LYMPH NODE HARVESTING IN LAPAROSCOPIC VERSUS OPEN COLECTOMY; A COMPARATIVE STUDY

Thesis

Submitted for partial fulfillment of the MD degree in general surgery

By

Mohamed Korayem Fattouh Hamed

M.B.,B.Ch,M.SC.General surgery

Supervised By:

Prof. Dr. Hisham Hassan Hassan Wagdy

Professor of General Surgery
Faculty of medicine-Ain shams university

Prof. Dr. Mohamed Helmy Shehab

Professor of general surgery
Faculty of medicine-Ain Shams University

Prof. Dr. Ahmed Mohamed Nafei

Professor of General Surgery
Faculty of Medicine, Ain Shams University

Assit. Prof. Dr. Wael Abd El-Azeem Jummah

Assistant Professor of General Surgery
Faculty of Medicine, Ain Shams University

Assit. Prof. Dr. Tarek Youssef Ahmed

Assistant Professor of General surgery
Faculty of Medicine, Ain Shams University

Faculty of Medicine
Ain shams University
2016

بسم الله الرحمن الرحيم

"ذلك فضل الله

يؤتيه من يشاء والله

ذو الفضل العظيم"

صدق الله العظيم

(سورة الجمعه)

" ايه (٤) "

Acknowledgement

First thanks to **ALLAH** *to whom I relate any success in achieving any work in my life.*

I wish to express my deepest thanks, gratitude and appreciation to **Prof. Dr. Hisham Hassan Hassan Wagdy,** *Professor of General Surgery, Faculty of Medicine, Ain Shams University, for his sincere efforts, kind guidance, valuable instructions and generous help.*

Best wishes are not to be forgotten for **Prof. Dr. Mohamed Helmy Shehab,** *Professor of General Surgery, Faculty of Medicine, Ain Shams University, for his sincere efforts, kind guidance, valuable instructions and generous help.*

Then comes the valuable and sincere help of **Prof. Dr. Ahmed Mohamed Nafei,** *Professor of General Surgery, Faculty of Medicine, Ain Shams University, a valuable role that is always to be remembered.*

I wish to express my gratitude and appreciation to **Assist. Prof. Dr. Wael Abd El-Azeem Jummah,** *Assistant Professor of General Surgery, Faculty of Medicine, Ain Shams University, for his efforts a guide on the road to accomplish this thesis.*

Special thanks are due to **Assist. Prof. Dr. Tarek Youssef Ahmed,** *Assistant Professor of General Surgery, Faculty of Medicine, Ain shams University, for his meticulous supervision and fruitful encouragement kind guidance and generous help.*

Mohamed Korayem Fattouh

الغدد الليمفاوية المحصودة فى عمليات استئصال القولون جراحياً أو بالمنظار، دراسة مقارنة

رسالة

توطئة للحصول على درجة الدكتوراة فى الجراحة العامة

مقدمة من

الطبيب/ محمد كريم فتوح حامد
ماجيستير الجراحة العامة

تحت إشراف

الأستاذ الدكتور/ هشام حسن حسن وجدى
أستاذ الجراحة العامة
كلية الطب- جامعة عين شمس

الأستاذ الدكتور/ محمد حلمى شهاب
أستاذ الجراحة العامة
كلية الطب- جامعة عين شمس

الأستاذ الدكتور/ أحمد محمد نافع
أستاذ الجراحة العامة
كلية الطب- جامعة عين شمس

الأستاذ الدكتور/ وائل عبد العظيم جمعه
أستاذ مساعد الجراحة العامة
كلية الطب- جامعة عين شمس

الأستاذ الدكتور/ طارق يوسف أحمد
استاذ مساعد الجراحة العامة
كلية الطب- جامعة عين شمس

كلية الطب
جامعة عين شمس
٢٠١٦

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AJCC	: American Joint For Cancer Control
APR	: Abdomino-Perineal Resection
ASA	: American Society Of Anesthesiology
CRC	: Colorectal Cancer
CRM	: Circumferential Radial Margin
CRP	: C-Reactive Protein
CRT	: Chemo-Radiotherapy
CTC	: Computed Tomographic Colonography
DCBE	: Double Contrast Barium Enema
DRE	: Digital Rectal Examination
FAP	: Familial Adenomatous Polyposis
FIT	: Fecal Immunochemical Tests
FOBT	: Fecal Occult Blood Test
H&E	: Hematoxylin And Eosin
HNPCC	: Hereditary Non Polyposis Colorectal Cancer
IHC	: Immune-Histochemical
IL	: Interleukin
IMA	: Inferior Mesenteric Artery
ITC_s	: Isolated Tumor Cells
LLQ	: Left Lower Quadrant
LNR	: Lymph Node Ratio
LNs	: Lymph Nodes
LOS	: Length Of Stay

List of Abbreviations

LUQ	: Left Upper Quadrant
MEDPAR	: Medical Patient Accounting And Reporting
NGT	: Naso-Gastric Tube
NIH	: National Health Institute
RT-PCR	: Reverse Transcriptase Polymerase Chain Reaction
SMA	: Superior Mesenteric Artery
TME	: Total Mesorectal Excision
TME	: Total Mesorectal Excision
TNF	: Tumor Necrosis Factor
TNM	: Tumor-Node-Metastasis

