

# Assessment Risk Factors Study for Bowel Anastomosis for Iraqi Patients

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**Abstract:** Background: anastomotic leakage is one of the most dreaded surgical complications and is associated with increased morbidity, mortality, and hospitalization.

Objective: This research aims to assessment risk factors study for bowel anastomosis for Iraqi patients.

Materials and methods: a descriptive-analytical study was conducted in several hospitals in Iraq for the assessment of risk factors for Bowel Anastomosis for Iraqi Patients applied to 90 patients between the ages of 20 and 60 from May 2020 to October 2021.

Patient in This study was distributed for two groups between leakage and no leakage patients, and the subjects of the study included risk factors affecting the intestines before surgery, such as age, weight, comorbidities, and inflammation related to the operation after surgery, as well as the duration of the operation and factors affecting the patient's surgery.

This study relies on the SPSS program to determine the mean, SD, and the application of statistics to find out which injured are more than men or women, and to determine the patient's surgery status, whether its leakage no leakage. Results: This study estimated that most of the ages between 30 and 60 are more likely to undergo anastomosis surgeries, as the number of cases reached 15 (30%) leakage and 12 (30%) without leakage. Outcomes of patients based on time setting of resections. In Elective, cases reached 17 (34%) leakage and 13 (32.5%) without leakage. On the emergency basis, cases were estimated to be 33 (66%) leakage and 27 (67.5%) without leakage. According to complications related to patients who underwent anastomotic resection, Wound infection, Ileus, and Wound infection dehiscence, where the most severe cases are infected and the most frequently identified as acute postoperative complications: Wound infection dehiscence6 with an infection rate of between 6 (12%) for leakage and 3 (7.5%) without leakage as well. Conclusion: This study concluded that patients with surgery without leakage are less likely and more successful in the operation than patients with surgery with leakage because of severe complications may affect both types of patients and infect the intestinal cells, resulting in infection with secretions and internal bleeding of the disease of the Wound infection with leakage more than patients without leakage.

**Keywords:**Bowel Anastomosis; Leakage; Hypertension; Transverse colectomy; Ant resection; Small bowel resection.

## Introduction

Anastomotic leakage is one of the most dreaded surgical complications in GI surgery and is associated with increased morbidity, mortality, and hospitalization. The frequency and severity of complications vary depending on the location in which they occur. Currently, it is considered an indicator of the quality of care and surgical care, which in turn serves as a cut-off point for evaluating the protocols and standards of different hospital units, which can be compared with each other [1]

It is an operation to remove part of the intestine. This is done when some part of it is blocked or diseased. Most of the digestion (the breakdown and absorption of nutrients) of the food one eats takes place there. [2]

An anastomosis is a surgical connection between two structures. It generally means a connection between tubular structures, such as blood vessels or loops of the intestine. [3]

Several risk factors that may condition the appearance of bowel anastomosis secretion have been identified. For the purposes of the study, we can group them into three types: those that have been fully identified, some that are still being studied, and finally, those that were considered to have an adverse or protective effect and which, in recent studies, have shown the opposite effect. The rates of dehiscence vary according to the series, from 0.3 to 5.5% in the small intestine up to 21% in the large intestine. [4,5]

In recent years, various studies have converged in searching for factors related to the presence of dehiscence and emphasizing clinical findings, nutritional history, and laboratory or imaging tests that guide early detection of these complications since the presence of three or more factors can increase the probability of dehiscence by up to 50% [4, 5, 13]. The mortality rate in patients with anastomotic leakage ranges from 0.5 to 15%. [6,7]

Morse et al. identified the 12 most common risk factors for discharge in the 682 anastomoses: lung disease (29%), previous albumin <3.0 mg/dL (37%), preoperative peritonitis (34%), [8] tension in the anastomosis (5%), blood transfusions before surgery (15.8%), presence of cancer (19.4%) and placement of drains (3%); As predictive factors, in the multivariate analysis, only anastomotic tension (odds ratio [OR]: 10.1; 95% confidence interval [95% CI]: 1.4–75.9), and drains (OR: 8.9; 95% CI: 4.4–18.4) were used. And blood transfusions (OR: 4.2; 95% CI: 1.4–12.3). [9,10]

The difficulty in predicting the occurrence of dehiscence lies in identifying factors associated with this complexity. [11] In practice, dehiscence occurs even in well-nourished young patients, without comorbid conditions and despite satisfactory surgical technique, so it is important to identify the factors associated with anastomotic leakage in each population. [12]

the aim of this study was to determine the presence of factors associated with the dehiscence of small and large intestine anastomoses in our hospital in order to implement preventive measures to avoid the occurrence of this event. The aim of this paper is to assessment risk factors study for bowel anastomosis for Iraqi patients. [13,14]

## Material Methods

### Collection Sample

A descriptive-analytical study was conducted in several hospitals in Iraq. Assessment Risk Factors Study for Bowel Anastomosis for Iraqi Patients.

