

A PROSPECTIVE COHORT STUDY OF INTESTINAL OBSTRUCTION DUE TO TUBERCULOSIS.

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Abstract

Introduction

Intestinal tuberculosis-related bowel obstruction is notably prevalent in underdeveloped nations. This study aims to explore the factors leading to suboptimal patient outcomes and to detail the surgical treatments, clinicopathological features, and prognoses of tuberculous intestinal obstruction in affected communities.

Methods

The prospective cohort study spanned 15 months at MGGMC & LSK Kishanganj, involving 123 patients treated surgically for tuberculous intestinal obstruction. Ethical approval was secured from the relevant authorities. Data analysis was performed using SPSS version 17.0, employing techniques such as descriptive statistics, chi-square tests for categorical data, and multivariate logistic regression to identify predictors of surgical outcomes.

Results

The study comprised 123 tuberculosis-related intestinal obstruction patients. Men outnumbered women 1.8 to 1. The median was 11–67 years old. The average age was 21–30. HIV-positive individuals had a median CD4+ count of 225 cells/μl, with 26.3% additionally having pulmonary tuberculosis. 58.5% of patients underwent emergency surgery, and 41.5% had elective surgeries. The most common operative findings were small bowel strictures (72.9%), followed by bands and adhesions (16.9%).

An ileo-transverse anastomosis and right hemicolectomy were the most common surgeries at 55.9%. All patients received antituberculous drugs for a year after surgery. Surgical site infection (SSI) was the most common postoperative complication at 37.3% in 42.8%. HIV-positive status and low CD4+ count were the best predictors of SSI ($p < 0.001$).

Conclusion

Tuberculous intestinal obstruction is highly prevalent and increases morbidity and mortality in the area, with patients often seeking help at advanced disease stages. Early diagnosis and effective treatment require heightened awareness, thorough evaluation, and proactive management.

Recommendation

Upon potential exposure to tuberculosis, it is critical to regularly monitor for symptoms, understand associated risks, and adhere to recommended preventative strategies.

Keywords: Intestinal tuberculosis, Bowel obstruction, Clinicopathological profile.

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Introduction

Globally, tuberculosis (TB) is a prevalent and significant issue that is caused by the bacteria *Mycobacterium tuberculosis* [1]. Roughly three million people worldwide pass away from this illness each year, accounting for nearly one-third of all infections [1,2]. Because of rising living standards, tuberculosis incidence has decreased in developed nations [3]. However, HIV infection, the increased use of immunosuppressive medications, and the inflow of

immigrants are all contributing to the resurgence of tuberculosis in wealthy countries [4]. Due to a combination of factors, including poverty, overcrowding, inadequate sanitation, hunger, misinformation, and the presence of emerging diseases like AIDS in underdeveloped countries, TB is the primary cause of death [5]. 98% of deaths and 95% of new cases occur in developing nations [6, 7]. Any portion of the body might be affected by tuberculosis. However, after the lungs, the abdomen is most frequently impacted. The peritoneum, lymph nodes, solid viscera, and gastrointestinal system can all be affected by abdominal tuberculosis [8].

The intestines can get infected by milk products, Mycobacterium-infected lymph nodes, or consuming bacilli from infected sources. The infection can also be brought on by miliary TB or hematogenous spread from a primary lung focus that reactivates later [9].

Page | 2

One of the three primary types of intestinal tuberculosis—hypertrophic, ulcerative, or ulcerohypertrophic, and fibrous stricturing form—usually manifests [10,11]. The illness can mimic several gastrointestinal conditions, including infections, colon cancer, and inflammatory bowel disease [12].

It typically progresses slowly and manifests later in life with difficulties, particularly acute or subacute intestinal blockage brought on by stricture formation in the ileocaecal area or small intestine or by a gut perforation that results in peritonitis [13, 14]. The specific and non-specific symptoms of abdominal TB make it challenging to diagnose the disease early, even with advancements in medical imaging [15]. Patients typically show up when problems such as intestinal blockage or perforation have occurred. Obstruction from adhesions, hyperplastic caecal TB, or numerous small intestine strictures is the most common adverse effect of abdominal tuberculosis. Emergency surgery is required to confirm the diagnosis or relieve obstruction [15,16].

Surgery and anti-tuberculous medication are used as postoperative treatments for intestinal blockage caused by tuberculosis [15,17].

Aim of the Study

The objective of this study was to describe the clinicopathological characteristics, surgical care, and result of tuberculous intestinal obstruction in the community and to pinpoint the causes of the unfavorable outcomes seen by these patients. Also, wanted to share the experiences in treating intestinal tuberculosis-related bowel obstruction.

