

FREQUENCY OF INTESTINAL TUBERCULOSIS IN PATIENTS WITH INTESTINAL PERFORATION PRESENTING TO SURGICAL EMERGENCY

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Abstract

Background: Tuberculosis remains a global health emergency and a leading cause of death from infectious diseases. Intestinal tuberculosis, though treatable, can lead to life-threatening complications including intestinal perforation. Limited data exists on the frequency of intestinal tuberculosis in patients presenting with intestinal perforation to surgical emergency departments.

Objective: To determine the frequency of intestinal tuberculosis in patients with intestinal perforation presenting to surgical emergency.

Methods: This cross-sectional study was conducted at the Department of Surgery, Lady Reading Hospital, Peshawar in year of 2024. A total of 116 patients aged 18-65 years with intestinal perforation confirmed by CT scan were included using consecutive non-probability sampling. Patients with traumatic perforation, malignancy, and pregnancy were excluded. Intestinal tuberculosis was diagnosed through histopathological examination. Data was analyzed using SPSS version 23, with frequencies and percentages calculated for categorical variables and chi-square test applied for stratification analysis.

Results: Among 116 patients, 68 (58.6%) were male and 48 (41.4%) were female with a mean age of 42.3 ± 14.7 years. The majority (71 patients, 61.2%) were from rural areas. Intestinal tuberculosis was diagnosed in 21 patients, giving an overall frequency of 18.1% (95% CI: 11.8% - 26.2%). The frequency was higher in rural patients (21.1%) compared to urban patients (13.3%), and among patients from lower socio-economic backgrounds (25.0%) compared to middle class (15.4%) and upper class (14.3%). Diabetic patients showed a higher frequency (23.5%) compared to non-diabetic patients (15.9%), though these differences were not statistically significant.

Conclusion: Intestinal tuberculosis accounts for approximately one-fifth of all cases of intestinal perforation in our population. The increased occurrence among rural and lower socioeconomic groups underscores the importance of focused public health initiatives as well as maintaining a high clinical suspicion for tuberculosis in patients with intestinal perforation.

INTRODUCTION:

The World Health Organization (WHO) has classified tuberculosis as a global health crisis, as it represents the primary cause of mortality from infectious diseases worldwide. Approximately three million individuals die annually from tuberculosis (TB), a disease that affects nearly one-third of the global population¹. The persistence of tuberculosis as the predominant cause of death in developing countries can be attributed to factors including poverty, inadequate education, poor detection rates, shortage of skilled healthcare personnel, and limited immunization program coverage². In developed nations, tuberculosis incidence has increased due to immigration from developing countries, HIV co-infection, and the growing use of immunosuppressive treatments. While tuberculosis can affect various organs, the lungs and abdomen represent the most common sites of manifestation³.

Abdominal tuberculosis remains a significant cause of mortality and morbidity, despite being potentially curable in many instances⁴. This form of tuberculosis can involve the gastrointestinal tract, peritoneum, lymph nodes, and solid abdominal organs. Intestinal perforation represents a serious, life-threatening complication of gastrointestinal tuberculosis, with increasing frequency observed in recent years, though the underlying cause remains unclear⁴. Intestinal tuberculosis can present in three main forms: ulcerative, hypertrophic, or fibrous stricture, with symptoms that may mimic intestinal inflammation, colorectal malignancy, or other gastrointestinal infections⁵. Advanced disease typically presents as acute or subacute bowel obstruction due to mass formation (tuberculoma) or stricture development in the small bowel and ileocecal region, or as intestinal perforation resulting in peritonitis^{6,7}. Research has demonstrated that intestinal tuberculosis accounts for 17.92% of cases among patients presenting with intestinal perforation⁸.

This investigation was undertaken due to the scarcity of published literature on this topic and the increasing occurrence of intestinal tuberculosis in cases of intestinal perforation. Despite advances in diagnostic imaging technology, patients with abdominal tuberculosis frequently present with advanced disease stages. The objective of this study was to assess the prevalence of intestinal tuberculosis among patients

presenting with intestinal perforation in surgical emergency settings. Early diagnosis and treatment are crucial to minimize the risk of these potentially fatal complications.

