



## General Surgery

## A STUDY ON PREDICTORS OF ANASTOMOTIC LEAKS FOLLOWING GASTROINTESTINAL SURGERIES

**Dr. Om Prakash Bharti**

Senior Resident Department of GI Surgery Indira Gandhi Institute of Medical Science, Patna, Bihar

**Dr. Manish Mandal\***

Professor and Head Department of GI Surgery Indira Gandhi Institute of Medical Science, Patna, Bihar\*Corresponding Author

**ABSTRACT**

**Background:** Intestinal surgeries are the most common cases being done either in elective or emergency departments. Anastomotic leakage is a serious complication of gastrointestinal surgery resulting in increased morbidity and mortality. The goal of our study was to evaluate the significance of possible risk factors in the postoperative anastomotic leaks following GI surgeries. Timely identification of the predictors for anastomotic leaks and management will reduce significant morbidity and mortality in patients. **Materials and Methods:** The study was done in Department of Gastro intestinal Surgery, Indira Gandhi Institute Medical Sciences, Patna, Bihar, from January 2019 to February 2020. In this study, 75 cases were taken who had undergone laparoscopic/open gastrointestinal surgeries with resection and anastomosis in our hospital. The preoperative and postoperative factors identified in individual patient and analysed. Outcome of patients was recorded as mortality rate and postoperative hospital stay **Results:** In this study there were total 75 patients. Total number of males and females are 56 and 19. Mean age was 40 +/- 2 years of age. Out of 75, 28 underwent laparoscopic GI surgery and 47 underwent open surgery. Anastomotic leak occurred in 13(17.3%) patients. These risk factors should be considered before and during the surgical care of colorectal patients. The mean postoperative period for diagnosis of anastomotic leakage was 9 days range (5-16) days. Different predictors found to be significantly affecting the outcome of anastomosis were age of the patients, smoker versus non-smoker, preoperative deranged LFT, Anaemia, Hypo albuminemia, radiation and anti T.B. Type of surgery elective versus emergency, level of anastomosis small bowel and large bowel, Intraoperative blood loss. Mortality rate was 6/13 cases with AL. **Conclusion-** Anastomotic leak after large bowel resection is a very serious complication with a great impact on patient's morbidity and mortality. Detection of predictors of AL in time and proper treatment will reduce morbidity and mortality in patients undergoing GI surgeries.

**KEYWORDS :** Anastomotic leaks, Gastrointestinal surgery, risk factors, Resection anastomosis

**INTRODUCTION-**

Anastomotic leaks (AL) are potentially life threatening complications of GI surgeries. The prevalence of anastomotic leak (AL) has been reported to be between 0.5% and 21% after colon and rectal resections. 1-5 The incidence of clinically significant AL after colorectal surgeries is between 1% and 12% overall and up to 10% to 14% in low colorectal resections. The rates of morbidity and mortality significantly increase after AL, with mortality reported between 12% and 27%. The mean length of stay in the hospital for patients with AL has been described between 36 and 39 days, approximately 4 times longer than for patients without leak. Multiple reoperations and stoma creation are often necessary to control the leak, which significantly increases health risks and health care costs up to 5 times that of patients with no leak. Limited quantitative knowledge about risk factors for AL is available today despite numerous studies reporting the rate of AL.

The cause of the leakage may be multifactorial, including 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. The old patients, anaemia, malnourished with several coexisting diseases, receiving high doses steroids, after chemoradio-therapy is more prone to develop the anastomotic leakage. 6. Among other factors are male gender, anaemia, hypoalbuminemia, smoking, obesity, alcohol abuse, long duration of operation, preoperative blood transfusion and timing during duty hours 7.

To find predictors of AL following GI surgery more efficiently, a number of studies have investigated the risk factors for AL. In this study we also found the main predictors for AL.