This study was carried out on 90 patients of both sexes, men, and women, and their consent to participate in this study was obtained.

### Method

A descriptive-analytical study was conducted in several hospitals in Iraq for assessment of risk factors for Bowel Anastomosis for Iraqi Patients applied to 90 patients between the ages of 20 and 60 from May 2020 to October 2021.

This study was carried out on 90 patients of both sexes, men and women, and their consent to participate in this study was obtained, and patient in This study was distributed for two groups between leakage and no leakage patients

The subjects of the study included risk factors affecting the intestines before surgery, such as age, weight, comorbidities, and inflammation related to the operation after surgery, as well as the duration of the operation and factors affecting the patient's surgery.

Statistical procedures were used to study complications resulting from perioperative factors in anastomotic resection, such as injury or infection.

### Statistical Analysis

This study was designed to study Assessment Risk Factors for Bowel Anastomosis for Iraqi Patients on 90 patients, where leakage represents 50 while there is no leakage are 40 patients, in which surgery, type, and duration of surgery is specialized in removing the anastomosis from the intestine.

This study relies on the SPSS program to determine the mean, SD, and the application of statistics to find out which injured are more than men or women, and also to determine the patient's surgery status, whether its leakage no leakage.

### Ethical Approval

Ethical and scientific rules have been considered to collect patient demographic data and information that are based on internationally accepted guidelines to preserve the rights, safety, and health of patients participating in this study. The autonomy of the patient and consent to provide the requested information, as well as the confidentiality of personal data, were also respected.

To apply the techniques and methodological procedures, permission and approval were received from the implementing authorities for the purpose of create this study.

### Results

**Table 1- Characteristics of demographic results of patients**

Variables	Leakage (N=50)	No Leakage (N=40)	P-value
<b>Age, N (%)</b>			
20-29	8 (16%)	7 (17.5%)	0.0493
30-39	13 (26%)	6 (15%)	0.035
40-49	15 (30%)	12 (30%)	0.05
50-60	14 (28%)	15 (37.5%)	0.036
<b>BMI, %</b>			
25-28	9 (18%)	12 (30%)	0.024
29-32	11 (22%)	8 (20%)	0.0475
33-36	16 (32%)	6 (15%)	0.0233
37-40	15 (30%)	14 (35%)	0.0366
<b>Sex</b>			

Male	30 (60%)	22 (55%)	0.0445
Female	20 (40%)	18 (45%)	0.045
<b>Comorbidities</b>			
Hypertension	8 (16%)	4 (10%)	0.0443
Diabetes	11 (22%)	8 (20%)	0.0497
Anemia	5 (10%)	9 (22.5%)	0.0233
Heart diseases	6 (12%)	10 (25%)	0.0223
Hypoalbuminemia	13 (26%)	7 (17.5%)	0.0211
Others	7 (14%)	2 (5%)	0.0221
<b>Smoking</b>			
Yes	35 (70%)	23 (57.5%)	0.0225
No	15 (30%)	17 (42.5%)	0.0338
<b>Alcohol</b>			
Yes	12 (24%)	8* (20%)	0.0377
No	38 (76%)	32 (80%)	0.0326

**Table 2 - Outcomes of patients based on time setting of resection.**

Resection and anastomosis	Leakage	No leakage	P-value
Elective	17 (34%)	13 (32.5%)	0.0474
Emergency basis	33 (66%)	27 (67.5%)	0.0485
<b>Patients</b>	<b>50</b>	<b>40</b>	<b>Total (90)</b>

