

**ORIGINAL RESEARCH**

# A Clinicopathological Study Of Abdominal Koch's

<sup>1</sup>Dr. Rucha Rampalliwar, <sup>2</sup>Dr. Anant Jain, <sup>3</sup>Dr. Abhishek Jain, <sup>4</sup>Dr. S.K Dhakaita, <sup>5</sup>Dr. Prashik Meshram, <sup>6</sup>Dr. Anubhav Mishra

<sup>1,2</sup>Assistant Professor, <sup>3</sup>Associate Professor, <sup>4</sup>Professor, <sup>5</sup>Senior Resident, <sup>6</sup>Junior Resident 2, Department of General Surgery, RD Gardi Medical College, Ujjain, Madhya Pradesh, India

**Corresponding author**

Dr. Rucha Rampalliwar

Assistant Professor, Department of General Surgery, RD Gardi Medical College, Ujjain, Madhya Pradesh India

Received: 19 September, 2023

Accepted: 6 October, 2023

**ABSTRACT**

**Background:** Abdominal tuberculosis encompasses disease of any intra-abdominal organ and any part of the gastrointestinal tract from mouth to anus. Solid organs are involved through haematogenous dissemination, whereas the gastrointestinal tract is affected either through the ingestion of infected lung secretions, by contiguous invasion from infected lymph nodes, or through dairy products contaminated with *M. bovis*. There is a strong historical association between advanced pulmonary tuberculosis and gastrointestinal tuberculosis, reflecting the importance of swallowing infectious respiratory secretions to the pathogenesis of this disease. The clinical manifestations of abdominal tuberculosis are protean, dependent upon the organs involved. Ulceration, stricture, perforation and fistula formation are the cardinal pathological features of gastrointestinal tuberculosis, with additional complications dependent upon which segment of the bowel is involved. For example, serious bleeding may complicate gastric and colorectal tuberculosis, whereas malabsorption more commonly results from small bowel infection. Jejunioileal and ileocecal tuberculosis is the commonest part of the bowel to be affected by tuberculosis, occurring in 50–70% of all forms of abdominal tuberculosis. The commonest symptom is abdominal pain, which is reported by 90% of patients. Ileocecal tuberculosis typically presents with days or weeks of colicky abdominal pain, borborygmi and vomiting. Examination may reveal a mass in the right lower quadrant. The most common complication is sub-acute intestinal obstruction, although acute-on-chronic abdominal pain may indicate perforation. In India, tuberculosis is the second commonest cause of bowel perforation to typhoid. Tuberculous perforations are usually single and proximal to a stricture. Isolated colonic disease presents with pain, change in bowel habit and bleeding (in 70%). The disease is multifocal in one-third with diffuse ulceration mimicking colitis. Hepatic, pancreatic and splenic tuberculosis often accompany military tuberculosis, as do multiple peritoneal tubercle deposits. Enlarged intra-abdominal lymph nodes typically accompany this form of the disease. Presentations may include following Abdominal TB often presents with fever, weight loss, and abdominal pain. Negative chest radiograph or negative tuberculin skin test does not exclude extrapulmonary TB, it may or may not have evidence of pulmonary TB or positive tuberculin test. Possibly negative in immunosuppressed, malnourished, or severe disseminated disease. Other signs/symptoms - Peritonitis is most common clinical manifestation of abdominal tuberculosis - Affects 1/3 of patients; 90% with ascites (wet type) Adrenal tuberculosis

-Addisonian presentation (adrenal insufficiency, hypotension, and electrolyte disturbances) -Gastrointestinal TB Usually few or no symptoms (partial obstruction). **Results:** In our study highest incidence of abdominal Koch's was found in 0-20 year and 21-40 year age groups i.e. in 19(38.0%) & 18(36.0%) respectively. Pain in abdomen was most commonly found symptoms, reported in 48(96.0%) out of 50 patients Next commonly presenting symptom was loss of appetite, reported in 34(68%) out of 50 patients. It is followed by fever, constipation, loss of weight and distension of abdomen in 44%, 38%, 30% & 22% respectively. Lump in abdomen was seen only in 2 patients out of 50. In our study, out of 50 patients 88% received ATT category 1 (out of which 11 patients were operated up to), rest 12% received ATT category 2 (out of which only 1 patient was operated upon). All patients reported relief in symptoms in about 4 to 6 weeks after starting ATT. **Conclusion:** The patient often comes with vague clinical features, and hence it is difficult to diagnose the condition. Diagnosis of abdominal tuberculosis can only be made after correlating clinical presentation with biochemical and radiological investigations. Plain X ray chest and abdomen coupled with ultrasonography of the abdomen are the investigations of choice in acute cases. The disease has high morbidity and mortality in emergency surgery probably due to inadequate bowel preparation, contamination and fluid electrolyte imbalance. Tuberculosis is common in patients with HIV infection, necessitating screening for HIV for all patients. Neither clinical signs and symptoms, laboratory investigations, radiological and endoscopic methods, nor bacteriological and Histopathological findings provide a gold standard by themselves in the diagnosis of abdominal TB. Therefore, a large number of Koch's abdomen cases still remain undiagnosed. As the disease is severe and diagnosis is elusive, high degree of clinical suspicion is required for timely management and better outcome.

