

EVALUATION OF FACTORS INFLUENCING LEAKAGE IN PRIMARY INTESTINAL ANASTOMOSIS WITHIN A TERTIARY CARE HOSPITAL: A CROSS-SECTIONAL STUDY.

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Abstract

Background

Intestinal anastomosis is a procedure carried out widely for various pathological conditions such as benign tumors, malignant tumors, and inflammatory conditions of a certain part of the intestine. The removal of such a part of the intestine requires the joining of the two other parts of the intestine. Postoperatively the occurrence of a leak in this joint can lead to sepsis and increase the occurrence of mortality and morbidity.

Method

The anastomosis cases of the patients at Sheikh Bhikhari Medical College, Hazaribag are studied retrospectively, and were conducted over two years. 110 cases were reviewed. Clinical and radiological examinations were recorded. The data was statistically analyzed and it was correlated with the occurrence of leakage.

Results

Among the 110 patients participating in the study it was observed that 10 patients had anastomosis leakage. 50% of the patients with leakage had diabetes. more than 70% of them had undergone either emergency surgery, with a duration of more than 2 hours, and required blood transfusion. 30% of the patients with leakage had colo-colic site surgery.

Conclusion

In the present study, it was found that patients who had undergone anastomosis with associated comorbidity, of the colo-colic region, with more than 2 hours of surgery, emergency surgeries, and the required blood transfusion during the surgery had higher chances of development of the anastomosis leakage.

Recommendation

Surgeons should critically analyze the occurrence of anastomosis leakage considering the predisposing risk factors, intraoperative conditions, and site of the surgery.

Keywords: Anastomosis leakage, postoperative complication, Risk factors

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Introduction

Intestinal anastomosis is a procedure carried out widely for various pathological conditions such as benign tumors, malignant tumors, and inflammatory conditions of a certain part of the intestine. The removal of such a part of the intestine requires the joining of the two other parts of the intestine. Postoperatively the occurrence of a leak in this joint can lead to sepsis and increase the occurrence of mortality and morbidity.

To prevent the occurrence of anastomosis leak it is necessary to determine the risk factors associated with it. According to the literature available variety of risk factors are associated with the occurrence of leakage [1,2]. It can be

due to intraoperative complications as well as the pathological condition presented before the surgery. The anastomosis can be performed by using sutures or staplers. Those performed with sutures are less expensive, easily available, and require a surgeon's expertise whereas those which are performed using staplers are expensive. After the anastomosis, the immediate leakage is a part of the healing process where the recovery is happening whereas considering the anastomosis which happens after a week of surgery can lead to morbid sepsis which increases the mortality rates [3].

The patients may show signs of abdominal pain, fever, failure of the ileum, and increased WBCs. The extent of

leakage determines the severity of these symptoms. Patients who have other comorbid conditions such as pulmonary disorders, cancer, diabetes, malnutrition, and obesity have higher chances of occurrence of such complications [4]. Such complications can be prevented with early intervention and intraoperative tests. The earlier intervention can arrest the sepsis of the adjacent organs which can lead to multiple organ failure [5].

The study aims to retrospectively analyze intestinal anastomosis cases, identifying risk factors for anastomosis leakage, especially in patients with comorbidities, emergency surgeries, longer durations, and colo-colic site surgeries, aiming to offer critical recommendations for risk mitigation in surgical practice.

Method

Study design

A cross-sectional retrospective study design.

Study setting

The anastomosis cases of the patients at Sheikh Bhikhari Medical College, Hazaribag are studied retrospectively and were conducted over two years from February 2022 to January 2024.

Participants

The cases of patients who were within the age group of 18-50 years and underwent anastomosis at the Sheikh Bhikhari Medical College, Hazaribag for removal of the intestinal or colonic part were included in this study. The patients who had sepsis or any other pathological condition besides the anastomosis site were not included in this study.

All the patients participating in the study underwent radiological and laboratory investigations and radiological investigation. Details of all the examinations were recorded. All 110 patients underwent anastomosis by a similar procedure. Hand-sewn suture of victory was used outer transmural layer and silk suture was used for the inner layer. After the surgery ultrasound sonography was performed to check the anastomosis. Also, the occurrence of inflammatory conditions such as pneumonia was considered the postoperative complications.

Sample size

To calculate the sample size for this study, the following formula was used for estimating a proportion of a population:

$$n = \frac{Z^2 \times p \times (1-p)}{E^2}$$

Where:

- n = sample size
- Z = Z-score corresponding to the desired level of confidence
- p = estimated proportion in the population
- E = margin of error

Bias

There was a chance that bias would arise when the study first started, but it was avoided by giving all participants identical information and hiding the group allocation from the nurses who collected the data.