**Materials and Methods:**

The study was done in Department of Gastro intestinal Surgery, Indira Gandhi Institute Medical Sciences, Patna, Bihar, from January 2019 to February 2020. In this study, 75 cases were taken who had undergone laparoscopic/open gastrointestinal surgeries with resection and anastomosis in our hospital. The preoperative and postoperative factors identified in individual patient and analysed. Outcome of patients was recorded as mortality rate and postoperative hospital stay Important data for this study were: age, sex, chronic disease, past surgical intervention, blood count before surgery, albumin, blood urea nitrogen, serum creatinine, liver function tests and bowel preparation.

Other relevant data were duration of the operation, blood loss during surgery and intraoperative blood transfusion, and the segment of the colon in which anastomosis was performed.

**Inclusion criteria:** All age group, Both gender. All patients having a small or large bowel resection with anastomosis and patients need bypass for unresectable diseased bowel.

**Exclusion criteria:** Patients who underwent primary closure of small perforation, Patients who were referred from other hospitals after surgery, bariatric surgery patients.

**RESULTS-**

In this study there were total 75 patients.

Total number of males and females are 56 and 19. The number of male patients were more than females

Average age group of presentation was 40 +/- 2 years of age.

Out of 75, 28 underwent laparoscopic GI surgery and 47 underwent open surgery.

Anastomotic leak occurred in 13(17.3%) patients.

The haemoglobin level range (7.5- 13gm/dL), mean Hb was 9.5 ± 1.2.

The mean serum albumin level range (2.5- 4.5gm/dL), average was 3 ± 0.20.

The serum creatinine level range (0.8- 1.9 mg/dL), average was 1.2.

Type of surgery was elective in 65 patients and emergency in 10 patients.

No bowel preparation was done on these patients operated on an emergency basis.

Bowel preparation was done in 70 patients.

Smokers are 42 patients.

LFT was deranged in 38 patients.

Intra-op blood loss was in 41 patients.

Diabetes was seen in 43 patients and Hypertension in 33 patients.

AL in open surgeries are more than lap cases.

These risk factors should be considered before and during the surgical care of colorectal patients. The mean postoperative period for

diagnosis of anastomotic leakage was 9 days range (5-16) days.

Different predictors found to be significantly affecting the outcome of anastomosis were age of the patients, smoker versus non-smoker, preoperative deranged LFT, Anaemia, co-morbidities, Hypo albuminemia, radiation and anti T.B. Type of surgery elective versus emergency, level of anastomosis small bowel and large bowel, Intraoperative blood loss. Mortality rate was 6/13 cases with AL.

## DISCUSSION-

Anastomotic leakage is one of the most feared complications of gastrointestinal surgery. It causes considerable morbidity and mortality and contributes to local tumour recurrence. Quality of life is often affected due to poor functional outcomes with high rates of permanent stoma formation. Its reported incidence ranges from 1% to 30%. In our study we found that there is a statistically significant increase of anastomotic leak in patients above 45 years. Among patient related factors, male gender is generally accepted as a risk for anastomotic leakage. Some recent studies showed that male patients, have a high risk of complications in open and laparoscopic surgery. The assessment of nutritional status were done based on two biochemical parameters, namely haemoglobin, hematocrit and serum albumin estimation. The mean value of serum albumin in these patients was 3, anemiaHb9.5g and hematocrit below 33%. However many studies reveal that both prolonged and short term malnutrition diminish anastomotic healing. Smoking and addiction were the independent risk factors associated with anastomotic leak in our study. We agree with Sultan et al<sup>13</sup>, Daams et al., Trencheva et al. These investigators found that there is highly significant anastomotic leak in smoking patients.

Type of surgery and bowel preparation were independent risk factors of anastomotic leakage in this study. We found that there is increase of anastomotic leak in patients who operated in emergency. The present study found a clinical leakage rate of 13(17.3%). This rate is at the higher level of incidence reported by several investigators which range from 2.8%- 15% Sultan et al reported 15% anastomotic leakage in their study in agree with our results. A highly statistically significant relation was found between intra operative blood loss, intra operative blood transfusion and anastomotic leak. We agree with Kirchoff et al<sup>14</sup>, Kiran et al., about this point. The effect of comorbidities, such as diabetes and atherosclerosis on local blood flow and AL, has been described in the literature. Studies reported diabetes as an independent predictor for AL. Knowledge about anastomotic level and leak rate is important for surgical planning. The level of the anastomoses has been related to clinical and physiological outcomes. The incidence of AL has often brought more in trauma patients operated in emergency.