**Keywords:** Diabetes mellitus, macroscopic complication, polyuria, polydipsia, polyphagia

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution- Non commercial- Share Alike 4.0 License, which allows others to remix, tweak, and build upon the work non- commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

## INTRODUCTION

In the developing world including India, incidence of tuberculosis is very high owing to low socioeconomic status, overcrowding, illiteracy, ignorance, poor hygiene and insanitary living conditions. In our study all patients belonged to low socioeconomic strata. In 2020, an estimated 10 million people fell ill with tuberculosis (TB) worldwide. 5.6 million Men, 3.3 million women and 1.1 million children. A total of 1.5 million people died from TB in 2020. TB is the 13th leading cause of death and the second leading infectious killer after COVID-19 (above HIV/AIDS). But TB is curable and preventable. The average prevalence of all forms of tuberculosis in India is estimated to be 5.05 per thousand, prevalence of smear-positive cases 2.27 per thousand and average annual incidence of smear-positive cases at 84 per 1,00,000. The cause for this remains subclinical infection, less reliable diagnostic tools (thus late detection) and problem of low resistance of the host (due to malnutrition and ill hygienic methods) along

with development of infections by resistant strains of Mycobacterium not responding to usual drugs. As the disease is severe and diagnosis is elusive, high degree of clinical suspicion is required for timely management.

## AIMS AND OBJECTIVES

AIM is to do "a Clinicopathological study of Abdominal Koch's" in the Department of General Surgery, C. R. Gardi Hospital and R. D. Gardi Medical College, Ujjain, M.P.

## OBJECTIVES

To study the various clinicopathological manifestations and investigational modalities of abdominal Koch's.

## MATERIALS AND METHODS

**Study design:** Cross sectional study

**Study area:** Hospital based

**Study Duration:** JAN 2019 to JAN 2020

**Sample size:** 50 patients of abdominal tuberculosis which presented in the Surgery OPD during the specified period as acute abdomen in emergency or subacute or chronic presentation on routine admission.

**PROCEDURE PLANNED:** Patient with Abdominal Koch's were admitted and studied according to the case proforma, written consent of the patient taken, required investigations performed and all surgical procedures done.

#### INCLUSION/EXCLUSION CRITERIA

**Inclusion Criteria:** 1. Patients of all age groups, confirmed and admitted cases and operated cases of Abdominal TB.

**Exclusion Criteria:** 1. Active Pulmonary tuberculosis cases and patients who refuse to give consent.

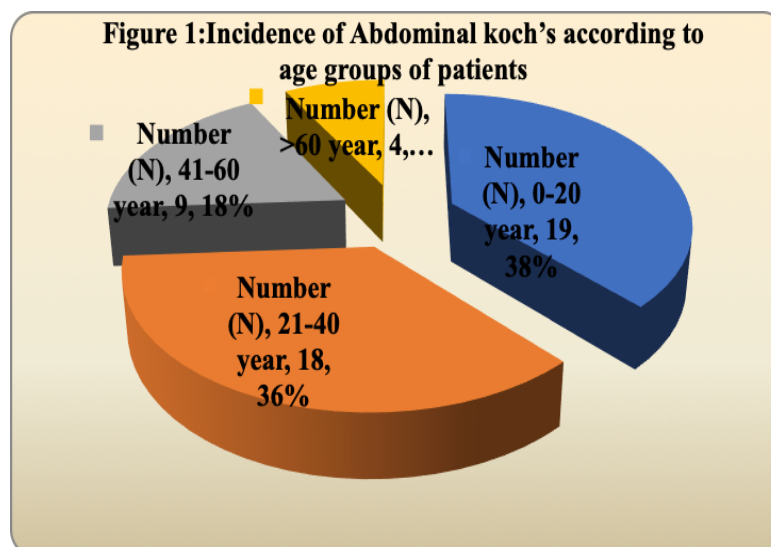
**DATA COLLECTION AND METHODS:** Final data obtained was evaluated and statistical analysis was done using SPSS software and observations were validated and graphically represented.

#### OBSERVATIONS AND RESULTS

**Table no 1: Incidence of Abdominal Koch's according to age groups of patients.**

Age groups	Number (N)	Percentage (%)
0-20 year	19	38.0%
21-40 year	18	36.0%
41-60 year	9	18.0%
>60 year	4	8.0%
Total	50	100%

Table 1/figure 1 reveals incidence of abdominal Koch's according to age groups of patients. In the present study, highest incidence of abdominal Koch's was found in 0-20 year and 21-40 year age groups i.e. in 19(38.0%) & 18(36.0%) respectively. It was found least in more than 60 year old patients. i.e. only in 4(8.0%). It was also seen that there was gradual decrease in incidence of abdominal Koch's with the rise in age.

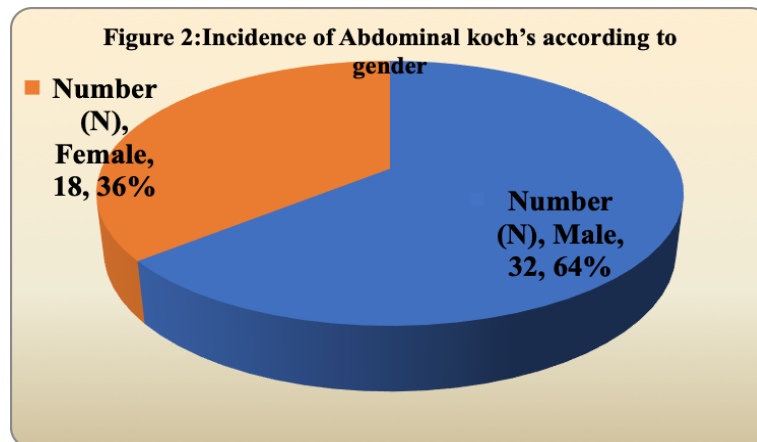


**Table 2: Incidence of Abdominal Koch's according to gender.**

Gender	Number (N)	Percentage (%)
Male	32	64.0%
Female	18	36.0%
M:F Ratio	32/18= 1.7	