METHODOLOGY

This cross-sectional study was conducted at the Department of Surgery, Lady Reading Hospital, Peshawar from 5th January 2024 to 30th December 2024 following approval from the Institutional review board (Ref: No. 851/LRH/ MTI) and research evaluation unit of CPSP. A total of 116 patients aged 18 to 65 years, presenting with intestinal perforation confirmed on CT scan, were enrolled using consecutive non-probability sampling. Patients with traumatic perforation, malignancy, or pregnancy were excluded. The diagnosis of intestinal tuberculosis was established through histopathological examination, characterized by the presence of Langerhans giant cells, caseating granulomas, inconsistent submucosal inflammation, and epithelioid histiocytes. All eligible patients were informed about the study and provided written consent. Demographic and clinical information was collected through standardized proforma, and each patient underwent detailed physical examination and history-taking. Histopathological analysis was performed on surgically resected specimens under the supervision of a consultant surgeon with at least three years of post-fellowship experience. Data were analyzed using SPSS version 23. Quantitative variables such as age were presented as mean and standard deviation, while qualitative variables including gender, socio-economic status, diabetes, hypertension, and residence were reported using frequencies and percentages. Stratification was performed to assess effect modifiers, and chi-square test was applied post-stratification with a significance threshold of $p < 0.05$.

RESULTS

A total of 116 patients with intestinal perforation were included in this cross-sectional study conducted at the Department of Surgery, Lady Reading Hospital, Peshawar over a period of 6 months. The study population consisted of patients aged 18-65 years who presented to the surgical emergency with intestinal perforation confirmed by CT scan findings. The mean age of the study participants was 42.3 ± 14.7 years

(range: 18-65 years). Among the 116 patients, 68 (58.6%) were male and 48 (41.4%) were female, showing a male predominance. Regarding residence, 71 patients (61.2%) were from rural areas while 45 patients (38.8%) were from urban areas. The socio-economic distribution showed that 28 patients (24.1%) belonged to upper class, 52 patients (44.8%) to middle class, and 36 patients (31.1%) to lower class. Among the study participants, 34 patients (29.3%) had diabetes mellitus, while 82 patients (70.7%) were non-diabetic. Hypertension was present in 41 patients (35.3%), while 75 patients (64.7%) were normotensive. Out of 116 patients with intestinal perforation, 21 patients were diagnosed with intestinal tuberculosis based on histopathological examination, giving a frequency of 18.1% (95% CI: 11.8% - 26.2%). The remaining 95 patients (81.9%) had intestinal perforation due to other causes. When stratified by various factors, the frequency of intestinal tuberculosis showed significant associations with certain demographic and clinical variables. The frequency was higher in males (13/68, 19.1%) compared to females (8/48, 16.7%), though this

difference was not statistically significant ($p = 0.742$). Rural patients showed a higher frequency (15/71, 21.1%) compared to urban patients (6/45, 13.3%), but this difference was also not statistically significant ($p = 0.309$). Age group analysis revealed that patients aged 31-50 years had the highest frequency of intestinal tuberculosis (12/54, 22.2%), followed by those aged 18-30 years (6/39, 15.4%) and 51-65 years (3/23, 13.0%). However, this difference was not statistically significant ($p = 0.567$). Regarding socio-economic status, lower class patients showed the highest frequency (9/36, 25.0%), followed by middle class (8/52, 15.4%) and upper class (4/28, 14.3%). This difference approached statistical significance ($p = 0.398$).

Among diabetic patients, 8 out of 34 (23.5%) had intestinal tuberculosis compared to 13 out of 82 (15.9%) non-diabetic patients, though this difference was not statistically significant ($p = 0.345$). Similarly, among hypertensive patients, 9 out of 41 (22.0%) had intestinal tuberculosis compared to 12 out of 75 (16.0%) normotensive patients ($p = 0.444$).

