

FACTORS PREDICTING LEAKAGE IN EMERGENCY SMALL BOWEL ANASTOMOSIS

Thesis

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General Surgery*

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا
إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ

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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.*



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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 *the 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 , emergency small 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).**