Total	50	100%
-------	----	------

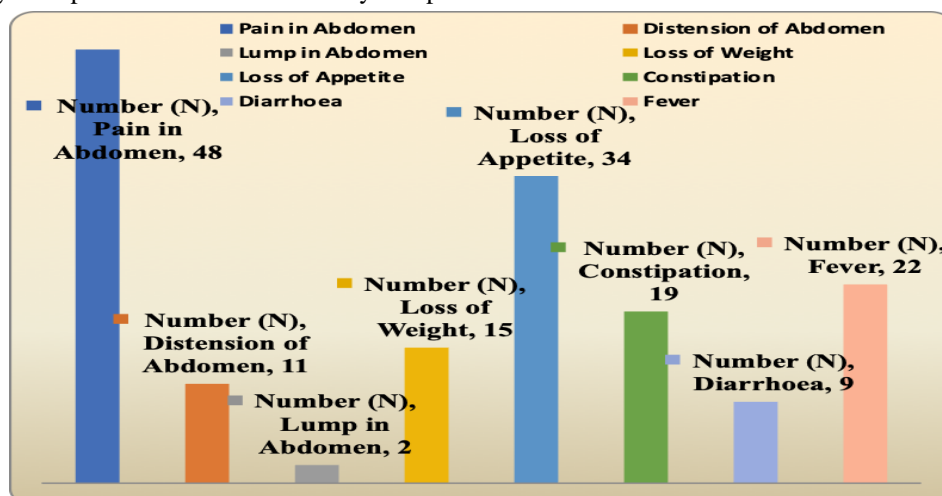
Table 2/figure 2 reveals incidence of abdominal Koch's according to gender. Incidence was found more in male as compare to female. It was 32(64.0%) among male and 18(36.0%) in female. Male female ratio was 1.7.



**Table 3: Relative Frequency distribution of common presenting symptoms among Abdominal Koch's patients**

Sign	Number (N)	Percentage (%)
Intestinal Obstruction	16	32
Peritonitis	1	2
Lump in Abdomen	27	54
Ascites	19	38
Doughy Abdomen	23	46

Table 3/figure 3 reveals relative frequency distribution of common presenting symptoms among Abdominal Koch's patients. Pain in abdomen was most commonly found symptoms, reported in 48(96.0%) out of 50 patients. Next commonly presenting symptom was loss of appetite, reported in 34(68%) out of 50 patients. It is followed by fever, constipation, loss of weight and distension of abdomen in 44%, 38%, 30% & 22.0% respectively. Lump in abdomen was seen only in 2 patients out of 50.

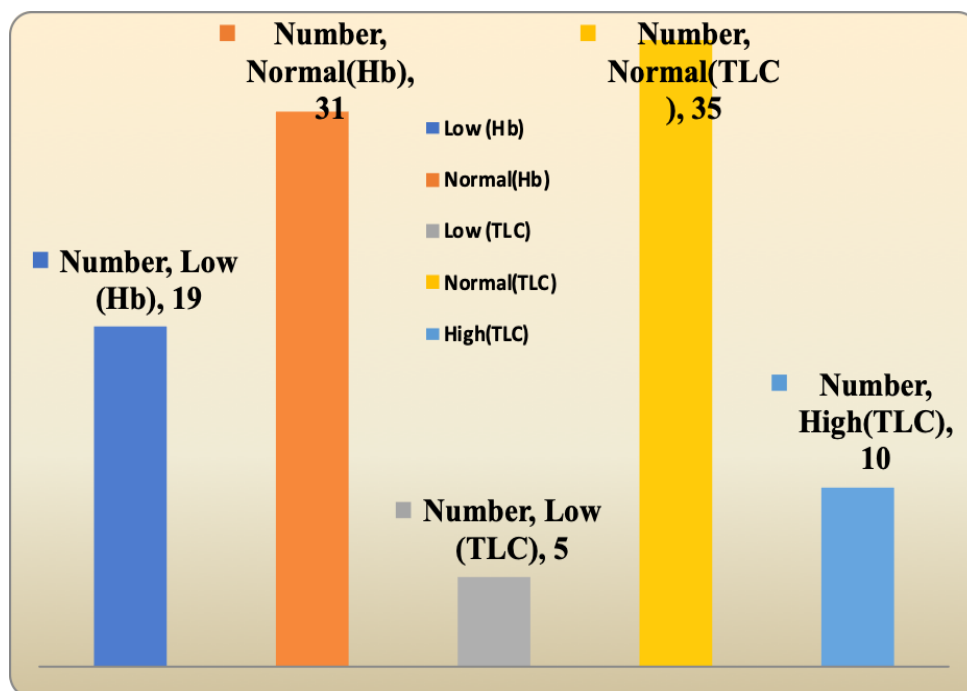


**Figure 3: Relative Frequency distribution of common presenting symptoms among Abdominal Koch's patients**

**Table 4: Hemogram & ESR of Abdominal Koch's patients.**

Heamogram	Level	Number (N)	Percentage (%)
Hemoglobin(Hb)-gm/dl	Low	19	38.0%
	Normal	31	62.0%
TLC	Low	5	10.0%
	Normal	35	70.0%
	High	10	20.0%
Polymorph	Normal	44	88.0%
	Deranged	6	12.0%
Lymphocytes	Normal	35	70.0%
	Deranged	15	30.0%
Monocytes	Normal	42	84.0%
	Deranged	8	16.0%
Eosinophils	Normal	27	54.0%
	Deranged	23	46.0%
ESR	Normal	8	16.0%
	Raised	42	84.0%

Table 4/figure 4 reveals Hemogram & ESR of Abdominal Koch's patients. Hemoglobin was found normal in 31(62%) and low in 19(38%). TLC was found high in 10(20%) patients. Polymorphs, lymphocytes, Monocytes, Eosinophils were found raised in 12%, 30%, 16% & 46% patients respectively. ESR was found raised among 42(84.0%) patients.

