

FREQUENCY OF ANASTOMOSIS LEAK IN PRIMARY REPAIR IN ILEAL PERFORATION

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ABSTRACT

OBJECTIVES

To determine the frequency of anastomotic leak in primary closure patients presenting with enteric perforation.

METHODOLOGY

Through a descriptive case series study design, 253 patients with the perforated ileum and subjected to primary closure were included and followed up post-operatively to determine the anastomosis leak.

RESULTS

The mean age of our sample was 42.2 years with a standard deviation of 8.6 years. Out of 253 patients, 70.8% were males, and 29.2% females were. The mean BMI of the study sample was $24.6 \pm 2.2 \text{ kg/m}^2$. 61.3% of patients belonged to urban settings, 41.1% were from lower socioeconomic class, and 36.4% had a middle school level education. On follow up, the anastomotic leak was recorded in 18.2% of patients.

CONCLUSION

Ileal perforation subjected to primary defect closure is the most performed surgery for treatment, with a significant number of patients developing the anastomosis leak. The frequency of anastomosis leaks is high, and other treatment strategies must be researched to reduce the burden of these complications.

KEYWORDS: Ileal Perforations, Anastomosis Leak, Primary Closure, Body Mass Index

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INTRODUCTION

There are various causes of non-traumatic ileal perforation, such as bacterial, viral, fungal, parasitic, and other diseases like Wegeners granulomatous, Crohn, and non-steroidal anti-inflammatory drugs. Common bacteria causing infection were salmonella, Yersinia and tuberculosis, while common viruses are cytomegalovirus and human immunodeficiency virus. Histoplasma is a common cause of fungal infection, while E. Vermicularis, A. Lumbricoids, and E. histolytica are common parasitic infections.^{1,2} The cause of perforation is unknown in significant numbers and is called nonspecific ileal perforation. Gram-negative aerobic and

anaerobic caused by perforation commonly at the site of terminal ileum leads to peritonitis.³ In tropical countries and the Indian subcontinent, ileal perforation peritonitis is a common medical emergency. Due to the high prevalence of tuberculosis and enteric ileal perforation peritonitis, these areas constitute the fifth most common cause of abdominal emergencies. Irrespective of modern days advanced diagnostic tools and treatment protocols, this disease has a sudden onset and short downhill course with a high death ratio; if not managed,⁴ 0.8% to 18% of perforation has been reported due to typhoid fever while in all small intestinal perforation tuberculosis accounts for 5% to 9%.⁵ Many authors suggest different procedures like primary repair and primary ileostomy in managing ileal perforation.^{6,7} Certain other procedures were single-layer repair with the omental patch, anastomosis and resection.^{8,9} Despite various management modalities, there is still high mortality and morbidity of enteric perforation because of various complications like Postoperative complications like wound infection, wound dehiscence, intra-abdominal abscess, and stricture of anastomosis site, fecal fistula, peritonitis, septicemia, ileostomy related complications, paralytic ileus, and intestinal obstruction. The present study aims to evaluate these two important entities, i.e., anastomosis leak and primary repair of ileal perforation, in relation to each other. By determining the frequency of anastomosis leak in such cases at the Department of General Surgery Hayatabad Medical Complex Peshawar. This would help us reduce the extra disease burden of anastomosis leak in our community, thus reducing the avoidable morbidity and mortality in an already complicated condition.

METHODOLOGY

A descriptive case series study was conducted in the Department of General Surgery at Hayatabad Medical Complex, Peshawar, from 13 May 2019 to 13 November 2019 after synopsis approval. 253 sample size was calculated under the WHO sample size calculator with 95% of the confidence interval and 5% of margin error. A consecutive (nonprobability) sampling technique was used. Both males and females with an age range between 15 to 60 years and with acute abdominal pain and gas shadow under the diaphragm on chest radiograph were included in the study. Postoperative referred cases to the casualty surgical unit of Hayatabad Medical Complex and postoperative cases with secondary gut leak

diagnosed on clinical examination were excluded from the study. Patients with preoperative diabetes (fasting glucose of >126mg/dL) or preoperative uremia (blood urea margin level of >20mg/dL or creatinine level >20mg/dL) or obese (BMI of >30kg/m2) or with hypertension of more than 140/90mmHg and with history of chronic use of steroids were also excluded from the study. Statistical analysis of the data was done using SPSS version 27.0 for windows. P-value ≤0.05 was considered statistically significant.

