FACTORS PREDICTING LEAKAGE IN EMERGENCY SMALL BOWEL ANASTOMOSIS

Thesis

A thesis submitted for partial fulfillment of Master degree in General Surgery

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2015

بسم الله الرحمن الرحيم

قَالُوا سُبْحَانَكَ لاَ عِلْمَ لَنَا
إِلاَّ مَا عَلَّمْتَنَا إِنَّكَ أَنتَ الْعَلِيمُ الْحَكِيمُ

صدق الله العظيم
سورة البقرة الآية (٣٢)

Dedication

My work is dedicated to:

My Great Good Allah, Merciful, Al-Aliem, Al-Khabeer & My beloved Prophet Mohammed Peace and Blessings of ALLAH upon him

Whose efforts and guidance made me able to serve this noble profession of medical science.

Acknowledgement

Thanks and for most thanks to **Allah,** *the merciful of all, who helped me for accomplishment of this work.*

I am extremely grateful to **Professor Dr. Hisham Ahmed Abou Eisha,** *Professor of General Surgery , Faculty of medicine , Kasr Al-Aini- Cairo University, for his sincere co-operation, continuous unlimited help, also his accurate supervision through every step taken in this work and the most fruitful pieces of advice and continuous guidance during execution of this work .*

My deep gratitude goes to **Dr. Hesham Nabil Abdel Mooty,** *Professor of General Surgery , Faculty of medicine Kasr Al-Aini- Cairo University, for his endless support, valuable assistance without which I would not have done nothing valuable through his continuous supervision in all the details of this work and helpful suggestions and continuous encouragement.*

I wish to extend my gratitude and deepest appreciation to **Dr. Hussein Ossama Elwan,** *Assistant Professor of General Surgery , Faculty of medicine Kasr Al-Aini Cairo University, for his helpful supervision in conducting this study through his great contribution through accomplishment of the clinical part of the study which brought our work to light, also for endless creativity and helpful supervision that have always stimulated me to spare no effort to get this study born to life.*

Lastly but not least, I feel deeply thankful to my dear family for their continuous support.

Mohamed Mansour Megahed Saleh

Abstract

Background: Anastomotic leak is a dreaded complication of intestinal surgery and has been associated with a high mortality rate. There is a great deal of conflicting data regarding risk factors for anastomotic leakage, with most studies being small and looking only at anastomoses performed at one level of the gastrointestinal (GI) tract. The purpose of this study was to evaluate the possible predictive factors of anastomotic dehiscence in patients undergoing resection anastomotic operations at the levels of the small intestine.

Objectives: The objective of this study was to identify risk factors associated with intestinal anastomotic leakage in order to practically assist in surgical decision making.

Study Design: All adult patients having a small bowel resection with anastomosis at Kasr El-Aeini university hospital Surgical Emergency Department from July 2012 to January 2013 were enrolled in the study. Patients with a postoperative leak based on standardized criteria were identified. Patient characteristics, surgical procedure, and operating surgeon were noted. Overall complication and leak rates by surgeon were compared using Fisher's exact test. Individual case review by a group of peers was performed for all patients with a leak who died, to determine the relationship to mortality.

Data Sources: Medline plus (Pub Med), control trials, review articles, prophetic (PBUH) medicine and t*he Cochrane systemic review.*

Review authors were to independently evaluate the articles for inclusion criteria and quality, and abstract information for the outcomes of interest. Differences were to be resolved by consensus. The statistical methods were to include relative risk, risk difference, number needed to treat to benefit or number needed to treat to harm for dichotomous and weighed mean difference for continuous outcomes reported with 95% confidence intervals. Statistical presentation and analysis of the present study was conducted, using the mean,

standard deviation and chi-square test by SPSS V.16. Difference was considered significant when probabilities of difference (P value) <0.05.

Results: A total of fifty one emergency patients meeting the inclusion criteria underwent resection with anastomosis during the study period. There were 13/51 patients with leaks (25.4%),4 of whom died. In bivariate analysis, factors that were associated with anastomotic leaks were; advancing age, hypoalbuminemia (serum albumin <3(g/dl) 12/13 (92.3%), intra-operative hypovolaemia 8/13 (61.5%), intraoperative hypotension (systolic blood pressure below 80 mm Hg), diffuse peritonitis and low hemoglobin concentration (less than 10g %), all have a great association with anastomotic leakage. Mortality was significantly increased in patients with AL, we had 4 cases of mortality (3 males and 1 females), 4/51 (7.843%) of which had AL (3/13 – 23.07%) died in the postoperative period due to sepsis related multiorgan failure following anastomotic dehiscence.

