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Incidence of Abdominal Tuberculosis in patients of Acute Abdomen Presenting with Intestinal Obstruction- A Prospective Observational Study in a Tertiary Care Centre of Eastern India.

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Abstract:

Introduction: Abdominal tuberculosis presenting as acute surgical emergency continues to be a major issue in developing countries including India. Being an indolent disease with varied presentation, there is a need to describe the epidemiology, clinicopathological nature of the disease. Hence, this study is intended to find the incidence of abdominal tuberculosis among patients presenting with acute surgical emergency, and to establish the various spectrum of clinical presentation, diagnostic modalities available, treatment options of abdominal tuberculosis.
Methods: This prospective observational study was conducted in department of Surgery, SCB Medical College and Hospital, Cuttack from March 2021 to October 2022. All consecutive patients aged more than 18yrs presenting to emergency department with features of intestinal obstruction are taken into the study. Diagnosis is made on the basis of thorough clinical history, examination and relevant radiological investigations. All patients were managed according to the standard institutional protocol. Patients with confirmed case of abdominal tuberculosis were recorded and treated as per DOTS protocol.
Results: A total of 100 patients of acute surgical emergency were included in the study. Of which 35% were belonging to the 6^{th} decade of life. 42% were male and 58% were female. 25% of the patients had hypertension, 18% had diabetes and 2% were HIV positive. The overall post-operative complication rate was 24% with surgical site infection being the most frequent. The mean length of hospital stay was 10.45±3.62 days. Of the total patients, eleven patients were confirmed to have abdominal tuberculosis. Amongst these, four had associated pulmonary tuberculosis. The mean age of them was 43.54±13.34 years, with a minimum age of 18 years and maximum age of 56 years. Seven patients (63.6%) were females and the reminding four patients (36.36%) were male. The most common intra-operative pathology found was ileal stricture seen in 54.54%. The mortality rate among patients with abdominal tuberculosis was 18.18%.
Conclusion: Abdominal tuberculosis presenting as acute abdomen continues to challenge surgeons even in the 21st century. Majority in the developing countries present late with varied complications. A high index of clinical suspicion is required for timely diagnosis to reduce the mortality and morbidity of the disease.
Keywords:
Tuberculosis, acute abdomen, intestinal obstruction, laparotomy, infectious disease .

INTRODUCTION:

Tuberculosis caused by Mycobacterium tuberculosis is a disease of great antiquity and for a long time it has maintained its evil reputation and being one of the greatest killer diseases of the mankind. Tuberculosis detected as far back as 10000BC, still remain a major public health problem worldwide[1].Seventy five percent of tuberculosis cases in developing countries is in the economically productive age group (15-50 years). Despite the fact that Bacilli Calmette Guerrin (BCG) vaccination is given at birth all over the country., Tuberculosis still remains the biggest killer disease in India. The twin disaster of dual infection with Human Immuno deficiency virus (HIV) and

tuberculosis in the 1990's has resulted in the resurgences of tuberculosis[1]. This cursed duet is on the rampage worldwide. Tuberculosis is a major opportunistic infection in HIV patient. with 10-fold increased risk of developing tuberculosis. Tuberculosis is an important socio-economic problem in our country and it is closely linked with health education, health consciousness, and preventive awareness. Because of effective control measures abdominal tuberculosis has become rare, but it is still quite common in our country than other non-specific granulomas. The symptom of abdominal tuberculosis is generally vague and non-specific. It may mimic any intra-abdominal disease and can challenge the diagnostic skills. Tuberculosis of the Ileocecal region ranks first in incidence among intestinal / abdominal tuberculosis[2]. Abdominal tuberculosis can affect the gastro intestinal tract; peritoneum lymph nodes or the solid viscera including spleen and occasionallypancreas.

Some patient will require immediate surgical intervention, whereas other will improve with conservative treatment. Mortality rate has reduced to 6% from 20- 50% after introduction of anti-tubercular chemotherapy. Surgical management of tuberculosis (intestinal tuberculosis) has changed considerably from bypass operations, hemicolectomy to conservative resection and stricturoplasty . The aim of surgery in case of intestinal tuberculosis is to overcome deleterious effect ofthe disease like tissue disorganization, obstruction and perforation.

Understanding the clinical presentation will enable to surgeon to diagnosis this disease with a high index of clinical suspicion at an early stage to prevent disastrous complications.

Hence, this study is intended to find the incidence of abdominal tuberculosis among patients presenting with acute surgical emergency, and to establish the various spectrum of clinical presentation, diagnostic modalities available, treatment options of abdominal tuberculosis.

METHODOLOGY

STUDY TYPE- Prospective observational study

Time period of study - March 2021 – October 2022

Place of study – Department of General Surgery, SCBMCH CUTTACK

Sample size -100

All patients aged more than 18yrs presented to emergency department with features of intestinal obstruction are taken into the study. Diagnosis is made on the basis of thorough clinical history and examination. Then all patients are subjected to routine investigations, Xray Abdomen erect and USG abdomen and pelvic and other investigations like CT abdomen , Barium study ,biopsy and peritoneal fluid analysis also considered. All newly diagnosed cases will be treated with Antitubercular drugs. Then all patients are observed clinically for first 7days and subsequent follow-up done after 30days,60days and every 3monthly for 6months.

INCLUSION CRITERIA: All the Adult patients with Acute abdomen presenting with intestinal obstruction.

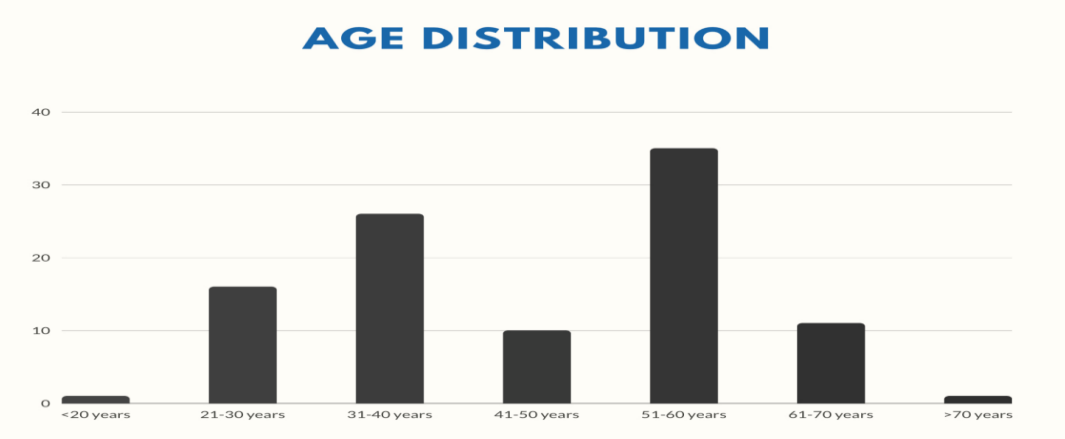
EXCLUSION CRITERIA: 1. Patients below 18-years of age.
2. Patients with GIT Malignancies.