RESULTS

The study was conducted on 253 subjected to primary closure for ileal perforation. The mean age of our sample was 42.2 years, with a standard deviation of 8.6 years.

Table 1: Demographics of the Sample

Variables	Categories	Frequency	Percentage
Age Groups	25-35 years	55	21.7%
	35-45 years	108	42.7%
	45-55 years	90	35.6%
Gender	Male	179	70.8%
	Female	74	29.2%
Body Mass Index	20-23	81	32%
	25-35	74	29.2%
	25-28	98	38.7%
Residence	Urban	155	61.3%
	Rural	98	38.7%
Socioeconomic Status	Low	104	41.1%
	Middle	89	35.2%
	High	60	23.7%
Education Status	Illiterate	51	20.2%
	Middle school	92	36.4%
	High school	91	36%
	High secondary and above	19	7.5%

On follow up, among 253 patients in the surgical unit at Hayatabad Medical Complex anastomotic leak was recorded in 46(18.2%) of patients.

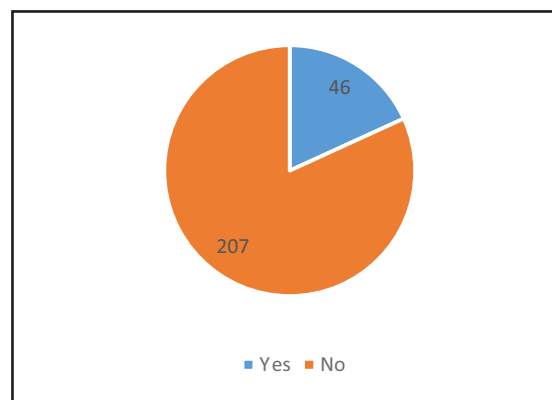


Figure:1 Shows The Frequency of Anastomosis Leak

Maximum anastomosis leak was recorded in 45-55 years old with n:25(27.8%). The P-value for age-wise stratification of anastomosis leak was 0.012, which means this stratification was statistically significant. In gender-wise stratification, on follow-up, maximum anastomosis leak was recorded in female patients (28.4%) compared to male patients (14%). The P-value for this stratification was 0.007, which means gender-wise stratification of anastomosis leak was statistically significant. There was a maximum anastomosis leak in the BMI category of 23-25 (33.8%). The P-value of BMI wise stratification was 0.001, which was

statistically significant. 38 out of 46 follow up anastomosis leak patients were from urban areas. P-value for urban wise stratification was 0.001, which means this stratification was also statistically significant. Low socioeconomic status patients reported more anastomotic leaks. The P-value for socioeconomic stratification of anastomotic leak was 0.304 higher than 0.05, so this stratification was not significant. High school education status patients came with maximum anastomosis leak, i.e., n:25. P-value was 0.011, which makes it significant.

Table 2: Variable Wise Stratification of Anostomosis leak

Variables	Categories	Anastomosis		P-Value
		Yes	No	
Age	25-35	8(14.5%)	47(85.5%)	0.012
	35-45	13(12.0%)	95(88%)	
	45-55	25(27.8%)	65(72.2%)	
Gender	Male	25(14.0%)	154(86.0%)	0.007
	Female	21(28.4%)	53(71.6%)	
BMI	20-23	8(9.9%)	73(90.1%)	0.001
	23-25	25(33.8%)	49(66.2%)	
	25-28	13(13.3%)	85(86.7%)	
Residency	Urban	38(24.5%)	117(75.5%)	0.001
	Rural	8(8.2%)	90(91.8%)	
Socioeconomic Status	Low	22(21.2%)	82(78.8%)	0.304
	Middle	17(19.1%)	72(80.9%)	
	High	7(11.7%)	53(88.3%)	
Education Status	Illiterate	6(11.8%)	45(88.2%)	0.011
	Middle school	15(16.3%)	77(83.7%)	
	High school	25(27.5%)	66(72.5%)	
	High secondary and above	0(0.0%)	19(100%)	