Conclusion: Multiple factors should be taken into consideration before and during emergency small intestinal resection anastomotic surgery to comprehensively assess the risk for AL and assessing preoperative comorbidities. The recognition of factors associated with anastomotic leakage after intestinal operations can assist surgeons in mitigating these risks in the preoperative period and guide intraoperative decisions. The variability in leak rate by surgeons doing similar operations suggests that many leaks may be preventable. But death after a leak is most often a surrogate for a critically ill patient and was infrequently the actual cause of death.

Key Words:

" Factors predicting leakage , emergencysmall bowel anastomosis".

Data collection and analysis

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List of Abbreviations

SPSS	**statistical package for the social sciences**
AL	**anastomotic leakage**
BMI	**body mass index**
IC	**intestinal crypts**
ME	**muscularis externa**
TA	**transverse anastomosis**
GIA	**gastrointestinal anastomosis**
EEA	**end to end anastomosis**
MRI	**magnetic resonance imaging**
MBP	**mechanical bowel preparation**
ASGBI	**association of surgeons of Great Britain and Ireland**
IV	**intra venous**
MVT	**mesenteric venous thrombosis**
GALT	**gut-associated lymphatic tissue**
TGF-B	**transforming growth factor beta**
EGF	**epidermal growth factor**
PDGF	**platelet derived growth**
CRF	**chronic renal failure**
BA	**bronchial asthma**
IEL	**intraepithelial lymphocytes**
TFF	**trefoil factor family**
VEGF	**vascular endothelial cell growth factor**
IL	**interleukin**
IFN	**interferon**
HGF	**hepatocyte growth factor**
GLP-2	**glucagon –like peptide-2**
FGF	**fibroblast growth factor**

SCFA	**short chain fatty acids**
CT	**computed tomography**
MDCT	**multiple detector computed tomography**
ECG	**electrocardiogram**
COPD	**chronic obstructive pulmonary disease**
DM	**diabetes mellitus**
ICU	**intensive care unit**
ATLS	**advanced trauma life support**
HCV	**hepatitis c virus**
DVT	**deep venous thrombosis**
DU	**duodenal ulcer**

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INTRODUCTION AND RATIONALE

Resection anastomosis of diseased small bowel segment is a common surgical procedure in surgical units. This operation has a wide range of indications such as inflammation, ischemia, trauma, injury, obstruction, or malignancy (**Kingham and Pachter, 2009 and Nasirkhan et al., 2006).**

Failed healing of an intestinal anastomosis results in an anastomotic leak (AL), which is one of the most serious complications after gastrointestinal (GI) surgery with a reported incidence in the range of 0.5 to 30 percent **(Nasirkhan et al., 2006).**

An AL increases mortality and morbidity as well as prolongs the length of hospital stay and increases the cost of care (**Bruce et al., 2001).** Furthermore, the management of an AL often necessitates additional invasive procedures such as reoperation or percutaneous drainage (**Kingham and Pachter, 2009; Nasirkhan et al., 2006; Alves et al., 1999 and Yamamoto et al., 1999).**

The definition of an AL varies in the literature characterized in different ways depending on the surgeon (**Yamamoto et al., 1999).** Most of the publications use a combination of various clinical signs and radiological findings to define an AL, which include peritonitis, wound discharge, wound infection, and intra-abdominal fluid and gas collection. Nevertheless, An intestinal anastomosis is essentially a surgically created wound, and the occurrence of an AL represents a failure of the healing of

that wound. Thus, we can assume that the clinical process of intestinal healing will be affected by some of the factors that determine the process of wound healing. In general, the factors that influence the healing of an anastomosis can be divided into three categories:

1) patient-related factors such as age, gender, body mass index (BMI), co morbid conditions (i.e., diabetes, hypertension, heart disease, cancer, anemia, neutropenia, infection/sepsis, and malnutrition);

2) preoperative treatment-related factors such as prior abdominal surgery, chemotherapy, radiotherapy, steroid use, anticoagulation.

3) surgical procedure-related factors (duration of surgery, volume of intraoperative blood loss, type of anastomosis, contamination, urgency of the procedure, blood supply of the remnant bowel, operating surgeon, and anastomotic tension) (**Kingham and Pachter, 2009 and Alves et al., 1999**).

Despite several publications on this topic, there are mixed conclusions available regarding the risk factors leading to AL. Studies have reported that preoperative low albumin levels, steroid treatment before surgery, abscess at the time of laparotomy, and fistula at the time of operation are significant risk factors for intra-abdominal complication and AL (**Alves et al., 1999 and Yamamoto et al., 1999).**