Initially, all patients were resuscitated at the ER with fluid replenishment, electrolyte correction, nasogastric aspiration, urinary catheterisation and broad-spectrum antibiotics. Preoperative evaluation included a complete hemogram, renal and liver function tests, erythrocyte sedimentation rate (ERS) and HIV testing via rapid screening test. Radiological investigations including plain radiograph of abdomen and pelvis, chest, ultrasonography of abdomen and pelvis, and contrast enhanced computed tomography (CT) of the abdomen was performed where warranted. With a documented indication, all patients underwent exploratory laparotomy with a midline incision. The intraoperative findings were noted, tissue samples sent for histopathological study. Patients either underwent a diversion ostomy, resection and anastomosis or band excision with adhesiolysis as necessitated. Post operatively patients were either monitored in the intensive care unit or the surgical care unit until recovery based on institutional protocol. Final diagnosis was confirmed based on intra operative findings and histopathological results. With the confirmation of tuberculosis, all the patients were started on anti-tubercular therapy based on Revised National Tuberculosis Control Programme (RNTCP). The drugs included Rifampicin, Isoniazid, Pyrazinamide and Ethambutol. The entire patient's data such as age, sex, socio economic details, symptomatology, investigations, intra operative finding, histopathological study, post operative complications (Clavien-Dindo > 2), length of hospital stay and mortality were recorded.

STATISTICAL ANALYSIS:

All the variables were tabulated and analysed for their statistical significance. The chi-square test procedure tabulates a variable into categories and computes a chi-square statistic. This goodness-of-fit test compares the observed and expected frequencies in each category to test either that all categories contain the same proportion of values or that each category contains a user-specified proportion of values.

The independent samples T test procedure compares means for two groups of cases. Ideally, for this test, the subjects should be randomly assigned to two groups, so that any difference in response is due ti the treatment (or lack of treatment) and not to other factors. All statistical calculations were performed using the software SPSS for Windows (Statistical Presentation System Software, SPSS Inc, version 20.0)



RESULT:

A total of 100 patients of intestinal obstruction were taken for the study.

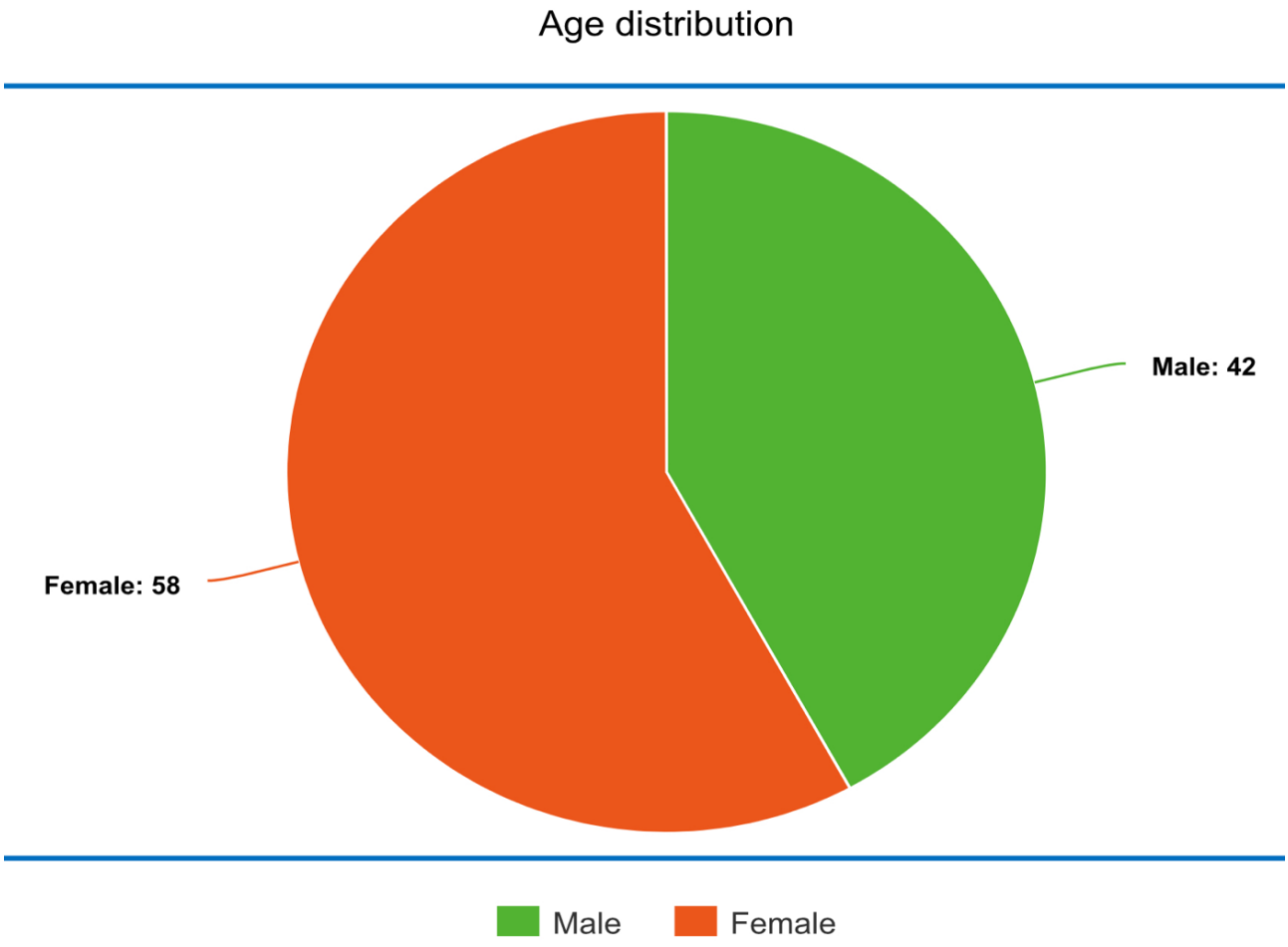
1)Age Distribution:

Age group	**Population**	**Percentage**	**Male: Female**
< 20 years	1	1%	0:1
21-30	16	16%	8:8
31-40	26	26%	10:16
41-50	10	10%	6:4
51-60	35	35%	17:18
61-70	11	11%	1:10
>70	1	1%	0:1