DISCUSSION

Ileal perforation contributes to high morbidity and mortality in developing countries where medical facilities are not readily available.^{10,11} The features mimic acute abdomen pain in febrile infections like appendicular pathologies and dengue hemorrhagic fever. Despite surgical advancement, nontraumatic ileal perforation is typically related to high morbidity and mortality. Delay in surgical intervention often accompanies rural sectors and places where medical facilities are scarce due to a lack of specific and sensitive diagnostic investigations.^{12,13} A surgical option like Simple/Primary closure, resection, and end to finish Anastomosis, Ileotransverse anastomosis, and a primary ileostomy is usually performed. Various factors play an important role in morbidity and mortality in determining the result measures in Nontraumatic ileal perforation, such as delay in presentation, anemia, hypovolemic shock, septicemic shock, faecal contamination peritoneum, age etc.^{14,15} The choice of surgical

treatment for ileal perforation remains controversial.^{3,16} The types of surgery recommended in the literature include primary repair; simple excision of the sides of the perforation and closure; wedge resection and closure; segmental resection with primary end-to-end anastomosis; and right hemicolectomy with ileocolic or ileotransverse anastomosis.³ In summary, we will say that there are two widespread surgical procedures: primary repair and intestinal resection with anastomosis. One study found no correlation between the surgical procedures adopted and mortality.^{17,18} On the other hand, some others found the mortality and morbidity rates in resection-and-anastomosis patients lower than in primary repair patients. In a study, a researcher suggested primary repair as the first treatment choice, as have others who reported a reduction in mortality.^{19,20} Although we didn't take several perforations in our study, the literature is controversial as it is suggested by many authors that mortality is not necessarily high in patients with a greater number of perforations but not

confirmed by others.²¹ However, we did not observe high mortality for male patients, although this is reported by others and attributed perhaps to the fact that males spend more time than females in outdoor activities.²² Factors that correlate with greater mortality are neutropenia and severe peritoneal contamination, as confirmed by the literature's data.²³ However, a large number of patients ultimately found to have an anastomotic leak develop a more insidious presentation, often with low-grade fever, prolonged ileus, or failure to thrive. In a systematic review of studies measuring the incidence of anastomotic leaks after gastrointestinal surgery; in the 97 studies reviewed, there were 56 separate definitions of anastomotic leak.²⁴ A leak could also be defined by the necessity for reoperation, clinical findings, or radiologic criteria, making comparisons between studies difficult or impossible. Although our leak rate (18.2%) was significantly high than what is reported in the published literature, we were surprised and disturbed by the strikingly higher rate of anastomotic leak after primary closure. Our poor performance is uncertain, although subtotal colectomy has previously been associated with an increased leak rate. We think that prospective data collection is required to determine the true incidence and presentation of anastomotic leakage more accurately. Many of these leaks are diagnosed late in the postoperative period, commonly after discharge from the hospital. Increased awareness of these more subtle leaks may allow for more timely diagnosis and treatment. Further, a prospective database with ongoing peer review allows for meaningful comparison of outcomes as definitions can be standardized, and opportunities for improvement may be identified and targeted.

LIMITATIONS

Our limitations included a descriptive study design pattern and a limited sample size of anastomotic leak patients. We recommend a study of a larger cohort of anastomotic leaks in primary closure in patients presenting with enteric perforation with a better study design.

CONCLUSION

The primary repair of Ileal perforation is the treatment of choice. Early surgery and adequate resuscitation are necessary for successfully managing patients with ileal perforation. Early repair of the perforation is a better procedure due to its cost-effectiveness and lower rate of

complications than other surgical procedures. However, the frequency of anastomosis leaks is high, and other treatment strategies must be researched to reduce the burden of these complications.

CONFLICT OF INTEREST: None

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3. **Yousaf Jan** - Drafting Manuscript
4. **Shehzad Akbar Khan** - Supervision
5. **Shimee Shahzadi** - Critical Revision