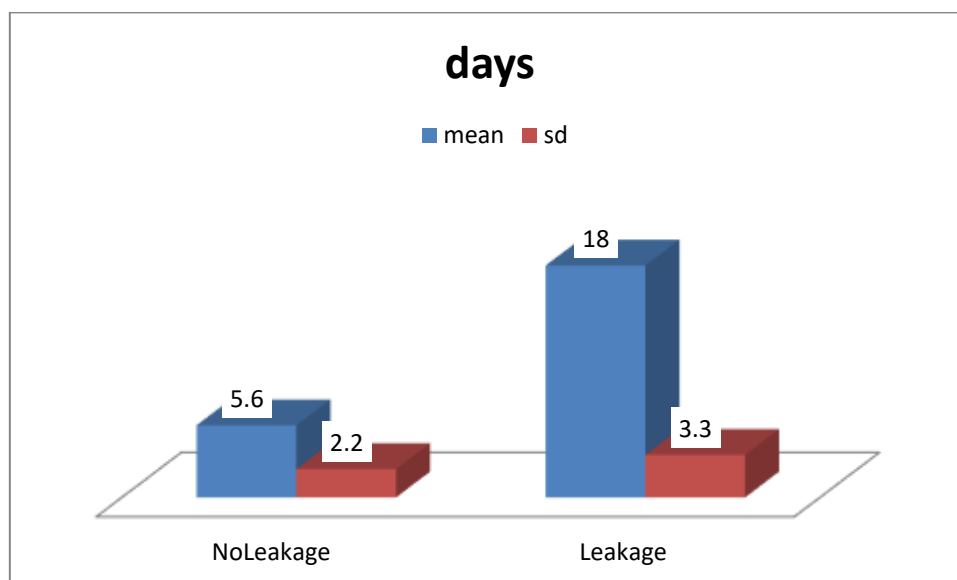
**Table 3- Estimation of outcomes of patients according to the type of surgery.**

Type of Surgery	Leakage	Leakage	P-value
Transverse colectomy	8 (16%)	6 (15%)	0.0487
Ant resection	15 (30%)	14 (35%)	0.0452
Small bowel resection	27 (54%)	20 (50%)	0.0462
<b>Number of Patients</b>	<b>50</b>	<b>40</b>	

**Table 4- Perioperative variables of the outcome according to Morbidity.**

Complications	Leakage	No leakage	P-value
<b>Wound infection</b>	10 (20%)	3 (7.5%)	<b>0.022</b>
<b>infection Ileus</b>	4 (8%)	2 (5%)	<b>0.0475</b>
<b>Wound infection dehiscence</b>	6 (12%)	3 (7.5%)	0.0355
<b>Patients</b>	<b>50</b>	<b>40</b>	

Figure 1- outcomes of a patient with Hospital stay (day)



**Table 5- Univariate analysis of the risk value for the patients of this study.**

Parameters	Leakage	No Leakage	P-value
<b>Age</b>			
20-29	0.73 (0.67-1.3)	0.98 (0.65-1.0)	0.64
30-39	1.32 (0.76-1.4)	1.2 (0.64-1.23)	0.78
40-49	1.22 (0.88-1.66)	1.24 (1.0-1.3)	0.023
50-60	1.33 (0.54-1.44)	1.23 (1.1-1.5)	0.048
<b>BMI%</b>			
25-28	0.73 (0.67-1.3)	0.98 (0.65-1.0)	0.64
29-32	1.32 (0.76-1.4)	1.2 (0.64-1.23)	0.78
33-36	1.22 (0.88-1.66)	1.24 (1.0-1.3)	0.023
37-40	1.22 (0.88-1.66)	1.24 (1.0-1.3)	0.023
<b>Hypertension</b>	<b>2.66 (1.9-5.5)</b>	<b>1.87 (1.4-2.5)</b>	<b>0.026</b>
<b>Diabetes</b>	<b>1.36 (1.1-2.4)</b>	<b>1.42 (1.1-1.8)</b>	<b>0.01</b>
<b>Small bowel resection</b>	<b>4.4 (3.1-8.9)</b>	<b>1.3 (0.9-1.8)</b>	<b>0.04</b>
<b>Emergency basis</b>	<b>2.76 (1.9-4.5)</b>	<b>1.77 (1.3-2.4)</b>	<b>0.025</b>
<b>Heart diseases</b>	<b>1.34 (1.2-2.5)</b>	<b>1.34 (1.1-1.7)</b>	<b>0.02</b>
<b>Wound infection dehiscence</b>	<b>6.3 (3.1-8.9)</b>	<b>1.7 (0.9-1.8)</b>	<b>0.042</b>

**Table 6- Evaluation of the correlation of good outcomes with groups of patients.**

Variable	Outcomes	Leakage	No leakage
<b>R correlation</b>	<b>1/0</b>	<b>-0.32</b>	<b>+0.64</b>
<b>Sig</b>	<b>--</b>	<b>0.7</b>	<b>0.042</b>
<b>N</b>		<b>90</b>	

### Discussion

This study was applied to 90 cases of bowel anastomosis patients, where a statistical study was carried out in the data-recorded hospitals in Iraq.

This study specialized in the cause of the results of the analysis based on specific subjects such as age, sex, diseases associated with the patient before surgery, intervention, and alcohol for both male and female sexes.

