

ASSESSMENT OF VARIOUS PROGNOSTIC FACTORS OF INTESTINAL ANASTOMOTIC LEAKAGE

ABSTRACT

OBJECTIVES: To determine the various prognostic factors of intestinal anastomosis leakage at tertiary care Hospital

MATERIAL AND METHODS: This prospective observational study was conducted in All Surgical Units of Liaquat University Hospital Jamshoro/Hyderabad. Total 100 patients were included those who underwent gastrointestinal surgeries with intestinal anastomosis. After taking detailed history and clinical examination, in all the patients' relevant investigations i.e. Blood CP, X-ray abdomen, Methylene Blue Test for Leaks (to confirm leaks) and Ultra sound of abdomen. If they remain free of any complication, they were discharged. After collection of data the analyses will be conducted by using Statistical Package for Social Science (SPSS) program version 26.0

RESULTS: Mean age was recorded of 51.5 ± 3.5 years, male were found in the majority (76.6%). On the clinical presentation abdominal pain was the most common (63.6%). Typhoid 75/(25.0%) was the most common diagnosis. Pathological site were found as ileocolic 180/(60.0%). Poor nutritional status was in 60.0% cases. Anaemia was 40%, diabetes 20%, and hypertension 10%. High steroid dose history was in 10% cases and 6.6% had history of chemotherapy. Ischemia of the intestine at the suture line was seen in 6%, local sepsis was 20%, obstruction distal to the anastomosis was 6.6%, postoperative early adhesions was 6.6%.

CONCLUSION: Male gender, poor nutritional status, diabetes, anemia, presence of local sepsis, chemotherapy and high dose steroid were observed highly prevalent and suspected as factors of anastomosis leakage. Furthermore many efforts are needed to be made to bring down the mortality and morbidity rates associated with anastomotic leak.

KEY WORDS: Intestinal anastomosis leakage, risk factors.

INTRODUCTION

Anastomotic disruption is the most menacing complication of gastrointestinal surgery. However Anastomotic leakage in most patients presents in a dramatic fashion, early in the postoperative period, thus leaves little doubt in making appropriate diagnosis. A considerable proportion present in a far more subtle fashion, often relatively late in the postoperative period, consequently can be difficult to distinguish from other postoperative infectious complications. Even though a great advancement in gastrointestinal surgery has taken place but anastomotic leakage or dehiscence is still common in surgical practice, and greatly increases morbidity and mortality associated with the surgery. Hence doubles the hospital stay and increases the mortality as much as 8 to 10 folds.¹

Patients with Anastomotic leakage classically present with abdominal pain, rigid abdomen and tachycardia. Available literature suggests 10-15% mortality rate after anastomotic leakage.²⁻⁵ However, majority of patients who have an Anastomotic leak develop more gradual but harmful outcomes.⁶ In these patients, reaching the diagnosis seems to be much more difficult, as the clinical course is often similar to other postoperative infectious complications. The cause of the leakage is often multifactorial, including patient related factors, in addition to the contribution from faulty technique, ischemia of the intestine at the suture line, excessive tension across anastomosis and mesentery, the presence of local sepsis, presence of obstruction distal to the anastomosis chronic obstructive pulmonary disease, and transfusion two or more units of blood during operation. The older age (>80 years), anaemic, malnourished with several coexisting diseases, receiving high doses steroids, after chemo-radiotherapy are at

relatively higher risk to develop the Anastomotic leakage.⁸ Available literature confirms the above factors, however it is not yet studied that which are the dependent factors and how they affect in combination. Therefore this study was designed to analyze the various prognostic factors of intestinal anastomosis leakage at tertiary care Hospital.

MATERIAL AND METHODS

This prospective observational study was conducted in All Surgical Units of Liaquat University Hospital Jamshoro/Hyderabad. All the patients who underwent gastrointestinal surgeries with intestinal anastomosis, age >12 years and either of gender were included. All the patients who were not agreeing to participate in the study were excluded. Written informed consent was obtained from the patient or next of kin. Patients fulfilling the inclusion criteria admitted in the Surgical Wards were selected. After taking detailed history and clinical examination and all the relevant investigations including abdominal ultrasound were done. Details of each patient were recorded on a proforma designed for this study. Followed-up for ten weeks was carried out in all the cases. After collection of data the analysis was done by using Statistical Package for Social Science (SPSS program version 20).