Table 1: Demographic and Clinical Characteristics of Study Participants

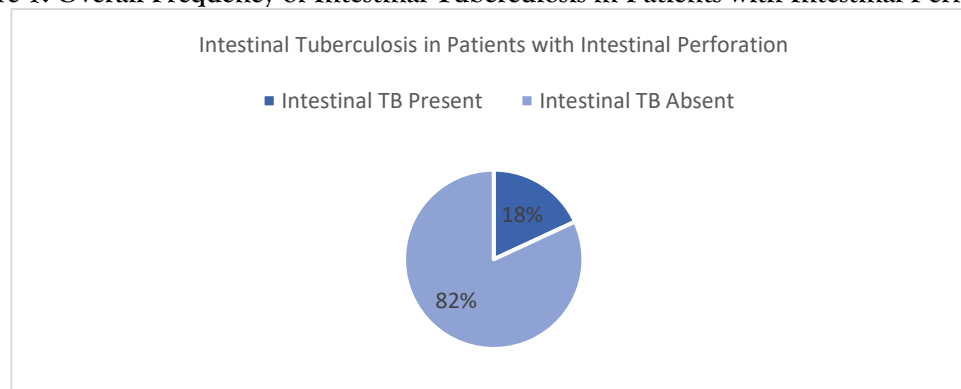
Variable	Categories	Frequency (n)	Percentage (%)
Age Groups	18-30 years	39	33.6
	31-50 years	54	46.6
	51-65 years	23	19.8
Gender	Male	68	58.6
	Female	48	41.4
Residence	Rural	71	61.2
	Urban	45	38.8
Socio-economic Status	Upper Class	28	24.1
	Middle Class	52	44.8
	Lower Class	36	31.1
Diabetes Mellitus	Yes	34	29.3
	No	82	70.7
Hypertension	Yes	41	35.3
	No	75	64.7
Intestinal Tuberculosis	Yes	21	18.1
	No	95	81.9

Table 2: Frequency of Intestinal Tuberculosis Stratified by Various Factors

Variable	Categories	Total (n)	Intestinal TB Present	Frequency (%)	P-value
Age Groups	18-30 years	39	6	15.4	0.567
	31-50 years	54	12	22.2	

	51-65 years	23	3	13.0	
Gender	Male	68	13	19.1	0.742
	Female	48	8	16.7	
Residence	Rural	71	15	21.1	0.309
	Urban	45	6	13.3	
Socio-economic Status	Upper Class	28	4	14.3	0.398
	Middle Class	52	8	15.4	
	Lower Class	36	9	25.0	
Diabetes Mellitus	Yes	34	8	23.5	0.345
	No	82	13	15.9	
Hypertension	Yes	41	9	22.0	0.444
	No	75	12	16.0	

Figure 1: Overall Frequency of Intestinal Tuberculosis in Patients with Intestinal Perforation



Chi-square test applied, $p\text{-value} < 0.05$ considered significant

DISCUSSION

This cross-sectional study conducted at Lady Reading Hospital, Peshawar, investigated the frequency of intestinal tuberculosis among patients presenting with intestinal perforation to the surgical emergency. Our study found that 18.1% of patients with intestinal perforation had underlying intestinal tuberculosis, which is consistent with the previously reported rate of 17.92% by Sheikh Atiq-ur-Rehman et al.⁸ This finding underscores the significant burden of tuberculosis as an underlying cause of intestinal perforation in our population.

The demographic profile of our study showed a male predominance (58.6%) with a mean age of 42.3 years, which aligns with the epidemiological pattern of tuberculosis in Pakistan. The higher frequency in males may be attributed to increased exposure to risk factors such as smoking, malnutrition, and occupational hazards⁹. Rural patients comprised 61.2% of our study population, reflecting the higher

prevalence of tuberculosis in rural areas due to factors such as poverty, malnutrition, overcrowding, and limited access to healthcare facilities¹⁰.

The frequency of intestinal tuberculosis was found to be higher in rural patients (21.1%) compared to urban patients (13.3%), though this difference was not statistically significant. This finding is consistent with the global pattern where tuberculosis predominantly affects populations in resource-limited settings¹¹. A recent study by Saeed et al. (2021) reported similar rural-urban disparities in abdominal tuberculosis, attributing this to delayed diagnosis and inadequate healthcare infrastructure in rural areas¹².