In terms of age, as this study estimated that most of the ages between 30 and 60 are more likely to undergo anastomosis surgeries, as the number of cases reached 15 (30%) leakage and 12 (30%) without leakage. This is considered the most dangerous age due to the symptoms that they suffer. Diabetes, high blood pressure, etc., with values of 8 (16%) leakage, 4 (10%) without hypertension, 11 (22%) dropout, 8 (20%) without Diabetes, 6 (12%) dropout, and 10 (25%) without leakage of heart diseases.

According to the evaluation of BMI%, a study estimated that most of those who were overweight reached between 33 to 40, as some studies concluded that most of those who face bowel problems are between the ages of 30 to 60, where the BMI% reaches 40, and cases have been estimated to be 15 (30%) Dropouts, 14 (35%) and without dropouts with a P value of 0.0366 as a result of having diabetes, a sharp rise in some cases of blood pressure and other symptoms, the most of which are smoking and alcohol, where the results of smoking reached 35 (70%) for dropouts and 23 (57.5%) without dropouts for smokers, while 15 (30%) and 17 (42.5%) were non-smokers, while alcoholic patients included 12 (24%) 8 \* (20%) alcoholic patients, while 38 (76%) 32 (80%) were non-alcoholic It can be shown in **Table 1**.

Morse and others showed that most smoking patients are exposed to acute intestinal problems, including colon irritation, which leads to severe risks during surgery. [15,16]

Outcomes of patients based on time setting of resections. In Elective, cases reached 17 (34%) leakage and 13 (32.5%) without leakage. On the emergency basis, cases were estimated to be 33 (66%) leakage and 27 (67.5%) without leakage. These appear results are in **Table 2**. In **Table 3**, Estimates the outcomes of patients according to the type of surgery, which included three types of surgeries: Transverse colectomy, Ant resection, and small bowel resection, where the most dangerous and vulnerable patients were determined: 27 (54%) to leakage and 20 (50%) without leakage with 0.0462.

According to complications related to patients who underwent anastomotic resection, Wound infection, Ileus, and Wound infection dehiscence, where the most severe cases are considered to be infected and the most frequently identified as acute postoperative complications: Wound infection dehiscence<sup>6</sup> with an infection rate of between 6 (12%) for leakage and 3 (7.5%) without leakage as well. It is shown in **Table 4**. [17] English studies classified that patient with leakage surgery had more severe complications than patients without leakage due to the type of injury that caused them as a result of acute inflammation, which causes severe bleeding. [18]

In **Table 5**, the outcomes related to leakage and non-leakage cases for male and female patients in Iraq were assessed and included age and gender, including Hypertension, Diabetes, Small bowel resection, emergency basis, heart diseases, and Wound infection dehiscence, and were most affected by the patient at risk. [19]

Simon and Rickens discussed that most patients suffer from complications and acute infections as a result of high blood pressure, or that their age is unable to tolerate this type of surgery, or as a result of an infection or Wound infection that affects the patient's immune system and results in severe bleeding. [20,21,22]

The correlation of outcomes with the case of the patient is specified in **Table 6**. It shows that patients without leakage are more successful than patients with leakage, as a result of the R correlation between - 0.32 for leakage and +0.64 without leakage, while Sig is 0.7 for leakage and 0.042 without leakage.

## Conclusion

This study aimed to know the risks and complications to patients who underwent Bowel Anastomosis and by relying on logistic analysis to the factors that posed a risk to patients where a statistically significant relationship was found with the leakage group at P-value < 0.05. It will be concluded in this study that patients who undergo surgery without leakage have fewer complications in the operation than patients who undergo surgery with leakage as a result of serious complications that may affect both types of patients.

## References

1. Komen N, Morsink M, Beiboer S, Miggelbrink A, Willemsen P, van der Harst E, et al. Detection of the colon flora in peritoneal drain fluid after colorectal surgery: can RT-PCR play a role in diagnosing anastomotic leakage? J Microbiol Methods. 2009;79 (1):67–70.