The mean age of the patient cohort was 45.21 ± 13.39 SD

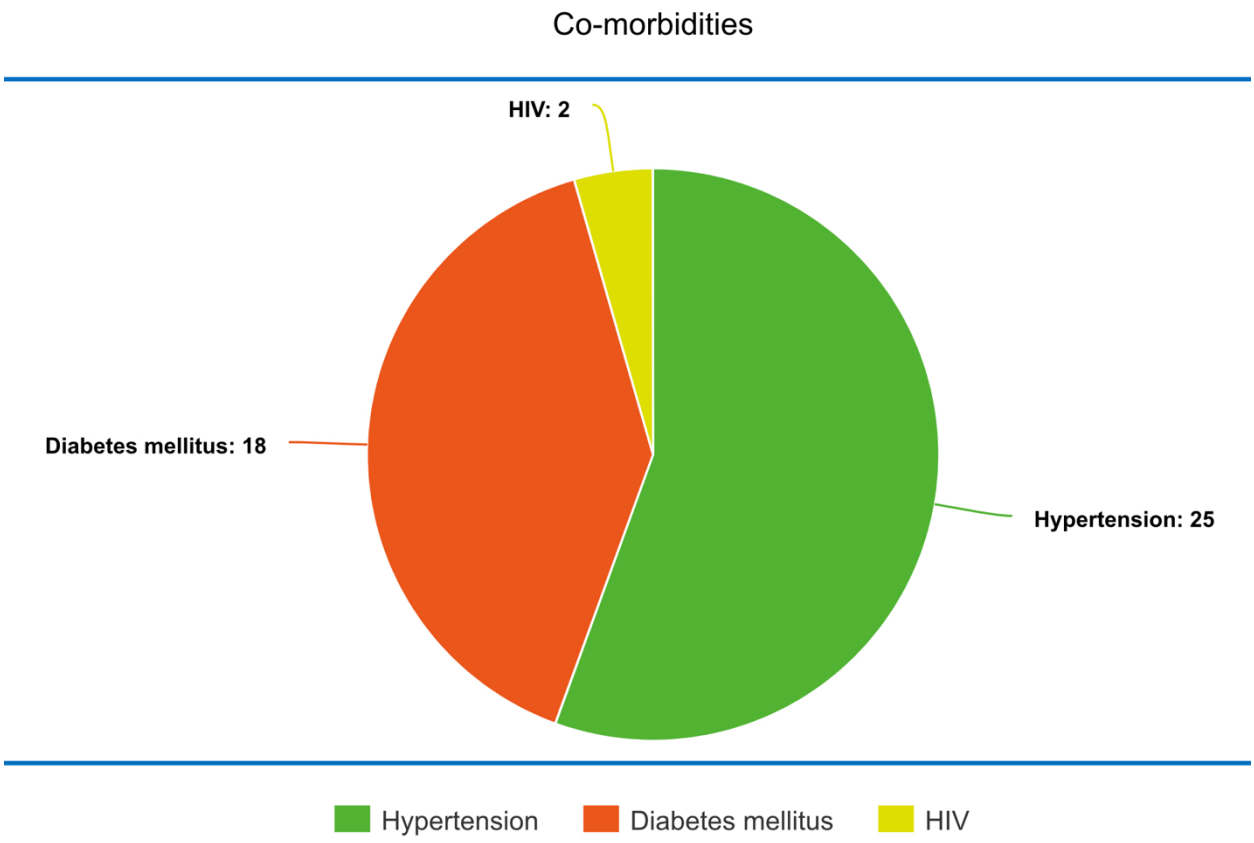
2)Sex distribution:

Male: 42
Female: 58
Male: Female = 1:1.4



3)Distribution of Co-morbidities:

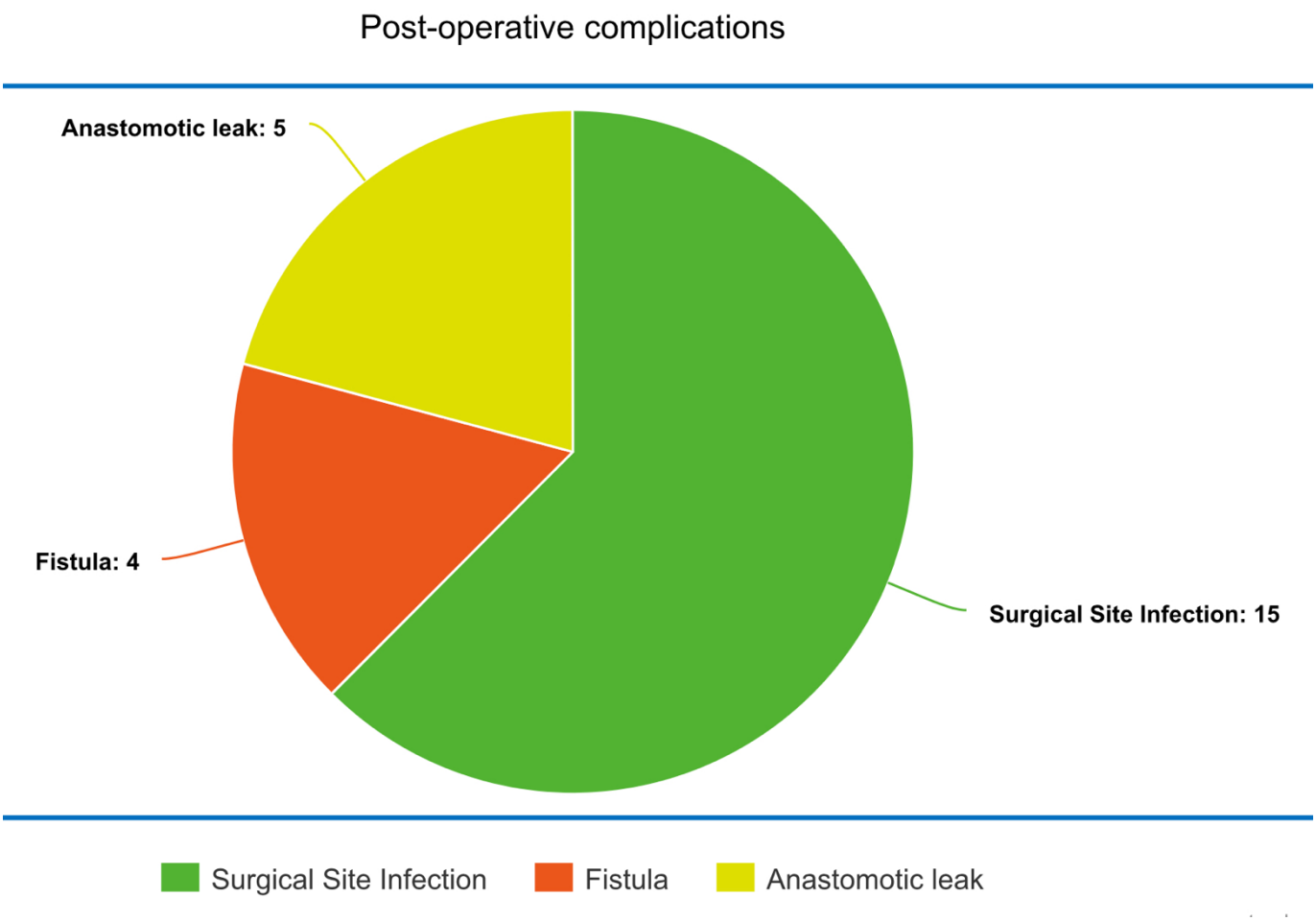
Co-morbidity	**Incidence**
Hypertension	25%
Diabetes mellitus	18%
HIV	2%