Ethical consideration

The institutional ethics committee approved this study.

Statistical analysis

All the data obtained from the patients were arranged in a tabular format and it was subjected to statistical analysis. The chi-square method was used to determine the significance

Result

In all 110 patient data for anastomosis was studied retrospectively. 10 of them had an occurrence of anastomosis leakage while the remaining 100 did not have any such occurrence. The data obtained from the leakage group and absent leakage group was arranged separately and statistically, they were compared for various existing comorbidities, intraoperative conditions, and post-operative complications.

The average age of the patient in the absent leakage was 37 years and the leakage group had an average age of 48 years. The number of male genders was equivalent in both groups. Close analysis of the data revealed that the existing comorbidities such as diabetes mellitus, pulmonary complications, renal complications, and hypertension were higher among the patients with anastomosis leakage.

The occurrence of post-operative complications such as infection, sepsis, and inflammation of the adjacent organs was higher amongst the leakage group. The site of anastomosis also had a significant correlation with the occurrence of leakage. The majority of the patients who had leakage underwent colo-colic, ileo-ileal, and ileo-transverse colon anastomosis.

Table No. 1: Demographic profile of the study

Parameters	Anastomosis leakage group (n=10)	Anastomosis leakage absent group (n=100)	Significance of the difference
Age more than 50 years	6	34	p>0.05
Male gender	7	59	p>0.05
Higher BMI	4	14	p< 0.05

Table No. 2: Clinical findings of the study

Parameters	Anastomosis leakage group (n=10)	Anastomosis leakage absent group (n=100)	Significance of the difference
<i>Existing comorbidities</i>			
Diabetes	5	3	p< 0.05
Hypertension	3	7	p< 0.05
Renal impairment	2	1	p< 0.05
Pulmonary inflammation	1	1	p< 0.05
<i>Intraoperative conditions</i>			
Duration of the surgery more than 2 hours	7	50	p< 0.05
Emergency surgery	8	50	p< 0.05
Blood transfusion	7	40	p< 0.05
<i>Postoperative complications</i>			
Pneumonia	2	2	p< 0.05
Renal inflammation	2	1	p< 0.05
Bursting of the anastomosis	2	1	p< 0.05
Death	2	8	p< 0.05

Table No. 3: Site of the surgery

Parameters	Anastomosis leakage group (n=10)	Anastomosis leakage absent group (n=100)	Significance of the difference
Ileo-ileal	2	70	p>0.05
Jejuno-jejunal	1	3	p>0.05
Colo-colic	3	17	p>0.05
Ileo transverse colon	2	4	p>0.05
Ileo-jejunal	1	1	p>0.05
Ileo-to the end of the colon	1	3	p>0.05

Discussion

Anastomosis can have severe complications such as septic shock and multiple organ failure leading to the death of the patient. To improve the patient outcomes and survival rate of the patients it is necessary to determine the risk factors and address them according to the severity.

In this study, it was found that patients who had leakage had one or more associated comorbidities. 50% of the patients who had leakage had diabetes whereas only 3% of the patients who did not have leakage had diabetes. The difference among the number of patients who had

comorbidities was statistically significant. Similar statistics were reported in the patients participating in such a study [6,7].

There was no significant correlation obtained when the occurrence of anastomosis was compared with the surgical site of the patients. However, when observed numerically the colo-colic patients had higher chances of leakage. It was also observed that intraoperative conditions significantly influence the anastomosis leakage. Patients have emergency surgeries, had a higher duration of surgery, and those who required blood

transfusion intraoperatively had higher chances of occurrence of anastomosis leakage.

Studies with similar objectives have reported similar findings regarding the surgery site, intraoperative conditions, and post-operative complications [8,9]. Earlier intervention and prevention strategies such as diversion stoma can significantly improve the outcome of anastomosis. Anastomosis is a life-saving procedure but the associated factors need critical analysis to predict the outcomes which can improve the quality of life of the patients [10-12].

Conclusion

In the present study, it was found that patients who had undergone anastomosis with associated comorbidity, of the colo-colic region, with more than 2 hours of surgery, emergency surgeries, and the required blood transfusion during the surgery had higher chances of development of the anastomosis leakage.

Limitation

The study cohort was small to confirm the findings of the study. This study was conducted at a single institute. More such multicenter study with larger cohorts is required to confirm the findings of the study.

Recommendation

Surgeons should critically analyze the occurrence of anastomosis leakage considering the predisposing risk factors, intraoperative conditions, and site of the surgery.

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List of abbreviation

WBC- White blood cell

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Conflict of interest

The authors declare no conflict of interest.

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