2. Frasson M, Flor-Lorente B, Rodríguez JLR, Granero-Castro P, Hervás D, Alvarez Rico MA, et al. Risk factors for anastomotic leak after colon resection for cancer. *Ann Surg.* 2015;262 (2):321–330.
3. Choi G-S, Park IJ, Kang BM, Lim KH, Jun S-H. A novel approach of robotic-assisted anterior resection with transanal or transvaginal retrieval of the specimen for colorectal cancer. *Surg Endosc.* 2009;23 (12):2831.
4. Dekker JWT, Liefers GJ, van Otterloo JCdM, Putter H, Tollenaar RA. Predicting the risk of anastomotic leakage in left-sided colorectal surgery using a colon leakage score. *J Surg Res.* 2011;166 (1): e27–e34.
5. Sciuto A, Merola G, De Palma GD, Sodo M, Pirozzi F, Bracale UM, et al. Predictive factors for anastomotic leakage after laparoscopic colorectal surgery. *World J Gastroenterol.* 2018;24 (21):2247.
6. Varon J, Marik PE. Perioperative hypertension management. *Vasc Health Risk Manag.* 2008;4 (3):615–627.
7. Den Dulk M, Witvliet M, Kortram K, Neijenhuis P, de Hingh I, Engel A, et al. The DULK (Dutch leakage) and modified DULK score compared: actively seek the leak. *Colorectal Dis.* 2013;15 (9): e528–e533.
8. Rahbari NN, Weitz J, Hohenberger W, Heald RJ, Moran B, Ulrich A, et al. Definition and grading of anastomotic leakage following anterior resection of the rectum: a proposal by the International Study Group of Rectal Cancer. *Surgery.* 2010;147 (3):339–351.
9. Clavien PA, Barkun J, De Oliveira ML, Vauthey JN, Dindo D, Schulick RD, et al. The Clavien–Dindo classification of surgical complications: five-year experience. *Ann Surg.* 2009;250 (2):187–196.
10. Shogan BD, Carlisle EM, Alverdy JC, Umanskiy K. Do we really know why colorectal anastomoses leak? *J Gastrointest Surg.* 2013;17 (9):1698–1707.
11. Nasir Khan MU, Abir F, Longo W, Kozol R. Anastomotic disruption after large bowel resection. *World J Gastroenterol WJG.* 2006;12 (16):2497.
12. Trencheva K, Morrissey KP, Wells M, Mancuso CA, Lee SW, Sonoda T, et al. Identifying important predictors for anastomotic leak after colon and rectal resection: a prospective study on 616 patients. *Ann Surg.* 2013;257 (1):108–113.
13. Thornton M, Joshi H, Vimalachandran C, Heath R, Carter P, Gur U, et al. Management and outcome of colorectal anastomotic leaks. *Int J Colorectal Dis.* 2011;26 (3):313–320.
14. Law WL, Choi HK, Lee YM, Ho JW, Seto CL. Anastomotic leakage is associated with poor long-term outcome in patients after curative colorectal resection for malignancy. *J Gastrointest Surg.* 2007;11 (1):8–15.
15. Rencuzogullari A, Benlice C, Valente M, Abbas MA, Remzi FH, Gorgun E. Predictors of anastomotic leak in elderly patients after colectomy: nomogram-based assessment From the American College of Surgeons National Surgical Quality Program Procedure-Targeted Cohort. *Dis Colon Rectum.* 2017;60 (5):527–536.
16. Segelman J, Mattsson I, Jung B, Nilsson P, Palmer G, Buchli C. Risk factors for anastomotic leakage following ileosigmoid or ileorectal anastomosis. *Colorectal Dis.* 2018;20 (4):304–311.
17. Kream J, Ludwig KA, Ridolfi TJ, Peterson CY. Achieving low anastomotic leak rates utilizing clinical perfusion assessment. *Surgery.* 2016;160 (4):960–967.
18. Jung SH, Yu CS, Choi PW, Kim DD, Park IJ, Kim HC, et al. Risk factors and oncologic impact of anastomotic leakage after rectal cancer surgery. *Dis Colon Rectum.* 2008;51 (6):902.
19. Hautefeuille P. Gastrointestinal suturing: Apropos of 570 sutures performed over a 5-year period using a single layer continuous technique. *Chirurgie.* 1976;102 (2):153–65.
20. Burch JM, Franciose RJ, Moore EE, Biffl WL, Offner PJ. Single-Layer Continuous Versus Two-Layer Interrupted Intestinal Anastomosis. *Ann Surg.* 2000;231 (6):832– 837. Available from: <https://dx.doi.org/10.1097/00000658-200006000-00007>.



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21. Garude K, Tandel C, Rao S, Shah NJ. Single Layered Intestinal Anastomosis: A Safe and Economic Technique. *Indian J Surg.* 2013;75 (4):290–293. Available from: <https://dx.doi.org/10.1007/s12262-012-0487-7>.
  22. Khan R, Hameed F, Ahmed B, Dilawaiz M, Akram M. Intestinal anastomosis: comparative evaluation for safety, cost-effectiveness, morbidity, and complication of single versus double layer. *Professional Med J.* 2010;17 (2):232–266.