4)Distribution of post-operative complication:

The incidence of post-operative complications was 24 %

Post-operative complication	**Occurrence**	**Percentage**
Surgical site infection	15	15%
Fistula	4	4%
Anastomotic leak	5	5%



5)Length of Hospital Stay:

The mean length of hospital stay was 10.45 ± 3.62 SD

6)Mortality Rate:

The mortality rate of our patient series is 17%

7) Association between presence of diabetes as a co-morbidity with mortality:

	Alive	**Dead**	
No Diabetes	70	12	P =0.18
Diabetes present	13	5	

Diabetes did not have a statistically significant association with mortality among patients of acute abdomen undergoing exploratory laparotomy, with p value being 0.18.

8) Association between presence of hypertension as a co-morbidity with mortality:

	Alive	Dead	
No hypertension	63	12	P = 0.76
Hypertension present	20	5	

There is no statistically significant association between hypertension as a co-morbidity with mortality among patients of acute abdomen undergoing exploratory laparotomy, with p value being 0.76.

9)Association between post-operative complications with mortality:

	Alive	**Dead**	
No post-operative complication	64	12	P =0.54
Post-operative complication present	19	5	

Occurrence of post operative complications did not have a statistically significant association with mortality, with p value being 0.54.

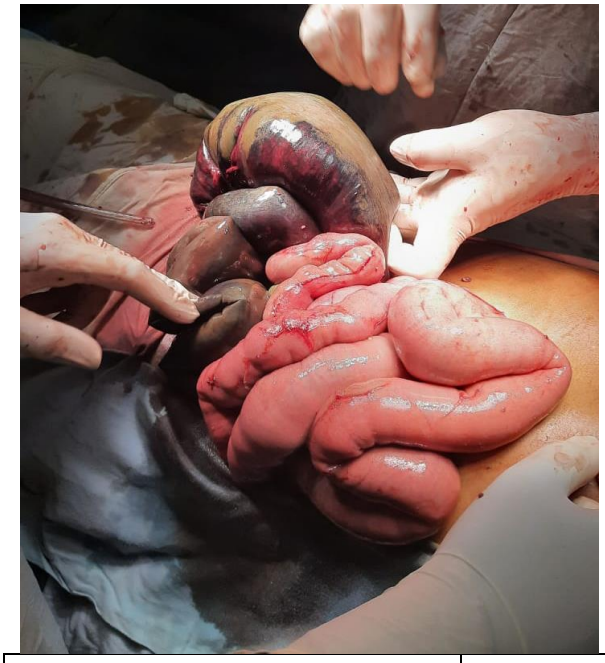
10) Distribution of anemia and raised ESR:

Anemia	**Occurrence**	**Percent**
Present	68	68%
Absent	32	32%

ESR	**Occurrence**	**Percent**
Normal	27	27%
High	73	73%

11)Intra-operative findings:

Intra operative findings	**Occurrence**	**Percent**
Splenic flexure growth	2	2%
Sigmoid volvulus	15	15%
Sigmoid growth	5	5%
Ileo sigmoid knotting	5	5%
Hepatic flexure growth	8	8%
Ileal perforation	10	10%
Cecal growth	3	3%
Appendicular perforation and cecal gangrene	11	11%
Appendicular perforation with cecal perforation	9	9%
Ileal stricture	9	9%
Intussusception	6	6%
Recto sigmoid growth	5	5%
Bands and adhesions	18	18%



Multiple strictures with ascites	2	2%
Bands with meckel diverticulum	1	1%

Figure 1: Intraoperative finding of intussusception.

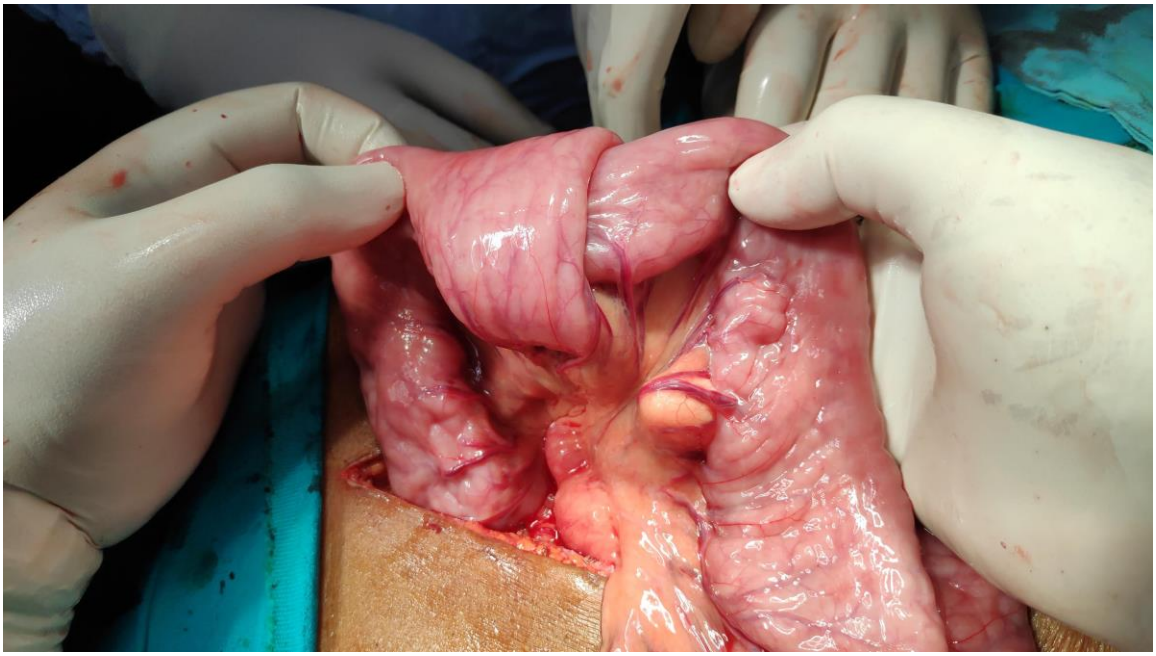


Figure 2: Intraoperative finding of Ileo-sigmoid knotting.

