incidence of colorectal cancer has been rising dramatically following economic development and industrialization. Currently, colorectal cancer is the third leading cause of cancer deaths in both males and females in the United States ***(American Cancer Society, 2011).***

Adenocarcinomas comprise the vast majority (98%) of colon and rectal cancers. Other rare rectal cancers, including carcinoid (0.4%), lymphoma (1.3%), and sarcoma (0.3%). Squamous cell carcinomas may develop in the transition area from the rectum to the anal verge and are considered anal carcinomas. Very rare cases of squamous cell carcinoma of the rectum have been reported ***(Anagnostopoulos et al., 2005).***

Approximately 20% of colon cancers develop in the cecum, another 20% in the rectum, and an additional 10% in the rectosigmoid junction. Approximately 25% of colon cancers develop in the sigmoid colon ***(Giovannucci & Wu, 2006).***

The etiology of colorectal cancer can be seen as an interaction between genetic factors but the basic underlying cause appears to be an accumulation of genetic mutation, which leads to the development of benign adenomas with subsequent

transformation to invasive malignancy (the adenocarcinoma sequence) ***(Cuschieri & Robert, 2001).***

Seventy percent of patients with colorectal cancer with apparently localized disease, in these patients surgery can be curative, but relapse after complete resection is frequent. Many trials including adjuvant therapy have rapidly developed to decrease the recurrence rate and increasing the survival of the patient ***(Enker et al., 2000)***.

Open colorectal procedures have always been considered the cornerstone operations for colorectal malignancy. But since the first laparoscopic cholecystectomy performed in 1985, advances in minimally invasive techniques and equipment have permitted safe and more advanced operations to be performed starting from laparoscopic appendectomy and up to laparoscopic liver, pancreatic and colorectal resection. First laparoscopic colectomy was performed on 1991 ***(Jacobs et al., 1991).***

Apart from perforation and obstructing carcinoma, there are no uniformly accepted specific contraindications ***(John, 2002).***

Transanal excision was the most commonly performed procedure for local excision of rectal masses. Transanal endoscopic microsurgery (TEM) has long been utilized in Europe but has been adopted much more slowly in the United States ***(Cataldo, 2006).***

Recent resurgence in local excision of rectal masses has stimulated renewed interest in the procedure. TEM has been advocated by some as a superior technique to transanal excision, offering lower recurrence rates without increases in morbidity ***(Middleton et al., 2005).***

On the other hand, the treatment of early rectal cancer by means of endoscopic resection might well be a safe and effective alternative. Endoscopic resection can be used as curative treatment in selected patients with early rectal cancer. It has been accepted not only in Japan but also in Western countries. However, prospective studies are still needed to compare the results of endoscopic resection techniques with laparoscopic surgery for patients with early rectal cancer ***(Hurlstone et al., 2004).***

Endoscopic resection was safe and effective for the treatment of early rectal cancers; the results were comparable to patients undergoing a transanal excision. In addition, the endoscopic resection had the advantage of a shorter hospital recovery ***(Lee et al., 2009).***

AIM OF THE ESSAY

The aim of this essay is to throw some lights on the comparison between open surgical excision of malignant rectal tumors and laparoscopic resection, and to investigate the safety and efficacy of transanal excision compared to laparoscopic resection.

ANATOMY OF THE RECTUM

Embryology:

Formation of the hindgut during the first month of life, the embryo undergoes an anterior flexion, called cephalocaudal plication. The ectoblaste stays on the convex pole of the embryo. The entoblaste engages the concave part and forms the anterior, median and posterior gut inside and the umbilical vesicle and allantoid outside the embryo ***(Faucheron, 2005).***

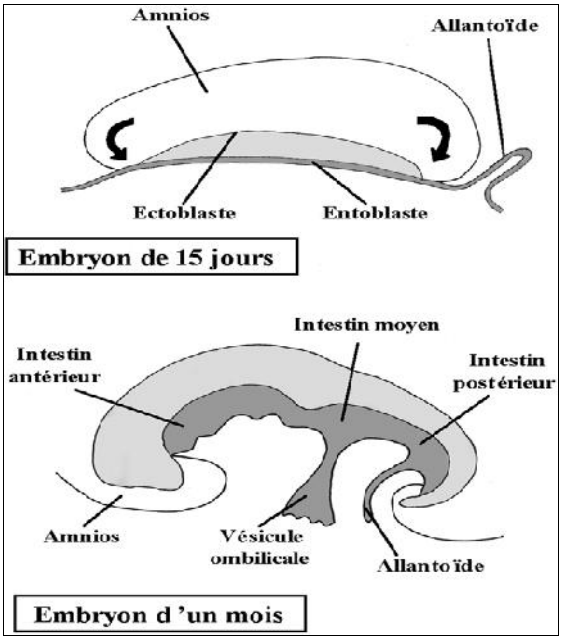

Fig. (1): The formation of the hindgut ***(Faucheron, 2005).***

The posterior gut, or hindgut, develops and becomes the splenic flexure, the descending colon, the sigmoid colon, the

rectum and the anal canal. The distal part of this hindgut ends in a cul de sac called cloaca. At that point, the entoblaste is in contact with the ectoblaste, defining a membrane called the cloacal membrane. Formation of the rectum and anus.A transversal membrane progressively descends between the allantoid in the front and the hindgut behind, so that the cloaca is separated into two parts: the anterior one receives the name of urogenital sinus and the posterior the name of anorectal canal. Before the end of the second month of life, the septum joins the cloacal membrane and will form later, in the girl, the perineal fibrotic area. That membrane is divided into urogenital membrane in the front and anal membrane behind ***(Faucheron, 2005).***

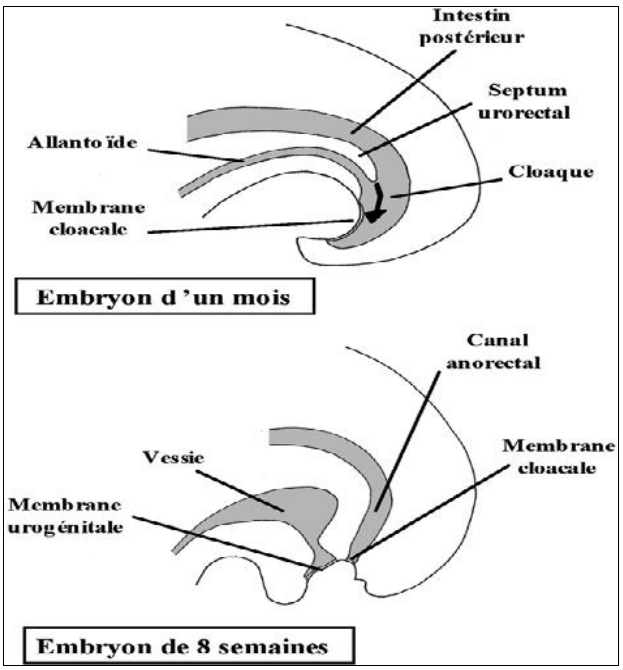

Fig. (2): The formation of the rectum and anus ***(Faucheron, 2005).***