

**ORIGINAL RESEARCH**

# Unraveling the Etiopathogenesis of Non-Traumatic Intestinal Perforation: Insights from Histopathology

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**ABSTRACT**

**Background:** Non-traumatic bowel perforation is a significant surgical challenge, particularly in developing countries with limited access to medical facilities. This condition is associated with high mortality and morbidity rates. **Aim:** Present study aimed to study the etiopathological factors responsible for non-traumatic perforation of intestine and to assess the role of histopathological examination in such cases. **Material and Method:** Descriptive observational study was conducted on 120 patients undergoing laparotomy for intestinal perforation. Patients undergoing laparotomy for traumatic intestinal perforation, peptic/ duodenal perforation is encountered as etiology on laparotomy were excluded from study. **Result:** In a study of 120 cases of non-traumatic intestinal perforations in developing countries, typhoid emerged as the leading cause, along with tuberculosis, amoebiasis, and occasional malignancy. These infections predominated as the primary culprits, with the 21-30 age group and males being the most commonly affected. Notably, the small bowel, particularly the distal ileum, was the frequent site of perforation, while large bowel perforations were rarer and typically occurred in older individuals. **Conclusion:** Precise preoperative diagnosis proved challenging due to nonspecific clinical symptoms, underscoring the crucial role of histopathology in guiding effective patient management, especially in cases of infectious, inflammatory, or malignant etiologies.

**Keywords:** Intestinal perforation, Non traumatic perforation, Air under diaphragm.

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**INTRODUCTION**

Perforation is defined as an abnormal opening in a hollow organ or viscus. It is derived from latin *perforatus*, meaning "to bore through". Perforation is one of the most common etiologies of surgically treatable pain.

Perforation is said to occur when pathology has breached through all the layers of the hollow viscus with resultant escape of intraluminal contents into the peritoneal cavity and peritoneal contamination<sup>1</sup>. It is very essential to have a correct pre-operative etiological diagnosis because ultimate prognosis depends upon cause of perforation.

Generalized peritonitis due to hollow viscus perforation continues one of the commonest surgical emergency in India. Despite many advances in perioperative care, antimicrobial therapy and intensive care support, patients with peritonitis still suffer high morbidity and mortality<sup>2,3,4</sup>.

The preoperative diagnosis usually made in an endemic country except in patients who are moribund;

there has to be a high level of suspicion<sup>5</sup>. Investigation aid in diagnosis but no single investigation is diagnostic.

Various etiologies have been suggested for NTPI; however, the distribution of these etiologies across the globe is variable. In the western world it is mostly attributable to Foreign body, Crohn's disease, Primary ischemic events, and as a part of systemic disorders.<sup>5,6</sup>

The main causes of non-traumatic intestinal perforations (NTPI) as described in literature in our country are (in decreasing order of frequency) Enteric perforation, Tubercular perforation, Appendicular perforation, Amoebic perforation, Meckel's diverticular perforation, Malignant perforation, Irradiation perforation, Parasitic perforation, NSAID induced enteropathy.<sup>6-9</sup>

Less frequent causes are volvulus and gangrene, strangulated hernia with gangrene, carcinoma of alimentary canal, intussusception, biliary dysentery, gangrene caecum diverticulitis perforation, ulcerative

colitis, crohn's disease, foreign body perforation of small intestine<sup>8</sup>.

Intestine perforation is a common cause of peritonitis necessitating immediate surgical intervention. Non traumatic perforation of intestine refers to those perforations in which external trauma as an etiology has been excluded.

Different pathologies may lead to perforation of small intestine. Infection is the commonest cause of such perforation in developing countries. This includes typhoid fever and tuberculosis. Rare cases of non-traumatic perforation of small intestine due to opportunistic infection have also been reported<sup>1</sup>. The operating surgeons should thus be aware of the diverse etiologies of NTPI, which would affect the management and hence the prognosis of the patients.

Non-traumatic large bowel perforation are rare and difficult to diagnose, pre-operatively.

The majority of perforations in the colon or rectum are caused by obstruction-related complication owing to carcinoma, diverticular disease, inflammatory bowel disease, foreign body, or infections<sup>10,11</sup>.

#### AIM

1. To study the etiopathological factors responsible for non-traumatic perforation of intestine.
2. To assess the role of histopathological examination in such cases.

#### MATERIAL AND METHODS

It was a hospital based descriptive type of observational study, involving 120 patients of intestinal perforation undergoing laparotomy in the department of general surgery.

#### Inclusion criteria

All patients undergoing laparotomy for intestinal perforation.

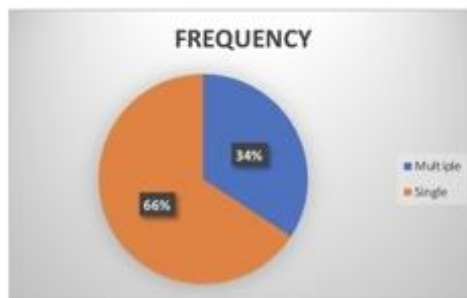
#### Exclusion criteria

- Patients undergoing laparotomy for traumatic intestinal perforation.
- Patients in whom peptic/ duodenal perforation is encountered as etiology on laparotomy.
- Patients undergoing laparotomy for iatrogenic perforation e.g. post ERCP duodenal perforation.