**Figure 5: Hemogram of Abdominal Koch's patients**

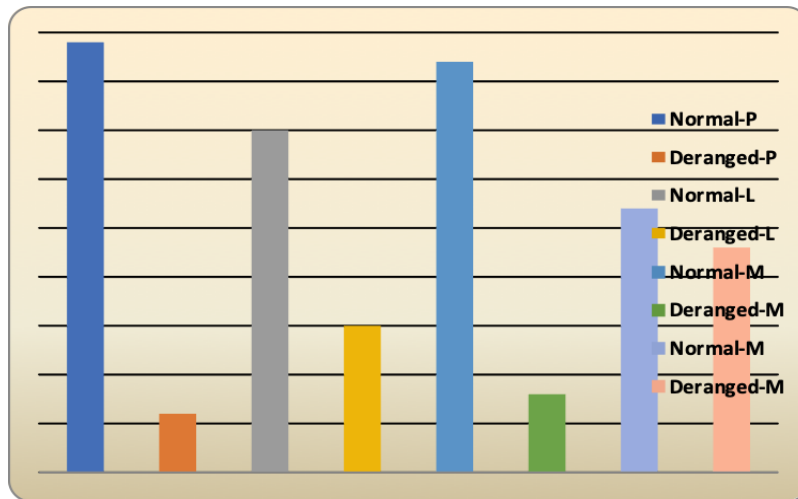


Figure 5(A): Hemogram of Abdominal Koch's patients

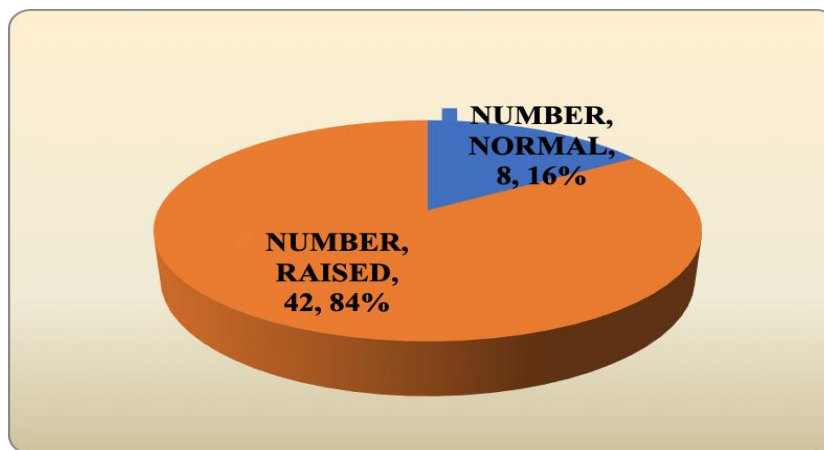


Figure 5(B): ESR among Abdominal Koch's patients

Table 5: Reliability of Mantoux test as diagnostic Aid among Abdominal Koch's patients.

Mantoux Test	Number (N)	Percentage (%)
Positive	42	84.0%
Negative	8	16.0%

Table 5/figure 8 reveals reliability of Mantoux test as diagnostic aid among abdominal Koch's patients. Mantoux test was positive in 42(84.0%) and negative in 8(16.0%) patients.

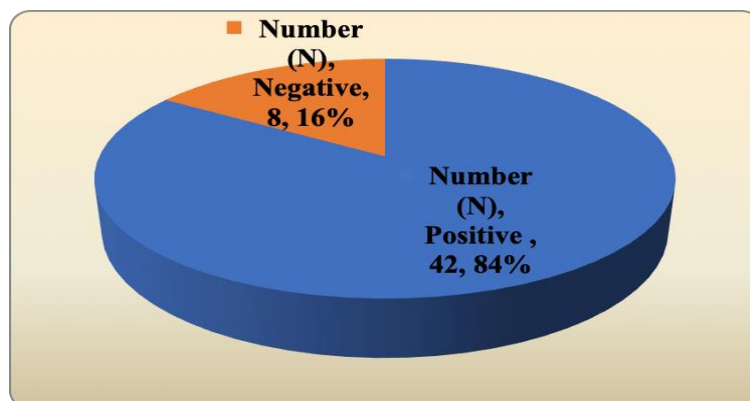
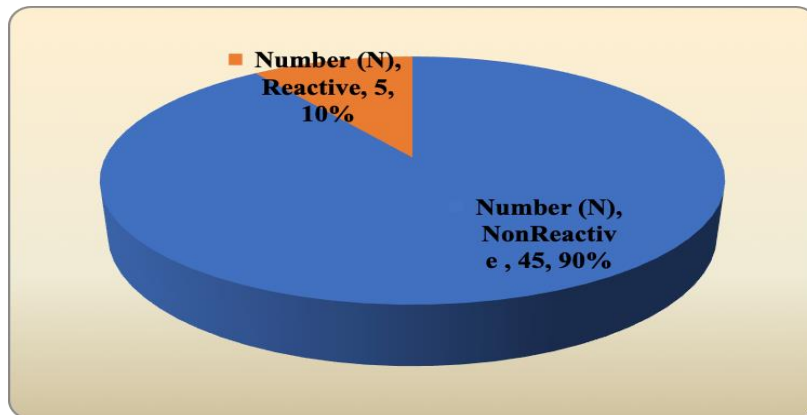