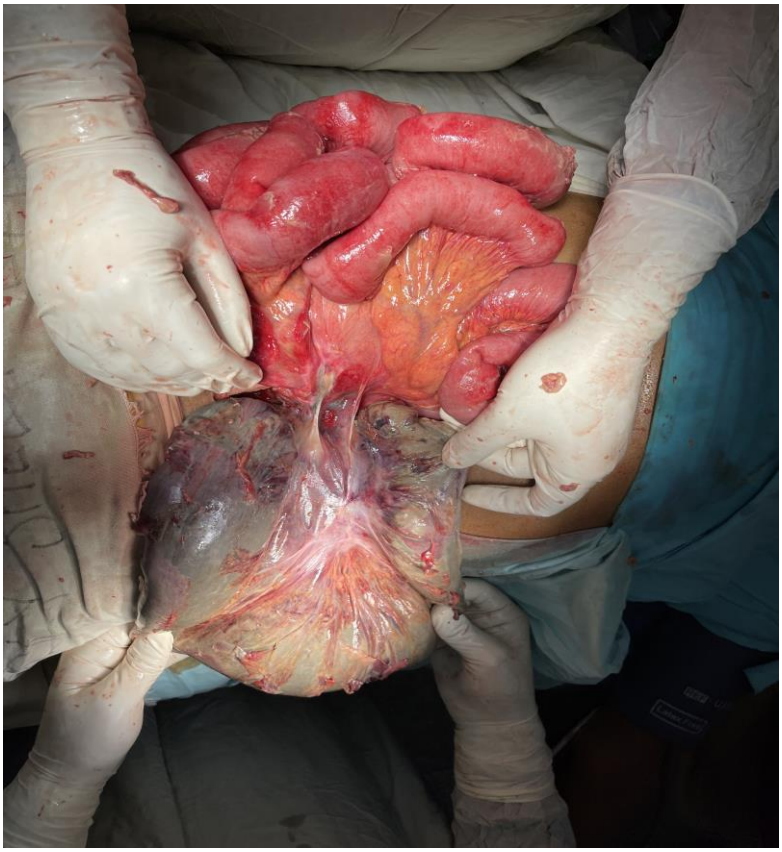


Figure 3: Intraoperative finding of Gangrenous Sigmoid Volvulus.

12) Distribution of surgical modes of treatment:

Surgical mode	**Occurrence**	**Percent**
Resection and anastomosis	35	35%
End Colostomy	8	8%
Right hemicolectomy	21	21%
End ileostomy	8	8%
Adhesiolysis	18	18%
Loop ileostomy	8	8%

Loop colostomy	1	1%
Appendicectomy	1	1%

INCIDENCE OF TUBERCULOSIS:

Of the total number of patients, tuberculosis as the etiology was found in 11 patients.
Amongst these 11 patients, Pulmonary tuberculosis was present in 4 patients.

Details of cases in the series:

Case no.	**Age/Sex**	**Predominant Symptoms**	**Comorbidity**	**Intra-operative Pathology**	**Surgical Procedure performed**	**Outcome**
1	18 / female	Abdominal Pain, constipation distension		Ileal stricture	Resection and anastomosis	Survived
2	27 / Male	Abdominal pain, fever, distension, constipation	Diabetes	Ileal stricture	Resection and anastomosis	Dead
3	36 / female	Abdominal pain, distension, constipation	HIV positive, Hypertension	Ileal stricture	ileostomy	Survived
4	34 / female	Abdominal pain, constipation, distension		Ileal stricture	Resection and anastomosis	Survived
5	34 / male	Abdominal pain, constipation, distension	Diabetes	Band adhesion	Adhesiolysis	Survived
6	54 / male	Abdominal pain, fever, constipation, distension	Diabetes, Hypertension	Ileal stricture with mesentric lymphadenopathy	Resection and anastomosis	Dead
7	56 / female	Abdominal pain, constipation, distension, weight loss		Ileal stricture	Ileostomy	Survived
8	56 / female	Abdominal pain, constipation distension, weight loss		Band adhesions	Adhesiolysis	Survived
9	54 / female	Abdominal pain, distension, fever, peritonitis		Ileal Perforation	Ileostomy	Survived

10	56 / female	Abdominal pain, mass constipation, fever		Ileocecal mass	Right hemicolectomy	Survived
11	54 / male	Abdominal pain, distension, constipation, weight loss	Diabetes	Ileal stricture	Resection and anastomosis	Survived

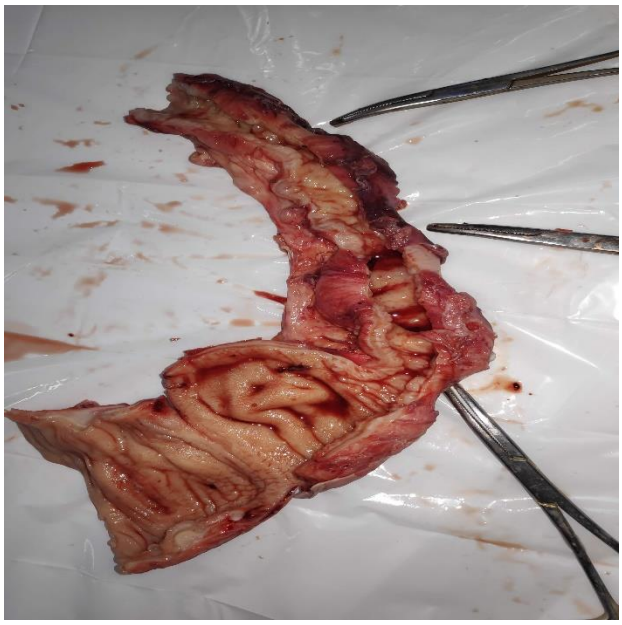
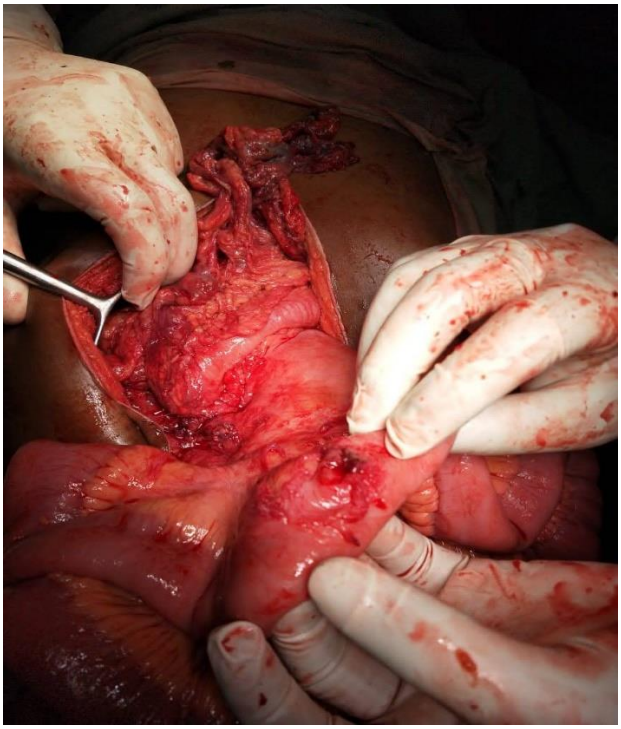


Fig4: Resected Specimen showing Ileal Tuberculosis with Multiple Stricture.