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INTRODUCTION

Colorectal cancer is the third most commonly diagnosed cancer in the world, but it is more common in developed countries. Around 60% of cases were diagnosed in the developed world. It is estimated that worldwide, in 2008, 1.23 million new cases of colorectal cancer were clinically diagnosed, and that it killed 608,000 people ***(Ferlay et al., 2010).***

Contemporary staging of colon cancer uses the TNM system and is based on the depth of bowel wall penetration (T-stage), involvement of the regional lymph nodes (N-stage) and spread of tumour to distant surfaces or organs (M-stage) ***(Denham et al., 2012).***

Of all the characteristics of the disease examined, lymph node status is the most significant predictor for determining patient survival in patients with colorectal cancer ***(Faerden et al., 2011).*** Moreover, in many cases which are not treated with preoperative radiation or chemoradiotherapy, the decision for or against an adjuvant chemotherapy is made by the lymph node status ***(Sauer et al., 2004).***

The College of American Pathologists recommends at least 12 lymph nodes be sampled in a colorectal cancer resection specimen. Based on such statements, there has been a

push to use the number of retrieved lymph nodes as an indicator of quality of care ***(Faerden et al., 2011).***

It is well known that even the smallest nodes with diameters less than 1 mm may bear metastases. Therefore, a broad spectrum of techniques beginning with fat clearance methods to sentinel techniques has been introduced in order to increase lymph node counts and improve accuracy ***(Smith et al., 2006).***

Laparoscopy has emerged as the preferred operative approach for most intra-abdominal pathologic conditions. Nonetheless, even though the first laparoscopic colectomy was reported almost 20 years ago, most colectomies in the United States are still being performed using the open technique This reluctance is partly caused by initial reports on high occurrences of port-site metastases after laparoscopic surgery for colorectal malignancies ***(Drake et al., 2007).***

Several clinical trials were initiated in the 1990s to address the controversial issue of using laparoscopic surgical techniques for colorectal cancer. A brief description of 2 of these trials follows:

Clinical Outcomes of Surgical Therapy (COST) study: This multi-institutional trial involved 48 centers and a total of 872 patients with colon cancer who underwent either open or laparoscopy-assisted colectomy. The time to tumor recurrence was used as a primary endpoint. The rates of recurrence were

16% in the laparoscopy-assisted group vs 18% in the open-colectomy group (P = .32).This trial revealed no difference in local wound recurrence rate between the 2 patient groups (< 1%). Additionally, there was no difference in overall survival (86% for laparoscopy-assisted and 85% for open colectomies) at 3 years of follow-up. The laparoscopic group demonstrated faster recovery with shorter median hospital stay (5 days vs 6 days) and shorter use of postoperative narcotics (3 days vs 4 days). These findings demonstrated that the laparoscopic approach to treating colorectal cancer is an acceptable and safe alternative to open surgery ***(The Clinical Outcomes of Surgical Therapy Study Group, 2004).*** Five-year data was available on 90% of patients and published in 2007. COST showed that with 170 recurrences and 252 deaths, cancer-free and overall 5-year survival was similar between open and laparoscopic groups. The rate of recurrence, along with the sites of those recurrences, was also similar (lap: 76%, open: 74%; $p = 0.93$). Although not adequately powered, an exploratory subset analysis was done to evaluate whether conversion to open operation impacted the outcome measures. This analysis did not identify a significant difference between groups for either cancer-free survival or recurrence ***(Lee et al., 2012)***.

Colon carcinoma Laparoscopic or Open Resection (COLOR) trial: This European trial involved 27 institutions and 1248 patients randomly assigned to either laparoscopic

surgery or open surgery for colon cancer. Patients who underwent laparoscopic resection had less blood loss compared with patients who underwent open resection (median 100 mL vs 175 mL), but median operative times were longer for the laparoscopic group (202 vs 170 minutes). Earlier recovery of bowel function, need for less analgesia, and shorter hospital length of stay were other benefits observed with laparoscopic resection. Morbidity and mortality rates 28 days after colectomy were similar among the laparoscopic and open resection groups. Additionally, resection margins, number of lymph nodes, tumor stage, tumor size, and number of reinterventions required within 28 days after surgery did not differ between treatment groups. At 3 years, COLOR found recurrences, whether local, distant or combined, were similar between both groups. Overall and cancer-free survival were not significantly different, regardless of disease stage. The 3-year cancer-free survival for all stages was 72.4% in the laparoscopic group and 76.4% in the open group ($p = 0.7$). Overall survival at 3 years for all stages was 81.8% in the laparoscopic group and 84.2% in the open group ($p = 0.45$) ***(Colon Cancer Laparoscopic or Open Resection Study Group, 2009).***

The prognostic significance of identifying lymph node (LN) metastases following surgical resection for colon and rectal cancer is well recognized and is reflected in accurate staging of the disease. An established body of evidence exists, demonstrating an association between a higher total LN count and improved survival, particularly for node negative colon cancer. In node positive disease, however, the lymph node ratios may represent a better prognostic indicator, although the impact of this on clinical treatment has yet to be universally established ***(McDonald et al., 2012).***

Ultimately, the adequacy of any cancer operation is measured by short- and long-term oncologic results. Lacking this type of information, several early studies used surrogate markers such as length of bowel resected, number of lymph nodes retrieved, estimated blood loss, and early morbidity and mortality in an attempt to prove that equivalent operations could be performed laparoscopically ***(Grayetal, 1994).***