Figure 8: Reliability of Mantoux test as diagnostic Aid among Abdominal Koch's patients

**Table 6: History of HIV among Abdominal Koch’s patients.**

HIV	Number (N)	Percentage (%)
Non-Reactive	45	90.0%
Reactive	5	10.0%

Table 6/figure 9 reveals history of HIV Abdominal Koch’s patients. HIV was reactive in 5(10%) cases and it was non-reactive in 45(90.0%) cases.

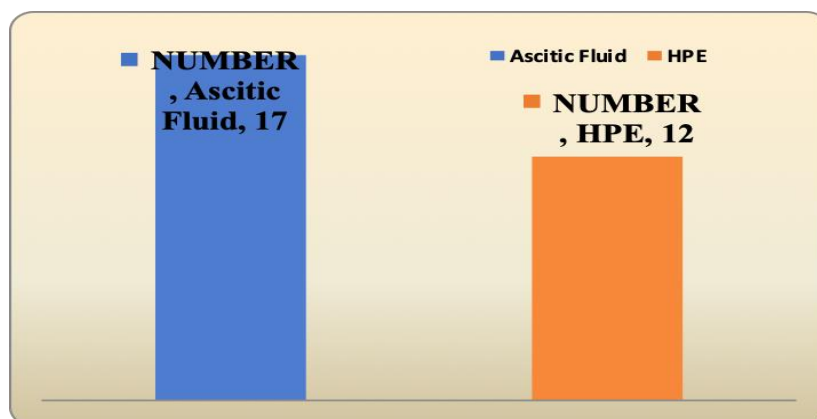


**Figure 9: History of HIV among Abdominal koch’s patients**

**Table 7 : Investigations done among Abdominal Koch’s patients.**

Investigations	Number (N)	Percentage (%)
1. Ascitic Fluid		
Positive	17/17	100%
Not Done	33	
2. HPE		
Positive	12/12	100%
Not Done	38	

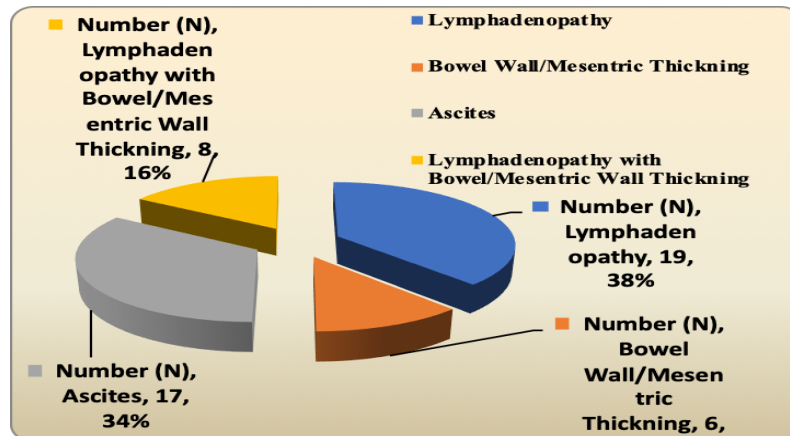
Table 7/figure 10 reveals investigations done among Abdominal Koch’s patients. Ascitic fluid was done in 17 patients and it was found in all 17(100%) cases. Lymph node biopsy was done only in 2 cases and it was found positive in all 2(100%) cases. Histopathological examination was done in 12 cases and it was found positive in all 12(100%) cases. 4 % showed AFB positive smear.



**Figure 10: Investigations (ascitic fluid analysis and histopathology) done & found positive among Abdominal Koch’s patients**

**Table 8: Radiographic Investigation of Abdomen (USG Abdomen) among Abdominal Koch’s patients.**

USG Abdomen Finding	Number (N)	Percentage (%)
Lymphadenopathy	19	38.0%
Bowel Wall / Mesenteric Thickening	6	12.0%
Ascites	17	34.0%
Lymphadenopathy with Bowel Wall / Mesenteric Thickening	8	16.0%