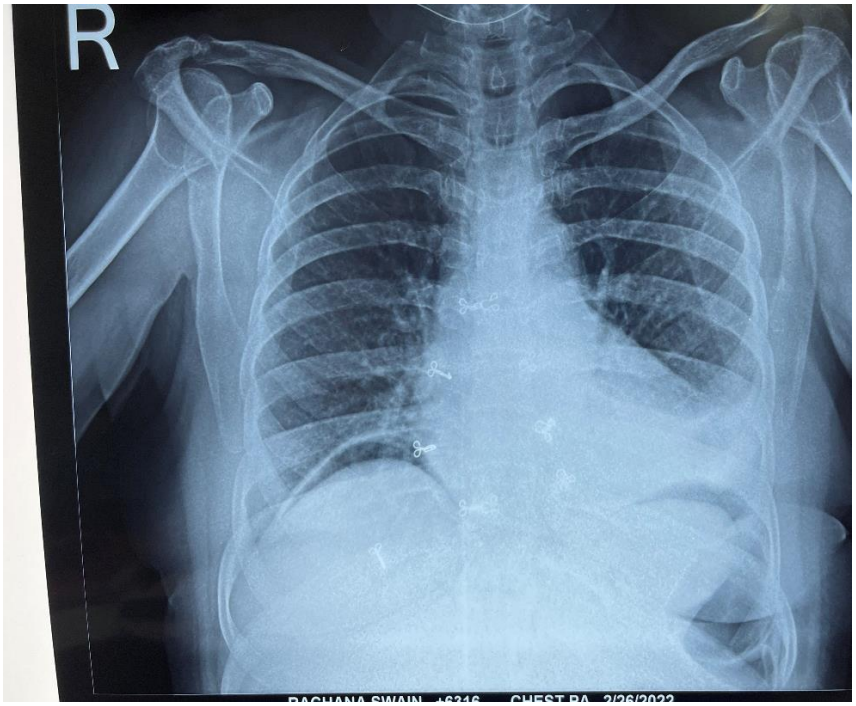


Fig5: Intraoperative Finding of Tubercular Ileal Perforation and Xray showing Free Gas under Right dome of Diaphragm.

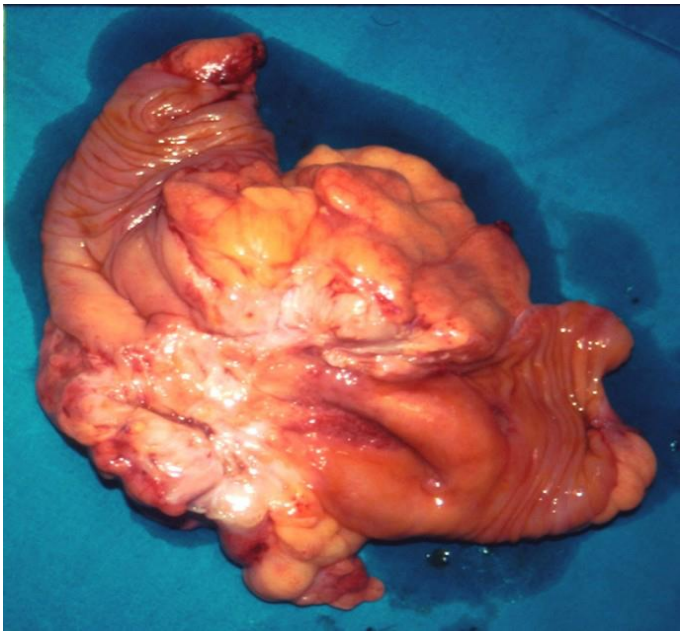


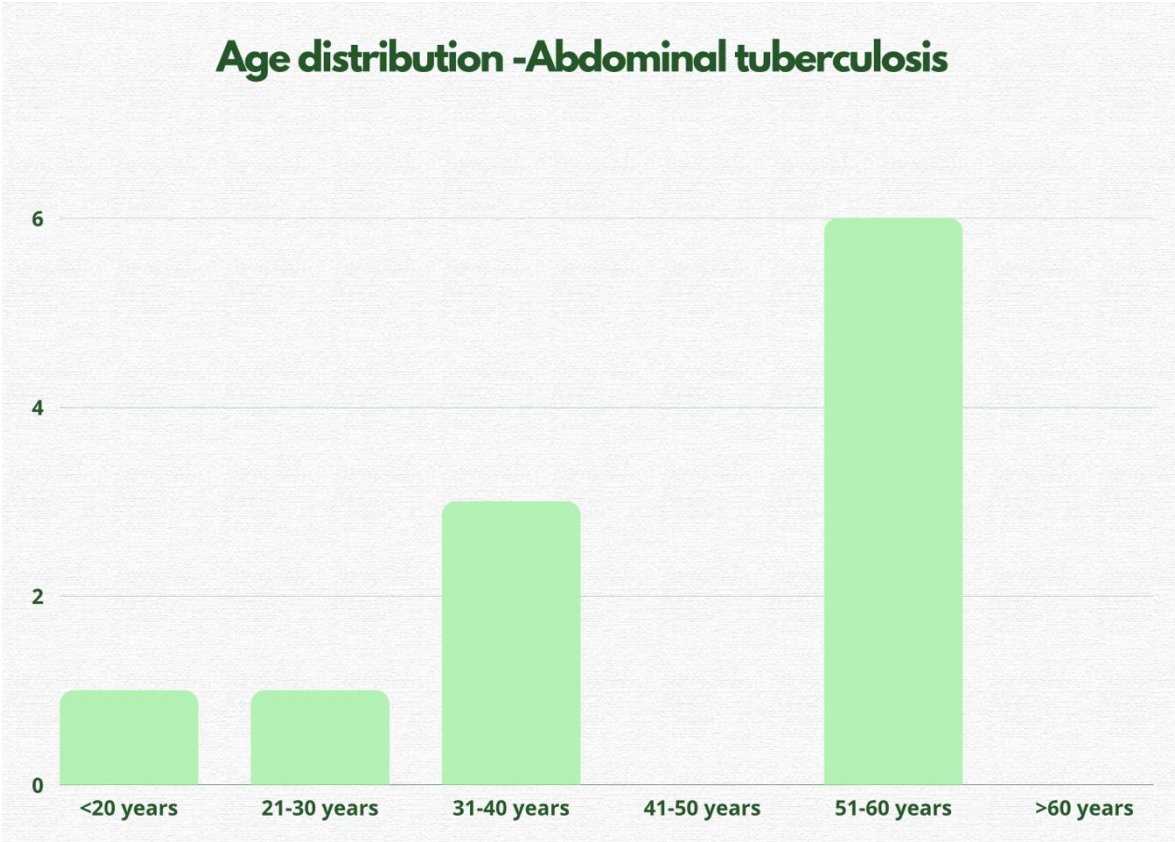
Fig6: Hyperplastic Tuberculosis of ileocecal region -excised specimen.