RESULTS

Total 100 patients were studied. The mean age of patients was 51.5 ± 3.5 years and male were found in the majority (76.6%) while female were (23.4%). Abdominal pain was the most common symptom (63.6%). Typhoid fever 25.0% was the most common diagnosis, followed by carcinoma 20%, Perforation 17%, volvulus 3.3%, Intestinal Obstruction 17.3%, gastric outlet obstruction 1.0%, multiple

strictures 2.0%, obstructed hernia 8.3%, trauma 4.3% and intussusceptions 2.0%. Peritoneal contamination was in 30% and the pathological site as presented in table.1

Poor nutritional status was found majority in the cases 60.0%. As per co-morbidities anaemia was found most common 40%, diabetes 20%, and hypertension 10%. History of high dose steroid was in 10% cases and history of chemotherapy was noted in 6.6% of the cases. Ischemia of the intestine at the suture line was seen in 6%, presence of local sepsis was the most common 40%, presence of obstruction distal to the anastomosis was noted 6.6%, postoperative early adhesions was 6.6%, postoperative internal Herniation was noted in 6.0% and the **ospital** mortality rate was recorded 8.0% in the cases. **Table. 2**

Table. 1. Demographic finding of the study participants=100

Variables		Statistics
Age (years)		51.5+3.5
Gender	Male	76(76.0%)
	Female	23(23.0%)
Presenting symptoms	Abdominal pain	63(63.0%)
	Constipation	33(33.0%)
	Distension	20(20.0%)
	Nausea	40(40.0%)
	Vomiting	33(33.0%)
	Unconscious	02(2.0%)
Diagnosis	Typhoid fever	25(25.0%)
	Carcinoma	20(20.0%)
	Perforation	17(17.0%)
	volvulus	03(03.0%)
	Intestinal Obstruction	17(17.0%)
	Gastric outlet Obstruction	03(03.0%)
	Obstructed hernia	25(25.0%)
	Trauma	13(13.0%)
	Intussusceptions	06(06.0%)
Site of pathology	Ileocolic	60(60.0%)
	Ileosigmoid	06(06.0%)
	Right Colocolic	15(15.0%)
	left colocolic	10(10.0%)
	Colosigmoid	04(04.0%)
	Colorectal	03(03.0%)
Peritoneal contamination	Present	30(30.0%)
	Absent	70(70.0%)
Status of gut	Friable	40(40.0%)
	Oedematous	60(60.0%)

Table.2 Factors of intestinal anastomosis leakage=100

Variables		Statistics	
Pre-operative factors	Poor nutritional status	60(60.0%)	
	Comorbidities	Diabetes	20(20.0%)
		Hypertension	10(10.0%)
		Anaemia	40(40.0%)
		Proteinemia	25(25.0%)
	History of chemotherapy	06(06.0%)	
Receiving high dose steroid	10(10.0%)		
Post	Ischemia of the intestine at the	05(05.0%)	

operative factors	suture line	
	Presence of local sepsis	20(20.0%)
	Presence of obstruction distal to the Anastomosis	06(06.0%)
	Postoperative early adhesions	06(06.0%)
Others	07(07.0%)	

DISCUSSION

Anastomotic leaking is a potentially serious complication that can develop after colorectal surgery and result in increased morbidity and mortality, the establishment of a permanent stoma, and the recurrence of cancer.⁹ Multiple risk factors for anastomotic leak have been found, and these can help to prevent and diagnose this serious complication earlier.⁹ In this study male gender, poor nutritional status, diabetes, anemia, presence of local sepsis, chemotherapy and high dose steroid were suspected as factors of anastomosis leakage. These findings were almost similar to the study of Midura EF et al¹⁰ the Male gender, steroid usage, smoking, open approach, operational time, and preoperative chemotherapy were all linked to an increased risk of anastomotic leaks, while diverting ileostomy was linked to a lower risk of leaks. In the study of Cheng S et al¹¹ demonstrated that the tumor differentiation medium degree, anastomotic method, chemoradiotherapy, intraoperative bleeding, diabetes and smoking were the causative factors of anastomosis leakage. While many writers believe that surgery time is a simple metric of difficulty, greater surgery time produces changes in inflammatory mediator activities, resulting in a large frequency of ischemic and septic sequelae. On other hand Lavanya NR et al¹² reported that the eight of the thirteen patients who experienced anastomotic leak were men. Anastomotic leak developed in one patient undergoing elective surgery. Four of the 13 cases with anastomotic leak were anaemic, four were hyponatraemic, and five were hypoalbuminemia. Nine of the 13 patients with anastomotic leak had peritonitis at the time of presentation.