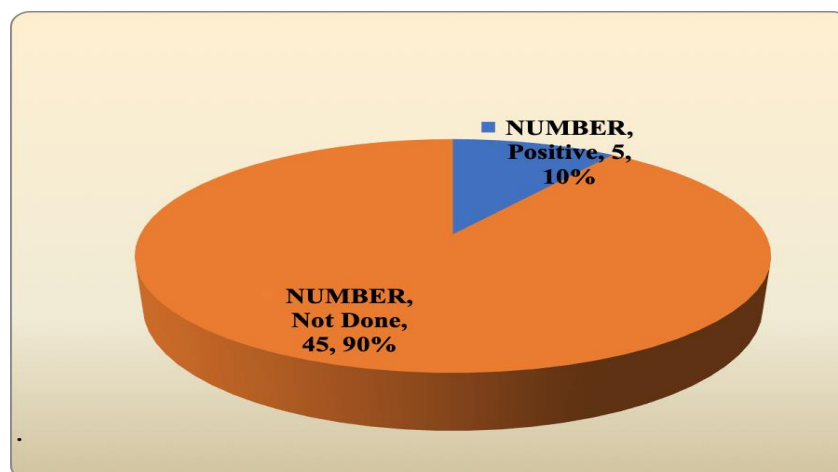


**Figure 12:USG Abdomen finding among Abdominal Koch’s patients.**

**Table 9 : Radiographic Investigation of Abdomen (CT Scan Abdomen) among abdominal Koch’s patients.**

CT Scan Abdomen	Number (N)	Percentage (%)
Positive	5/5	100%
Not Done	45	

Table 9/figure 13 reveals radiographic Investigation of Abdomen (CT Scan Abdomen) among abdominal Koch’s patients. CT Scan Abdomen was done only in 5 patients and it was found positive in 5(100%) patients.



**Figure 13:CT Scan Abdomen among abdominal Koch’s patients**

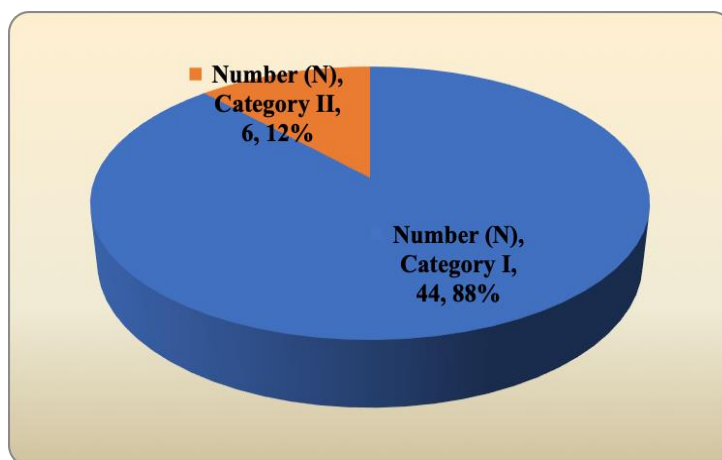
**Table 10: Anti Tubercular Therapy (ATT) Prescribed to abdominal Koch’s Patients.**

ATT	Number (N)	Percentage (%)
Category I	44	88.0%
Category II	6	12.0%



TOTAL	50	100.0%
-------	----	--------

Table 10/figure 15 reveals Anti Tubercular Therapy (ATT) Prescribed to abdominal Koch’s Patients. Category I ATT was give to the maximum number of patient’s i.e. 44(88.0%) and Category II was given to only 6(12%) patients.



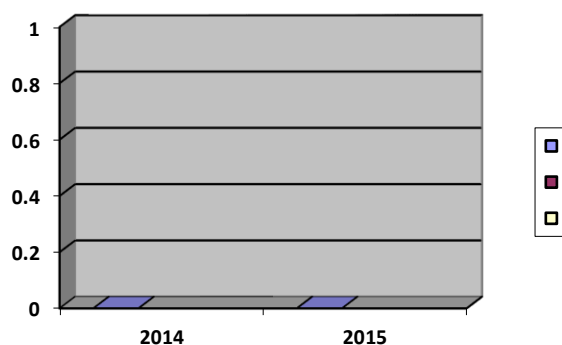
**Figure 15:Anti Tubercular Therapy(ATT) Prescribed to abdominal Koch’s Patients**

**TABLE 1 :AGE** In our study, the commonest age group suffering from Koch’s abdomen was 2<sup>nd</sup> and 4<sup>th</sup> decade. Similar results were obtained in other studies.

STUDIES	YEAR	COMMONEST AGE DECADES
Chalya et al <sup>14</sup>	2013	2 <sup>nd</sup> and 3 <sup>rd</sup> decades
Darbari et al <sup>16</sup>	2014	3 <sup>rd</sup> and 4 <sup>th</sup> decades
Present	2015	2 <sup>nd</sup> and 4 <sup>th</sup> decades

**TABLE 2 – GENDER**

Koch’s abdomen has been found to be more common in male in our study, ratio being 1.7:1, though many studies have found female preponderance ranging from 1.5 times<sup>98</sup> to 3 times<sup>97</sup>.



**TABLE 3 – PRESENTING SYMPTOMS**

STUDIES	YEAR	MALE : FEMALE RATIO
Darbari et al <sup>16</sup>	2014	1.3 : 1
Present	2015	1.7 : 1

In our study the most common presenting symptom was found to be pain in abdomen 96%; next being loss of appetite 68%, fever 44% and constipation 38%. Favourable comparisons were found in other studies

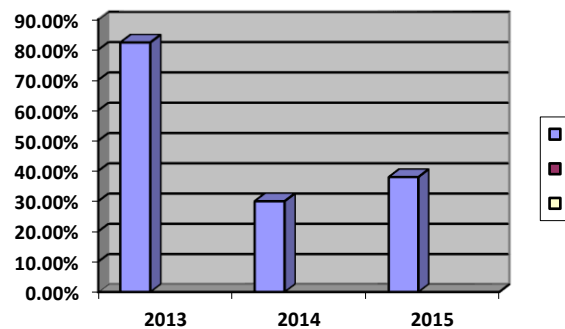
as well.