Methodology

Study Design

The study utilized a prospective descriptive cohort study design.

Study Setting

123 patients at Mata Gujari Memorial Medical College and Lions Seva Kendra Hospital, Kishanganj, Bihar, India, had surgery for tuberculous intestinal blockage. This teaching and tertiary care hospital for the health sciences conducted this study from January 2023 to March 2024.

Study Population

A total of 123 patients who have undergone surgery for tuberculous intestinal blockage are there in the present day.

Inclusion Criteria

The study involved the sequential enrollment of all patients who underwent intestinal obstruction surgery during the study period and whose surgical and histological results suggested TB.

Exclusion Criteria

Exclusion criteria for a study on intestinal obstruction due to tuberculosis typically involve excluding patients with previous abdominal surgery, co-existing medical conditions, concomitant gastrointestinal disorders, immunocompromised status, pregnancy, age restrictions, and non-tuberculous causes of obstruction.

Bias

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

Statistical Analysis

SPSS version 17.0 for Windows (SPSS, Chicago IL, U.S.A.) was used for the statistical analysis. The summaries for categorical variables were proportions and frequency tables, while for continuous data, the mean \pm standard deviation (SD), median, and ranges were calculated. The significance of the connection between the dependent (outcome) and independent (predictor) factors in the categorical variables was assessed through the application of the chi-square (χ^2) test. Set at $P < 0.05$ was the significance level. Multivariate logistic regression

analysis found predictive indicators for hospital stays, surgical complications, and mortality.

Ethical Consideration:

Page | 3 Before the study started, the institutional ethics review committee approved it for conducting it. For HIV testing and research, patients had to sign a written informed permission form.

Results

During the research period, 900 patients were taken to the center and received laparotomies for different abdominal diseases. 547 patients had laparotomies for intestinal blockage. Intestinal TB, verified by histology in 149

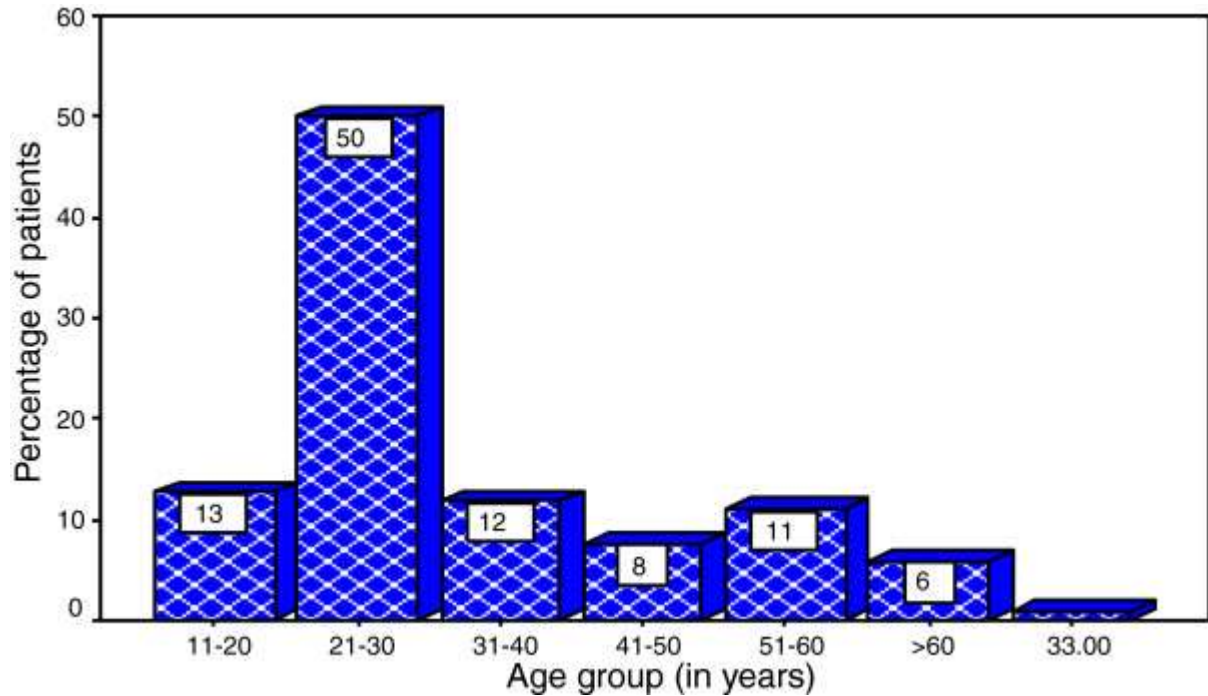
individuals out of 547, was the underlying cause of blockage. As a result, 31 patients were deemed ineligible for inclusion in the trial. Consequently, 123 out of 547 patients, or 22.4% of the cases, were enrolled in the research.