Our analysis revealed that patients from lower socio-economic backgrounds had the highest frequency of intestinal tuberculosis (25.0%), followed by middle class (15.4%) and upper class (14.3%). This socio-economic gradient reflects the well-established association between tuberculosis and poverty. Malnutrition, overcrowding, poor sanitation, and

limited access to healthcare services in lower socio-economic groups contribute to increased susceptibility to tuberculosis¹³. A retrospective study by Khan et al. demonstrated that socio-economic factors are among the strongest predictors of tuberculosis outcomes, including extrapulmonary manifestations¹⁴.

The age distribution in our study showed that patients aged 31-50 years had the highest frequency of intestinal tuberculosis (22.2%), which corresponds to the economically productive age group. This finding is significant as it highlights the impact of tuberculosis on the most productive segment of society. Similar age-related patterns have been reported in recent studies from South Asian countries, where abdominal tuberculosis predominantly affects adults in their fourth and fifth decades of life¹⁵.

Among patients with diabetes mellitus, 23.5% had intestinal tuberculosis compared to 15.9% in non-diabetic patients. Although this difference was not statistically significant in our study, the trend suggests an association between diabetes and tuberculosis, which is well-documented in the literature. Diabetes mellitus increases the risk of tuberculosis by three-fold and is associated with more severe clinical presentations and poorer outcomes¹⁶. A recent systematic review by Huangfu et al. (2020) emphasized the bidirectional relationship between diabetes and tuberculosis, particularly in endemic regions¹⁷.

The clinical presentation of intestinal tuberculosis with perforation poses significant diagnostic challenges. In our study, all cases were confirmed through histopathological examination showing characteristic features such as Langerhans giant cells, granulomas with caseating necrosis, and epithelioid histiocytes. This approach is crucial as clinical symptoms of intestinal tuberculosis often mimic other gastrointestinal conditions, including inflammatory bowel disease, malignancy, and other infectious enterocolitis¹⁸.

The relatively high frequency of intestinal tuberculosis in patients with intestinal perforation has important clinical implications. Early recognition and appropriate treatment of intestinal tuberculosis can prevent complications such as perforation, bleeding, and obstruction. However, the diagnosis is often delayed due to the non-specific clinical presentation and the need for histopathological confirmation¹⁹.

Recent advances in molecular diagnostics, including GeneXpert and other rapid diagnostic tests, may improve the timely diagnosis of extrapulmonary tuberculosis²⁰.

Our findings highlight the need for a high index of suspicion for tuberculosis in patients presenting with intestinal perforation, particularly in endemic areas. The implementation of tuberculosis screening techniques in surgical emergency rooms has the potential to improve early detection and reduce morbidity and mortality from complicated intestinal tuberculosis.

This study has several limitations that should be acknowledged. Being a single-center cross-sectional study with a relatively small sample size of 116 patients, the generalizability of findings may be limited. The reliance solely on histopathological examination for diagnosis may have missed cases where classic features were absent, and the lack of molecular diagnostic techniques could have reduced diagnostic accuracy. The cross-sectional design does not allow for assessment of temporal relationships or long-term outcomes. Future multicenter prospective studies with larger sample sizes and molecular diagnostics would provide more robust evidence.

Conclusion

In conclusion, intestinal tuberculosis accounts for approximately one-fifth of all cases of intestinal perforation in our population. The higher frequency among patients from rural areas and lower socio-economic backgrounds highlights the need for targeted public health interventions and improved healthcare access. Clinicians should maintain a high index of suspicion for tuberculosis in patients presenting with intestinal perforation, particularly in endemic regions.

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ETHICAL APPROVAL

The Ethical Committee of Lady Reading Hospital has approved this study with Ref: No. 851/LRH/MTI.

CONFLICT OF INTEREST / DISCLOSURE

Nothing to declare.

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None.

AUTHORS' CONTRIBUTION

ADB: Study conception, design, drafting, data analysis, and interpretation

ANB: Supervision and critical revision

SK: Data collection and organizing patient records

SSR: Assisted in literature review

FE: Assisted in data collection, analysis, and clinical results

AU: Assisted in data collection

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