In this study the mean age of patients was 51.5±3.5 years and male were found in the majority (76.6%). Consistently El-Badawy HA et al¹³ reported that the average age of the study subjects was 44.23 years and males were in majority 63.64%. In another study of Gutema Wako et al¹⁵ reported that the 46.44 years was the average age of the cases and males were 74.8%. In this study anemia and poor nutritional status were highly frequent. On other hand it is stated that the anemia has been linked to the development of leaks. Hemoglobin is linked to anastomotic margin perfusion and oxygenation, which is critical for anastomotic healing.¹⁵ Currently, this is a research topic, and various authors have found that haemoglobin levels less than 11 g/dL increase the risk of leak, as explained by a diminished capacity to transfer oxygen to the tissues and the danger of ischemia that follows.^{15,16}

CONCLUSION

Male gender, poor nutritional status, diabetes, anemia, presence of local sepsis, chemotherapy and high dose steroid were observed highly prevalent and suspected as

factors of anastomosis leakage. Best nutritional status and proper management of anemia the morbidity can be decreased. Furthermore many efforts are needed to be made to bring down the mortality and morbidity rates associated with anastomotic leak.

after rectal cancer surgery: Anastomotic complications in rectal cancer. *Annals of Medicine and Surgery.* 2015;1;4(1):11-6.

REFERENCES

1. Qureshi JN, Qureshi ZA, Ahuga P, Memon AS. Anastomotic Leakage - A Study of etiological factors *J Surg Pak* Dec 2001;6(4):22-4.
2. Moran BJ, Heald RJ. Risk factors for and management of anastomotic leakage in rectal surgery. *Colorectal Dis* 2001; 3: 135–137.
3. Docherty JG, McGregor JR, Akyol AM, et al. Comparison of manually constructed and stapled anastomoses in colorectal surgery: West of Scotland and Highland Anastomosis Study Group. *Ann Surg.* 1995;221:176–184.
4. Fingerhut A, Elhadad A, Hay JM, et al. Infraperitoneal colorectal anastomosis: hand-sewn versus circular staples. A controlled clinical trial: French Associations for Surgical Research. *Surgery.* 1994;116:484–490.
5. Fingerhut A, Hay JM, Elhadad A, et al. Supraperitoneal colorectal anastomosis: hand-sewn versus circular staples. A controlled clinical trial: French Associations for Surgical Research. *Surgery.* 1995;118:479–485.
6. Bokey EL, Chapuis PH, Fung C, et al. Postoperative morbidity and mortality following resection of the colon and rectum for cancer. *Dis Colon Rectum.* 1995;38:480–487.
7. Senn N: Enterorrhaphy; its history, technique and present status. *JAMA* 1893;21:215–235
8. Bielecki K, Gajda A. The causes and prevention of anastomotic leak after colorectal surgery. *Klin Onkol.* 1999;12(Suppl 1999):25-30.
9. Zarnescu EC, Zarnescu NO, Costea R. Updates of Risk Factors for Anastomotic Leakage after Colorectal Surgery. *Diagnostics.* 2021 Dec;11(12):2382.
10. Midura EF, Hanseman D, Davis BR, Atkinson SJ, Abbott DE, Shah SA, Paquette IM. Risk factors and consequences of anastomotic leak after colectomy: a national analysis. *Diseases of the Colon & Rectum.* 2015 Mar 1;58(3):333-8.
11. Cheng S, He B, Zeng X. Prediction of anastomotic leakage after anterior rectal resection. *Pakistan Journal of Medical Sciences.* 2019 May;35(3):830.
12. Lavanya NR, Janardhana T. A prospective study to understand the risk factors for anastomotic leak in small bowel anastomosis. *J. Evolution Med. Dent. Sci.* 2020;9(19):1549-1553.
13. El-Badawy HA. Anastomotic leakage after gastrointestinal surgery: risk factors, presentation and outcome. *The Egyptian Journal of Hospital Medicine.* 2014 Oct 1;57(1):494-512.
14. Gutema Wako, Henok Teshome, Engida Abebe. Colorectal Anastomosis Leak: Rate, Risk Factors and Outcome in a Tertiary Teaching Hospital, Addis Ababa Ethiopia, Five Year Retrospective Study. *Ethiop J Health Sci.* 2019;29(6):767
15. Zarnescu EC, Zarnescu NO, Costea R. Updates of Risk Factors for Anastomotic Leakage after Colorectal Surgery. *Diagnostics.* 2021 Dec;11(12):2382.
16. Hayden DM, Pinzon MC, Francescatti AB, Saclarides TJ. Patient factors may predict anastomotic complications