A ratio of 1.8:1 indicated that there were 35.6% female and 64.4% male participants. When they were first seen, the patients' ages ranged from 11 to 67, with a median age of 25. (Figure) 1 shows that the peak age incidence between 21 and 30 years old was reached by 0% of cases. Ages under 40 made up the majority of patients (74.6%). Seventy-seven percent of the patients had yet to complete their formal education, and over seventy-five percent were unemployed. More than 80% of patients did not have health insurance, and the majority (72.9%) came from rural areas near the research area (Table 1).

Table 1- Socio-demographic characteristics of study population

Social Characteristics	Percentage
Gender	
- Male	64.4%
- Female	35.6%
Age (Median)	25 years
Uneducated	77.0%
Educated	33.0%
Employed	25.0%
Unemployed	75.0%
Residence	
- Rural	72.9%
- Urban	27.1%
HIV-positive	21.2%
HIV-positive with risk factors	80.0%

Figure 1- Patient's Distribution based on age group.



Patients with acute intestinal obstruction accounted for 51.5% of cases, sub-acute intestinal obstruction for 28.8%, peritonism symptoms for 13.6%, and abdominal masses for 5.1% of cases. The most prevalent symptom, which showed up in every patient, was abdominal pain

(Table 2). In this study, diabetes mellitus, hypertension, bronchial asthma, and rheumatic heart disease were the pre-morbid medical conditions that were related to 10.2% of the patients.

Table 2- Patient's Distribution According to Clinical Presentation.

Clinical Presentation	Percentage
Abdominal pain	100%
Constipation	72.9%
Vomiting	83.1%
Fever	61%
Weight loss	67.8%
Diarrhea	21.2%
Abdominal distention	52.5%
Abdominal tenderness	69.5%
Features of peritonism	13.6%
Abdominal mass	5.1%

HIV-positive individuals made up 21.2%. Of these, 32.0% of the patients were known to be receiving antiretroviral therapy (ARV), while the remaining 68.0% were receiving their diagnosis for the first time (Table 3). Eighty percent of people who tested positive for HIV also had risk factors for the virus. Among these, it was found that being intoxicated (Odds Ratio 14.7, 95% C.I. (7.2-19.3), $p = 0.011$) and having multiple sexual partners

(Odds Ratio 9.5, 95% C.I. (4.8-14.4), $p = 0.001$) were independently and substantially associated with an increased risk of HIV infection (Table 4). All the patients had an exploration of the abdomen. (58.5%) patients were operated on an emergency basis while (41.5%) of patients had elective surgery. Operative findings of tuberculous intestinal obstruction are depicted in (Table 5).

Table 3- Characteristics of Patients with HIV and Surgical Procedures.

HIV Status	Percentage
HIV-positive	21.2%
Receiving ARV	32.0%
Newly Diagnosed HIV	68.0%
HIV with Risk Factors	80.0%
Abdominal Exploration	100%
Emergency Surgery	58.5%
Elective Surgery	41.5%

Table 4- Risk Factors Associated with Increased HIV Infection Risk.

Risk Factors	Odds Ratio	95% C.I.	p-value
Intoxication	14.7	(7.2-19.3)	0.011
Multiple Sexual Partners	9.5	(4.8-14.4)	0.001

Table 5- Distribution of Patients based on operative findings.

Operative Findings	Percentage
Enlarged mesenteric lymph nodes	1.7%
Small bowel strictures (single/multiple)	72.9%
Ileocaecal mass	3.4%
Bands and adhesions	16.9%
Bowel strictures and perforation	5.1%

An ileo-transverse anastomosis and right hemicolectomy were the most common surgeries at 55.9%. All patients received anti-tuberculous drugs for a year after surgery. Surgical site infection (SSI) was the most common postoperative complication at 37.3% in 42.8%. HIV-positive status and low CD4+ count were the best predictors of SSI ($p < 0.001$).

Discussion

According to the research, tuberculosis (TB) accounted for 22.4% of the cases of bowel obstruction; this figure is similar to the 21.8% [18]. This figure holds greater significance when compared to earlier studies [19]. The various research contexts' variations in risk factors and the prevalence of tuberculous complications, such as bowel obstruction, are reflected in the prevalence of tuberculous

intestinal obstruction. The research on tuberculous intestinal obstruction rates may have underestimated the severity of the problem due to the significant patients who were removed from the study.