Fig7:Tubercular Abdominal Cocoon.

Clinical profile of Intestinal tuberculosis presenting as acute surgical emergency:

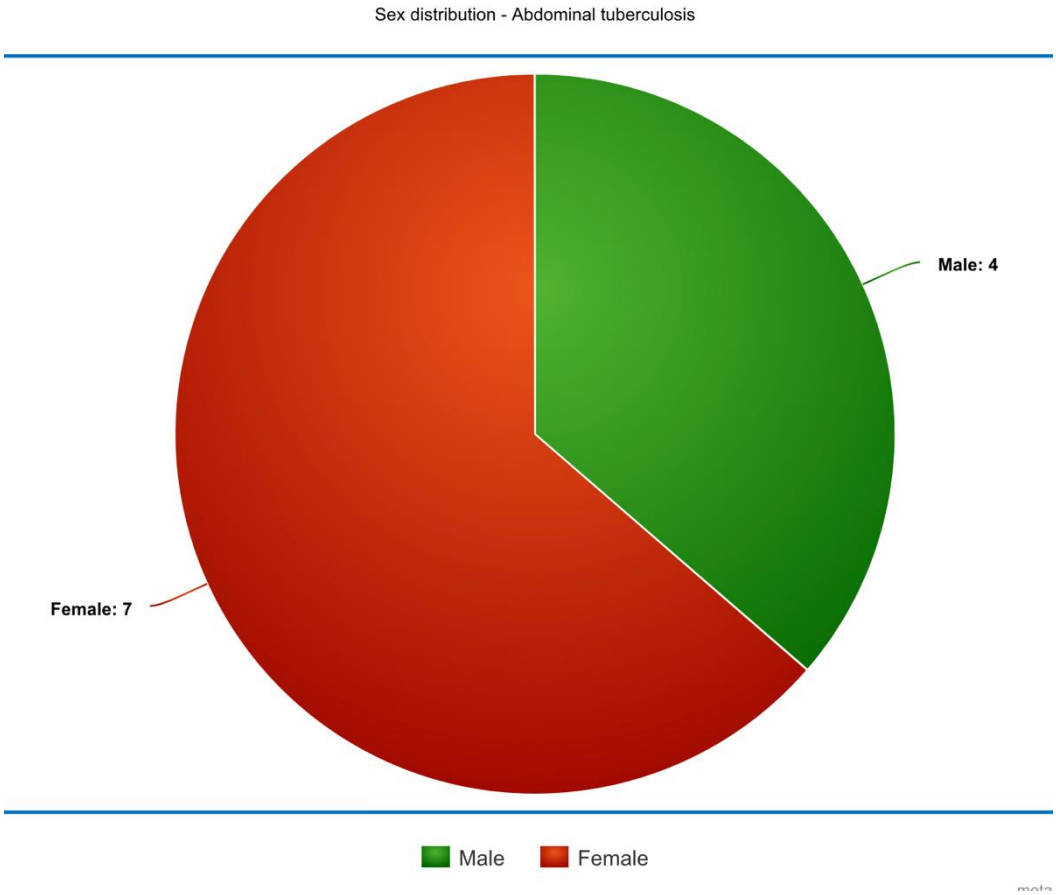
1) Age Distribution:

Out Of the 11 patients of intestinal tuberculosis, the mean age of them was 43.54 ± 13.34 years, with a minimum age of 18 years and maximum age of 56 years. The age distribution of them is shown in the graph below.



2) Sex Distribution:

Seven patients (63.6%) were females and the remaining four patients (36.36%) were male as depicted in the chart below.



The most common intra-operative pathology found among patients of abdominal tuberculosis was ileal stricture seen in 54.54% of patients. Fever as one of the presenting complaints was present in 36.36% of patients. Hypertension was present in 18.18%, while diabetes was present in 27.27% of patients. One patient was found to be HIV positive. The mortality rate among patients with abdominal tuberculosis was 18.18%.

3) Association between Diabetes among patients with abdominal tuberculosis and mortality:

	Alive	**Dead**	
No Diabetes	7	0	P =0.11
Diabetes present	2	2	

There is no statistically significant association between diabetes among patients of abdominal tuberculosis and mortality, with p value being 0.11.

4) Association between Anemia among patients with abdominal tuberculosis and mortality:

	Alive	**Dead**	
No anemia	3	1	P =1.00
Anemia present	6	1	

There is no statistically significant association between presence of anaemia among patients of abdominal tuberculosis and mortality, with p value being 1.00.

5) Association between surgical site infection as a post operative complication among patients of abdominal tuberculosis and mortality:

	Alive	**Dead**	
No SSI	5	1	P =1.00
SSI present	4	1	

There is no statistically significant association between occurrence of surgical site infection as a post operative complication among patients of abdominal tuberculosis and mortality, with p value being 1.00

DISCUSSION:

Tuberculosis (TB) typically affects the lungs, but may involve any other sites which referred as extrapulmonary TB. Extrapulmonary TB represented 14% of the 6.4 million incident cases worldwide that were notified in 2017, and 15% in South-East Asia [98]. As a fraction of extrapulmonary TB that manifest in gastrointestinal tract, intestinal TB (ITB) accounts for 2% of TB cases globally.

The postulated mechanisms by which the mycobacterium reach the gastrointestinal tract are: (1) ingestion of bacilli in sputum from active pulmonary focus; (2) hematogenous or lymphatic spread from a primary lung focus, with later reactivation; (3) direct spread from adjacent organs; and (4) ingestion of milk products infected with Mycobacterium bovis.

This study considered 100 patients of intestinal obstruction, of which 11 patients were found to have abdominal tuberculosis who presented as acute surgical emergency and underwent exploratory laparotomy. Similar such incidence (9.7%) of abdominal tuberculosis among patients of acute abdomen was found by other authors.

The study showed that the peak incidence of presentation of such patients is in the middle age groups. Since the affection is more in the productive years of life, the economic and social impact of tuberculosis is devastating, more so in the developing countries. We also found that the incidence of abdominal tuberculosis is higher in female with a male to female ratio of 4:7. Homan et al noted that the disease is more common in males in western countries and in females in developing countries. The explanation behind such an occurrence is little understood. It was also found that the incidence of this disease is more common in patients from rural areas with a low socio-economic status. Accessibility to healthcare and social factors such as overcrowding, lack of awareness could be the possible reasons for such an occurrence.