#### RESULTS

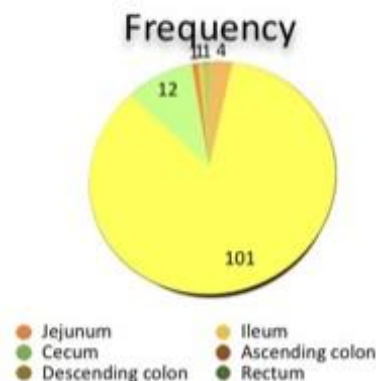
1. Of the 120 cases in our study, 65.83% (n=79) had single perforation while the rest 34.17% (n=41) had either two or more perforations.
2. The most common involved site in our study was ileum 84.17%, (n=101); while large bowel was involved in 12.5% (n=15) patients.
3. The most common histopathological report was of non-specific inflammatory pathology, 84.17% (n=101). Tubercular pathology was seen in 11.67% (n=14) patients.
4. Malignant pathology and amoebic perforation seen in older age group >40 years of age, while infectious pathology was seen in the younger age group.
5. Malignant pathology and amoebic pathology mostly present in male, 100% (n=3), 100% (n=2), respectively. Female formed 28.71% (n=29), with in the nonspecific inflammatory category and 28.6% (n=4) in the tubercular pathology.
6. While the inflammatory and infectious pathologies were mainly located in ileum, amoebic pathology involved the large bowel. Among 101 cases of ileal perforation, tubercular perforation was found 12.9%.
7. Multiple perforation formed a higher proportion of cases in amoebic pathology 100% (n=2), malignancy 66.67% (n=3), in tubercular it was 28.6% (n=4), and in typhoid it was 32.6% (n=33).

No.	FREQUENCY	PERCENTAGE
Multiple	41	34.17
Single	79	65.83
Total	120	100.00

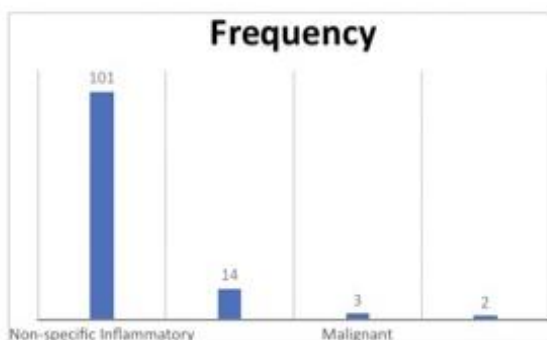


### 1. Single vs multiple perforation

Site	Frequency	Percent
Jejunum	4	3.33
Ileum	101	84.17
Cecum	12	10.00
Ascending colon	1	0.83
Descending colon	1	0.83
Rectum	1	0.83
	120	100.00



### 2. Site of perforation



HPE	Frequency	Percent
Non-specific Inflammatory	101	84.17
Tubercular	14	11.67
Malignant	3	2.50
Amoebic	2	1.67
	120	100.00

### 3. Histopathological type

#### DISCUSSION

Non-traumatic bowel perforation is a significant surgical challenge, particularly in developing countries with limited access to medical facilities. This condition is associated with high mortality and morbidity rates. This observational study focused on

patients with intestinal perforations undergoing laparotomy aimed to identify the causes of non-traumatic intestinal perforations and assess the role of histopathological examination in diagnosis.

The study analyzed 120 cases with ages ranging from 16 to 80 years, with a mean age of 39.93 years. The

most commonly affected age group was 21-30 years. This age distribution differs from Western countries, where bowel perforations primarily occur in the elderly due to factors like foreign bodies, ischemia, and Crohn's disease.

In this study, the male-to-female ratio was 2.63:1, consistent with previous research showing varying gender ratios. Male predominance in typhoid ileal perforation may be linked to differences in inflammatory responses between genders.

Most patients had single perforations, with typhoid being the leading cause of intestinal perforation (65%). Non-specific inflammation and tuberculosis were also common etiologies, while malignant and amoebic perforations were less frequent.

Gross examination of specimens revealed that the majority of perforations were in the terminal ileum, followed by the large intestine, mainly involving the cecum. Amoebic infections, affecting the cecum, were also observed, predominantly in males.

The study highlighted the importance of accurate diagnosis, which was primarily based on clinical symptoms and intraoperative findings. Immunological and culture tests had limited utility in diagnosing typhoid perforation.

This study's findings align with previous research in the field, emphasizing infectious etiologies, such as typhoid and tuberculosis, as the primary causes of non-traumatic intestinal perforations. Understanding these factors is crucial for improved diagnosis and management in regions with a higher prevalence of such conditions.

## CONCLUSION

Diagnosis of exact pathological cause of non-traumatic perforations is a challenge preoperatively. Clinical findings are usually nonspecific and definite diagnosis can be reached after histopathology that helps in proper management of patients. This is particularly helpful where etiology is infective like typhoid or tuberculosis; inflammatory like Crohn's disease or in malignant cases, especially large gut perforation.

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