This study revealed that men were more affected than women with a ratio of 1.8:1, with 64.4% male and 35.6% female participants. This skew towards male participants might indicate a gender-specific susceptibility or healthcare-seeking behavior [20]. According to some employees, males in poor nations are more likely than women to get sick. [21]. The median age of patients was 25 years, with the majority falling below the age of 40, suggesting a younger demographic affected by intestinal TB.

The most common symptoms reported included abdominal pain (100%), constipation (72.9%), vomiting

(83.1%), fever (61%), and weight loss (67.8%). These symptoms provide insight into the clinical presentation of intestinal TB and its overlap with other gastrointestinal conditions.

Similar to tuberculosis in other parts of the body, intestinal tuberculosis strikes young people who are at the height of their productive lives [22]. This finding is supported by the study, which shows that most of the patients were forty or younger, with the most significant age incidence occurring in the later decades of life. This aligns with other researchers' findings [16, 23]. When people in this age range present with tuberculous bowel obstruction, the working and producing class of society is replaced by sick and unwell people, which has a significant influence on the productivity and economics of the country.

It has been noted that individuals with lower socioeconomic positions are more likely to get intestinal blockage as a result of tuberculosis [24]. The investigation, which revealed that most patients had only completed elementary school or had never attended formal schooling and that over 75% were unemployed, supports this conclusion. Most of the patients in this study were from rural areas distant from the study area, and more than 80% did not have recognized health insurance. Others have made similar observations [10, 24]. These statistics highlight the socioeconomic challenges faced by the population affected by intestinal TB, which could influence access to healthcare and treatment outcomes.

Regarding HIV, 21.2% of patients were HIV-positive, with 80.0% having associated risk factors. Statistical analysis revealed significant associations between HIV infection and certain risk factors, such as being intoxicated (Odds Ratio 14.7, $p = 0.011$) and having multiple sexual partners (Odds Ratio 9.5, $p = 0.001$), emphasizing the importance of preventive measures and targeted interventions in at-risk populations.

Operative findings indicated that small bowel strictures (72.9%) and bands/adhesions (16.9%) were the most common. Emergency surgery was performed in 58.5% of cases, suggesting the severity and urgency of the condition in many patients. Postoperative complications, notably surgical site infections (37.3%), were observed, with HIV-positive status and low CD4+ count identified as significant predictors ($p < 0.001$).

The late presentation of the research may have resulted from the non-specific and hazy symptoms that characterize early-stage intestinal tuberculosis. Consequently, patients endure protracted periods without a diagnosis, receive treatment just for symptoms, and subsequently exhibit consequences such as a sub-acute or acute intestinal blockage.

According to the research, pulmonary TB was discovered in a total of 23.7% of cases, a percentage similar to that reported by Baloch et al. [25]. However, some reports [10,26] have indicated more significant numbers of concomitant pulmonary tuberculosis. The causes of these variations were not documented in any literature.

Overall, the study provides comprehensive statistical data on the epidemiology, clinical presentation, and outcomes of intestinal TB, highlighting the need for tailored interventions addressing socioeconomic factors, comorbidities like HIV, and postoperative complications to improve patient care and outcomes.

In the current setting, self-discharge by patients against medical advice is acknowledged as an issue. Poor follow-up visits following hospital discharge continue to be a concern. These problems are frequently brought on by ignorance, poverty, and a remote location from hospitals.

Generalizability

While the study provides valuable insights into the epidemiology, clinical presentation, and outcomes of intestinal TB and associated factors within its specific context, caution should be exercised when generalizing the results to other populations or settings. Replication studies in diverse populations and settings would help enhance the external validity of the findings and provide a more comprehensive understanding of the disease and its determinants.

Conclusion

In the current setting, bowel blockage due to intestinal tuberculosis (TB) is a typical surgical emergency involving the abdomen and a primary cause of high morbidity and mortality. Because of the high frequency of the disease, this area has high rates of morbidity and mortality, early age at presentation, delayed presentation, and poverty. To reduce the morbidity and mortality linked to this condition, a high index of suspicion, appropriate examination, and therapy trial are necessary for an early diagnosis and prompt, effective treatment in suspected patients. The study's conclusions about the variables associated with higher morbidity and death rates must be considered.

Nevertheless, in spite of these drawbacks, the research has produced local data that medical professionals can use to organize preventive measures and create management protocols for these individuals. Addressing the issues surrounding their management in the current setting is necessary to provide the best care possible for patients suffering from tuberculous bowel obstruction.

Limitations

This study's main limitations were the significant number of follow-up losses, the delayed histological confirmation of tuberculous intestinal blockage, and the delayed presentation.

Recommendation

We recommend checking yourself regularly when exposed to tuberculosis patients and being aware of all the consequences and prevention.

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Conflict of Interest

The authors say they don't have any conflicting interests.

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