**TABLE 4 – PRESENTING SIGNS:** In our study the most common presenting sign was lump in abdomen 54% comprising of palpable abdominal Lymphadenopathy/ bowel wall clumping or thickening/ ileocaecal mass. The next most common symptom was doughy abdomen 46% which denotes that the bowel is filled with faecal matter and gas owing to chronic inflammation and sluggish peristalsis. Ascites was found to be 38% and intestinal

obstruction mainly subacute was found to be 32%. Other study showing similar comparison is mentioned below.

**TABLE 5 – HEMOGLOBIN / TOTAL LEUCOCYTE COUNT / DIFFERENTIAL LEUCOCYTE COUNT**

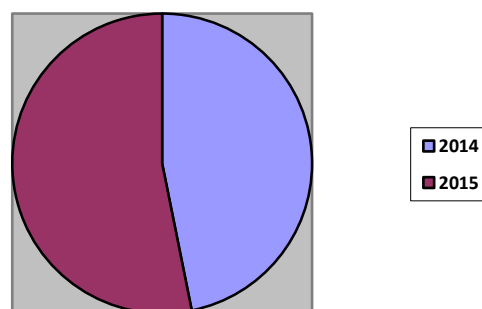
In our study, anaemia was found in 38% cases, leucocytosis in 20% cases and lymphocytosis in 30% cases. Some studies that show similar results are mentioned below.



**TABLE 6 – RAISED ERYTHROCYTE SEDIMENTATION RATE**

STUDIES	YEAR	ANAEMIA
Chalya et al <sup>14</sup>	2013	82.4%
Darbari et al <sup>16</sup>	2014	30%
Present	2015	38%

ESR was raised in 84% cases in our study. Studies that show similar values are mentioned below.



**TABLE 7 – MANTOUX TEST**

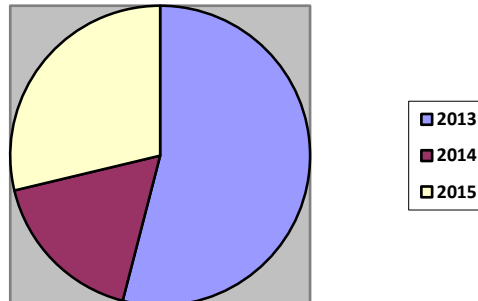
STUDIES	YEAR	RAISED ESR
Darbari et al <sup>16</sup>	2014	74%
Present	2015	84%

Mantoux test was positive in 84% (>10mm) cases in our study. A negative mantoux test doesn't excluded tuberculosis and its interpretation should be done carefully.

**TABLE 8 – HUMAN IMMUNODEFICIENCY VIRUS (HIV)**

STUDIES	YEAR	MANTOUX POSITIVE
Present	2015	84%

In our study, 10% were HIV positive cases. Similar comparisons were made in other studies.

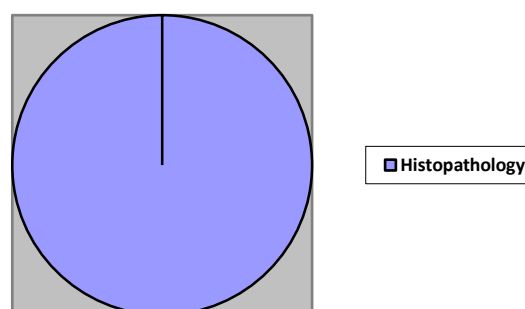


**TABLE 9 – ASCITIC FLUID EXAMINATION – (ADENOSINE DEAMINASE & ACID-FAST BACILLI CULTURE):**

STUDIES	YEAR	HIV POSITIVE
Chalya et al <sup>14</sup>	2013	18.8%
Darbari et al <sup>16</sup>	2014	6%
Present	2015	10%

In our study, ascitic fluid examination was done in only 17 out of 50 cases. Out of these 17, 100% showed raised ADA and 4 % showed AFB positive smear. Tubercular bacilli being paucibacillary in extra pulmonary tuberculosis show a very low yield on smear and culture, staining is positive in <3% cases, but it doesn't rule out tuberculosis. In contrast, Singh et al were able to culture AFB in 83% cases using 1 litre ascitic fluid. In coinfection with HIV, ADA values can be normal or low.

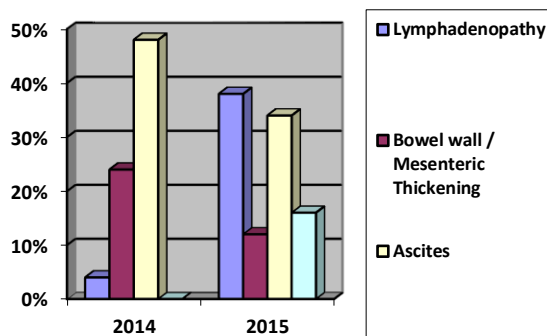
**TABLE 10 – HISTOPATHOLOGY:** Histopathological examination was performed in 12 cases out of 50, out of which all gave positive result. Other studies showing similar results are mentioned below.



STUDIES	YEAR	HISTOPATHOLOGY
Chalya et al <sup>14</sup>	2013	86.3%
Present	2015	100%

XRAY CHEST and SPUTUM EXAMINATION were done in all 50 cases to exclude active or inactive pulmonary tuberculosis as it is among the exclusion criteria.

**TABLE 11 – ULTRASOUND ABDOMEN:** Ultrasound was the mainstay investigational modality of our study; it was performed on all 50 cases. Maximum cases showed the presence of abdominal Lymphadenopathy followed by ascites. Contrasting results were found in some studies.

