SHORT AND LONG TERM FOLLOW-UP OF LAPAROSCOPIC RESECTION FOR COLORECTAL CANCER: NCI EXPERIENCE

Thesis submitted by

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LIST OF ABBREVIATIONS

CLASSIC	Conventional vs. laparoscopic Assisted Surgery With Colorectal Cancer
COLOR	Colon Cancer Laparoscopic or Open Resection
HALS	Hand Assisted Laparoscopic Surgery
COST	Clinical Outcomes of Surgical Therapy
HA	Hand Assisted
LAP	Laparoscopic
LC	Laparoscopic Colectomy
LAR	Laparoscopic Anterior Resection
LAPR	Laparoscopic Abdomino-Perineal resection
LNR	Lymph Node Retrieval
TNM	Tumor, Node, Metastasis
NCCN	National Comprehensive Cancer Network

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Key Words

Short-term Follow-up, Long-term follow-up, Colorectal surgery, Laparoscopic, Colon, Rectal

INTRODUCTION

The institution of laparoscopic approach to curative resection of malignant growths has been controversial. Nevertheless laparoscopic colectomy is rapidly becoming the surgical technique of choice on the expense of open procedure.

Laparoscopy offers a shorter length of stay, a decrease in postoperative pain , a shorter time to return to preoperative activity level, improved cosmoses' and reduced morbidity. Laparoscopic colectomy does not change the oncologic surgical principles, including en-bloc resection, proximal lymph-vascular ligation, and complete lymphadenectomy, adequate longitudinal and radial margins and wound protection.

A SUCCESSFUL Laparoscopic sigmoidectomy for cancer was reported in 1991 by Jacobs et al. Reports of port-site metastases observed after laparoscopic removal of colon cancer and other malignant neoplasm caused serious concern among surgeons and halted the rapid adoption of minimally invasive surgery for colon cancer. The reported port-site recurrence rate dropped rapidly. Zmora, 2001; reported a port-site recurrence rate of 1% in a review of 1737 patients who had undergone laparoscopic colorectal resection for malignancy

Trials randomizing patients with colon cancer to laparoscopically assisted surgery or open resection were initiated simultaneously in Europe and in North America to evaluate the oncological safety of laparoscopic colectomy.

The survival data from the Barcelona trial and from the Clinical Outcomes of Surgical Therapy (COST) study were published in 2002 and 2004, respectively.

The long-term survival data of the Colon Cancer Laparoscopic or Open Resection (COLOR) and Conventional vs. Laparoscopic-Assisted Surgery in Patients with Colorectal Cancer (CLASICC) trials are available.

We aimed to enhance the power in determining whether laparoscopic colectomy for cancer is technically and oncologically safe.

AIM OF WORK

The aim of this study is to evaluate the experience of the National Cancer Institute in laparoscopic colorectal surgery in the period from January 2000 to December 2005 in comparison to other international trials. This evaluation includes the short and long term outcome of laparoscopic resection of operable colorectal carcinoma.

REVIEW OF LITRATURE

I. The Development of Laparoscopy

Instruments closely resembling laparoscopic trocars have been recovered from Roman ruins. Similarly, Abulkasim described an "exploring needle with a groove" mounted on a handle. The term "trochar," however, was not coined until 1706, and is thought to be derived from *trochartor troise-quarts*, a three-faced instrument consisting of a perforator enclosed in a metal cannula (Thompson, 1942).

The first endoscopic examinations of the peritoneal cavity were accomplished early in the 20th Century. In 1901, Dimitri Ott, a German gynecologist described "ventroscopy," a technique in which a speculum was introduced through an incision in the posterior vaginal fornix. Ott wore head mirrors to reflect light and augment visualization. Also in 1901, George Kelling, a German surgeon, reported using a cystoscope to examine the intra-abdominal viscera of a dog after insufflating the peritoneal cavity with air, and coined the term "celioscopy." Jacobeus performed the first human celioscopy in Sweden in 1910, advocating the technique for the evaluation of patients with ascites. In 1911 in the United States, Bernheim published his laparoscopic experiences entitled, "Organoscopy," in the *Annals of Surgery 1911, (Berci, 1976), (Coakley, 1988), (Haubrich, 1987).*

World War I interrupted technological advances, and it was not until the mid-1920's that enthusiasm for "organoscopy" was renewed and photographic documentation attempted. In 1923, Kelling reported his 22 years of experience with laparoscopy to the German Surgical Society. Kelling became one of the earliest advocates of minimally invasive surgery. He encouraged

surgeons to use diagnostic laparoscopy in order to spare patients the prolonged and costly stay of a laparotomy (Gunning and Rosenzweig 1991) and (Nadeau and Kampmeier 1925).

Surgical procedures that treat diseases of the colon and rectum have been plagued by high rates of morbidity and mortality throughout history. Undoubtedly, this resulted from the high bacteria counts within the colon. When confronted with diseases requiring more invasive therapy, surgeons attempted to develop minimally invasive techniques that not only treated the disease process but also minimized patient morbidity. Minimally invasive surgery thus has a rich history spanning over thousands of years.

In the modern era, surgeons continued to develop minimally invasive techniques, particularly to treat colorectal diseases. Perineal approaches to rectal prolapse allowed treatment of elderly patients prior to the advent of modern anesthesia. The use of the rigid sigmoid scope for non-operative decompression of sigmoid volvulus dramatically decreased the mortality from this form of colonic obstruction. The flexible endoscope provided intra-luminal access to the colon and permitted the development of polypectomy techniques. Through minimally invasive techniques, surgeons could safely and effectively treat a larger patient population.

II. Technical Advances

The pioneers of laparoscopy believed that the technique was an important adjunct to surgical practice. Nonetheless, inadequate technology limited their vision, both literally and figuratively. Light sources in the first laparoscopes consisted of a distal light bulb with a rheostat to control intensity. The danger

of thermal burns to intra-abdominal contents from these primitive devices significantly limited their use. The laparoscope was introduced directly into the peritoneal cavity and pneumoperitoneum established by instilling air through the scope. Understandably, bowel perforations and vascular injuries posed very real risks in these early procedures (Philipietal, 1991) and (Haubrich, 1987).

In 1929, Kalk introduced the for-oblique (135 degrees) lens system, and advocated the use of a separate pneumoperitoneum needle and a second puncture site. These refinements in technique, along with Kalk's descriptions of therapeutic laparoscopic interventions earned him the designation as the "Father of Modern Laparoscopy." In 1938, Veress developed a needle with a spring-loaded obturator that allowed safe insertion and insufflation of the peritoneal cavity. Thereafter, pneumoperitoneum was established prior to instrumentation of the abdomen (Philipietal, 1991).

Despite such advances in laparoscopic imaging and technique, several troublesome problems persisted. Bowel and vascular injuries during trochar insertion continued to occur. No scientific knowledge existed regarding the dangers of increased intra-abdominal pressure. And finally and most distressingly, uni-polar cautery was associated with a high rate of thermal injury to the bowel. These dangers severely restricted the use of laparoscopy. Few surgeons judged that the advantages of laparoscopy outweighed the inherent risks of the technique (Philipietal, 1991).

In 1952, Fourestier, Gladu, and Valmiere developed a new imaging system which revolutionized endoscopy. The system utilized a quartz rod to transmit an intense light beam distally along a telescope. This development solved many of the aforementioned problems and additionally permitted the light