In many studies it is estimated that malnutrition and hypoalbuminemia are a serious risk factors of AL. 9-10 In this study, emergency surgery is associated with increased risk of AL. Similar data have been reported by McDermott and Bakker in their studies<sup>11-12</sup>. This study is one of the very few prospective observational trials designed to evaluate predisposing factors for AL as the main outcome. Although some risk factors for leak have been previously reported in retrospective studies.

## CONCLUSION-

Anastomotic leak after large bowel resection is a very serious complication with a great impact on patient's morbidity and mortality. AL is still a challenge because the healing process is dependent on multiple physiological, biochemical, and morphological factors. Detection of predictors of AL in time and proper treatment will reduce morbidity and mortality in patients undergoing GI surgeries.

## REFERENCES-

1. Nasirkhan MU, Abir F, Longo W, et al. Anastomotic disruption after large bowel resection. *World J Gastroenterol.* (2006;12:2497–2504).
2. Boccola MA, Buettner PG, Rozen WM, et al. Risk factors and outcomes for anastomotic leakage in colorectal surgery: a single-institution analysis of 1576 patients. *World J Surg.* (2011;35:186–195)
3. Fouda E, ElNakeeb A, Magdy A, et al. Early detection of anastomotic leakage after elective low anterior resection. *J Gastrointest Surg.* (2011;15:137–144)
4. Milsom JW, de Oliveira O, Jr, Trencheva KI, et al. Long-term outcomes of patients undergoing curative laparoscopic surgery for mid and low rectal cancer. *Dis Colon Rectum.* (2009;52:1215–1222)
5. Vignali A, Fazio VW, Lavery IC, et al. Factors associated with the occurrence of leaks in stapled rectal anastomoses: a review of 1,014 patients. *J Am Coll Surg.* (1997;185:105–113)
6. Bielecki K and Gajda A (1999). The causes and prevention of anastomotic leak after colorectal surgery: *Klinicka onkology*; (25-30.)
7. Gorissen KJ, Benning D, Berghmans T et al (2012). Risk of anastomotic leakage with nonsteroidal anti-inflammatory drugs in colorectal surgery. *Br J Surg.* (99(5):721-7)
8. Vignali A, Fazio VW, Lavery IC, et al. Factors associated with the occurrence of leaks in stapled rectal anastomoses: a review of 1,014 patients. *J Am Coll Surg.*

- 1997;185:105–113.
9. Bakker IS, Grossmann I, Henneman D, Havenga K, Wiggers T. Risk factors for anastomotic leakage and leak – related mortality after colonic cancer surgery in a nationwide audit. *Br J Surg* (2014; 101(4):42432)
10. Boccola MA, Buettner PG, Rozen WM, Siu SK, Stevenson AR, Stitz R, Ho YH. Risk factors and outcomes for anastomotic leakage in colorectal surgery: a single-institution analysis of 1576 patients. *World J Surg* (2011;35(1):186-95)
11. Frasson M, Flor-Lorente B, Rodriguez JL, Granero-Castro P, Hervás D, Alvarez Rico MA, et al. Risk Factors for Anastomotic Leak After Colon Resection for Cancer : Multivariate Analysis and Nomogram From a Multicentric, Prospective, National Study With 3193 Patients. *Ann Surg* (2015;262(2):321-30)
12. Parthasarathy M, Greensmith M, Bowers D, Groot – Wassink T. Risk factors for anastomotic leakage after colorectal resection: a retrospective analysis of 17 518 patients. *Colorectal Dis* (2017; 19(3):288- 298)
13. Sultan R, Chawla T and Zaidi M (2014). Factors affecting anastomotic leak after colorectal anastomosis in patients without protective stoma in tertiary care hospital. *J Pak Med Assoc.* (64(2):166-70)
14. Kirchoff P, Clavien PA and Hahnloser D (2010). Complications in colorectal surgery: risk factors and preventive strategies. *Patient Saf Surg.* (4(1):5)