We found that abdominal pain usually of prolonged duration is the most common clinical presentation, with other studies validating this point. Obscure and non-specific clinical features leads to a delay in the diagnosis, further leading to complications such as intestinal obstruction. The presence of co-existing medical illnesses such as diabetes has been shown to have a poor outcome in patients with tubercular intestinal obstruction. Although we found that the mortality and complication rate are higher in patients with co-morbidities, it was not statistically significant. The prevalence of co-infection with HIV was present in 9.09% of cases. This rate seems to be low in comparison to other studies where HIV seroprevalence is around 20%. It is expected that patients with HIV infection are prone to more severe and disseminated disease of tuberculosis manifesting with complications

having a poor outcome. Studies have shown that HIV co-infection with low CD-4 counts have a higher incidence of surgical site infections and multi drug resistance.

Intestinal TB most commonly affected region is the ileocecal, accounts for 64% of the incidence of gastrointestinal TB, followed by jejunum and large bowel. The main reasons for the predilection of ileocecal region are due to a relatively longer faecal static, high density of lymphoid tissue, a neutral pH environment and absorptive transport mechanisms that allow swallowed mycobacterium to be absorbed.

The manifestations of ITB can be divided into three categories: ulcerative form (60%), hypertrophic form (10%) and lesions such as mass (ulcero-hypertrophic, 30%) that mimic malignancies leading to a common misdiagnosis. Manifestations depend on host's immune system. The ulcerative forms occur in those with reduced immune responses, whereas the hypertrophic form occurs in those with an enhanced immune system. Manifestations may be nonspecific and show similarities to other gastrointestinal disorders, such as Crohn's disease, peptic ulcer, malignancy, sarcoidosis, fungal infections or idiopathic granulomatous gastritis.

Because TB can affect any part of the gastrointestinal tract, the presenting symptoms often vary depending on the affected anatomic location of the disease. Based on study by Tripathi et al., patients most commonly presented with abdominal pain, fever, weight loss regardless of the anatomical involvement [99]. In accordance with this, review by Choi and Coyle showed that the most common symptoms were abdominal pain (81%), followed by weight loss (62%), fever (51%), nausea and vomiting (42%), diarrhoea (29%), and constipation (22%) based on numerous studies [100].

Bacteriological signs and histopathological findings are gold standard to establish ITB. Sharma et al. studied 70 cases of abdominal TB and found evidence of active or cured lesions in chest X-ray in 22 cases (46%). Biopsy methods include endoscopy, gastrointestinal mucosal biopsy, percutaneous biopsy, guided endoscopic ultrasound biopsy, and surgery (open or laparoscopic). In ITB, granulomas are presented as larger amount and larger size (>200 μm) in the mucosa and submucosa. Among bacteriological examination, PCR analyses of biopsy specimens have been shown to be a valuable tool in improving diagnostic yield, with a high specificity, 95%. It has also been found to be more sensitive than AFB stain and Mycobacterium tuberculosis culture [100]. However, drawback of PCR utilization is the uncommon availability, notably on developing countries such as India.

We found that 24% of patients had an adverse post operative complication and 15% had surgical site infection. Presence of these complications put the patients at increased risk of mortality. The mean length of hospital stay was 10.45 ± 3.62 days which was lower in comparison to a study by Chalya et al [10] where the duration of hospitalisation was 24 days. This depends on the presence of post operative complications with a direct association. The mortality rate in our series is 18.18%, which could be related to delayed presentation, associated co-morbidities, presence of post operative complications, although this was not statistically significant in our series. Although, co-morbidities and occurrence of post-operative complications may be associated with more adverse mortality rates, there was no statistical correlation between them in our study.

Therapy for ITB includes pharmacological anti-tuberculosis drugs and surgical therapy. The first choice for ITB management is anti-tuberculosis drugs. When patients are suspected of ITB, ATD can be given in a full dose. Drugs administration is the same as for pulmonary TB. Conventional antituberculosis therapy for at least 6 months including the initial two months combination of isoniazid, rifampicin, ethambutol and pyrazinamide followed by four months combination of isoniazid and rifampicin, and this therapy is recommended in all patients with ITB in India. Although

there are some controversies where some clinicians treat for longer periods due to concerns that six months is inadequate to achieve cure and prevent relapse of the disease after the end of treatment, recent review from Cochrane found that six-month and nine-month regimens are probably similarly effective in terms of the chances of achieving cure and no evidence to suggest that six-month regimens are less safe for gastrointestinal and peritoneal TB than nine-month regimens.

Alongside pharmacological therapy, surgery is the second choice for complications such as free perforation, significant bleeding, complete obstruction, abscess formation, large fistulae, and refractory to antimicrobial drugs. Obstruction is the most common complication; patients with multiple and/or long strictures are less likely to respond to medical therapy. Colonoscopic balloon dilation, which shown may become one of the alternatives, may be used to manage readily accessible, short and fibrous tuberculous ileal strictures causing subacute obstructive symptoms. Although the experience is very limited, this technique appears safe and may obviate the need for surgery.

LIMITATIONS OF THE STUDY:

1. The sample size of the study is limited, hence the definitive representation of the population is not established
2. poor socio-economic conditions of the study population, delayed presentation, loss to follow up and lack of certain investigations lead to delayed diagnosis and poorer outcomes.
3. All the clinical parameters were not taken into account for analysis of patient outcome.

SUMMARY:

This is a clinical study of 100 patients of intestinal obstruction during 2021-22, among which 11 patients were of abdominal tuberculosis. This study included selection of patients of abdominal tuberculosis on prospective basis.

All the patients are diagnosed as abdominal tuberculosis on basis of detailed history and good physical exam, all the investigations done, including the routine basic investigation ie, Hb, total leukocyte count, ESR and special investigation like chest X-ray, abdominal x-ray, barium studies, USG, CT abdominal and laparoscopy. Laparoscopy has a role in diagnostic and therapeutic measure in abdominal tuberculosis.

Those patients who presented with acute intestinal obstruction and perforation were subjected to emergency laparotomy and while those patients who presented with subacute intestinal obstruction were subjected to initial evaluation and followed by laparotomy. The findings observed in this study included hypertrophic ileocecal lesion with or without ileal stricture, Ileal perforation with ileal stricture. The surgical procedures performed included resection and anastomosis or stricturoplasty. Either right hemicolectomy or limited ileocecal resection and ileo ascending anastomosis for ileocecal mass.

Those patients who were abdominal tuberculosis was confirmed by all modalities of investigations were included in this study.

All the patients were operated and put on ATT according to DOTS under RNTCP programme and patients were followed up regularly.

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