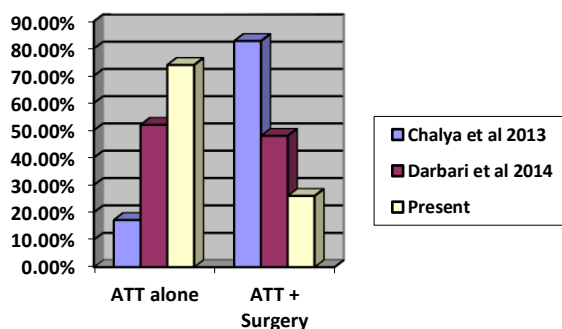


Studies	Year	Ultrasound Findings			
		Lympha-Denopathy	Bowel Wall/Mesenteric Thickening	Ascites	Lymphadenopathy + Bowel/Mesenteric Thickening
Darbari et al <sup>16</sup>	2014	4%	24%	48%	-
Present	2015	38%	12%	34%	16%

**TABLE 12 – CT ABDOMEN:** In our study of 50 cases, 5 were subjected to CT abdomen to confirm the diagnosis. Similar result was shown in the following.

STUDIES	YEAR	CT CONFIRMATION
Present	2015	100%

Chalya et al<sup>14</sup> showed a contrasting result of only 9% in their study.



**TABLE 13: ANTI TUBERCULAR TREATMENT**

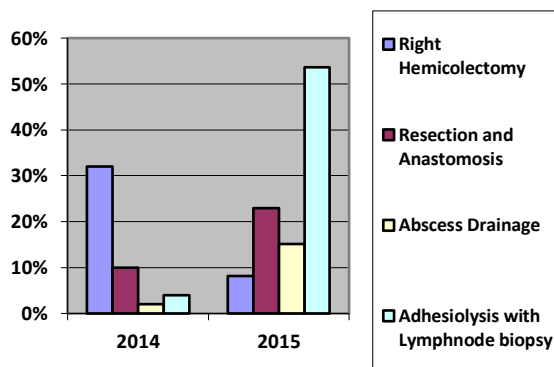
STUDIES	YEAR	ATT	
		ATT alone	Surgery + ATT
Chalya et al <sup>14</sup>	2013	17.2%	82.8%
Darbari et al <sup>16</sup>	2014	52%	48%
Present	2015	74%	26%

In our study, out of 50 patients 88% received ATT category 1 (out of which 11 patients were operated upto), rest 12% received ATT category 2 (out of which only 1 patient was operated upon). All patients

reported relief in symptoms in about 4 to 6 weeks after starting ATT. Islam et al<sup>15</sup> in his study, administered ATT to all his patients. Bhansali et al<sup>7</sup> in his study suggested that ATT be given conservatively for acute tubercular abdomen and should precede preoperatively also. On the contrary, Prakash et al<sup>102</sup> proposed that ATT be given preoperatively only if the patient has tubercular toxemia. Anand et al<sup>96</sup> in his study mentioned that patients of subacute intestinal obstruction due to strictures should be first given ATT to see whether the strictures resolve, else resort to surgery continuing ATT. Balasubramaniam et al<sup>109</sup> was certain that a 6 month course of ATT is sufficient to cure Koch's abdomen. Singh et al<sup>110</sup> proposed that

ATT be given to patients with colonic involvement.

**TABLE 14 – TYPES OF SURGERIES DONE:** In our study, out of the 26% cases (13 patients) that were operated upon, right hemicolectomy with ileotransverse anastomosis was done in only 1 patient (8.1%), resection anastomosis was done in 3 patients (23%), abscess drainage was done in 2 patients (15.2%) and adhesiolysis with lymph node biopsy on laparotomy/laparoscopy was done in 7 patients (53.7%). 4 patients out of 13 were subjected to diagnostic laparoscopy. Dandapat et al<sup>111</sup> in his study did right hemicolectomy in 4.7% cases.



STUDIES		Darbari et al <sup>16</sup>	Present
YEAR		2014	2015
SURGERIES	RIGHT HEMICOLECTOMY	32%	8.1%
	RESECTION ANASTOMOSIS	10%	23%
	ABCESS DRAINAGE	2%	15.2%
	ADHESIOLYSIS WITH LYMPH NODE BIOPSY	4%	53.7%

Darbari et al<sup>16</sup> showed similar results except they did 32% hemicolectomies in their study and only 4% adhesiolysis. Contrasting results were demonstrated in the study conducted by Islam et al – right hemicolectomy with ileotransverse anastomosis was performed in 63.3% and resection anastomosis in 6.6% cases. Bhargav et al<sup>113</sup> in his study performed diagnostic laparoscopy in 33 patients, of which 25 showed thickened peritoneum with yellowish white tubercles, 8 showed thickened peritoneum with adhesions and 5 showed fibroadhesive pattern. Visual diagnosis was accurate in 95% of cases. 2% mortality was noted in our study. The single patient who

underwent right hemicolectomy with ileotransverse anastomosis expired on 4<sup>th</sup> postoperative day due to tubercular toxemia

**DISCUSSION**

Tuberculosis of the gastrointestinal tract is one of the commonest forms of extra pulmonary tuberculosis accounts for 10% of all gut disorders.<sup>16</sup>

Around 0-20% of abdominal Koch's cases are associated with active pulmonary tuberculosis and 5-35% with inactive tuberculosis as reported by Abraham et al<sup>112</sup>, 1992.

The ileum and ileocaecal junction is the most

commonly involved part of the GI tract. Resection anastomosis is the treatment of choice in patients with passable stricture. Adhesiolysis is done in cases of subacute intestinal obstruction due fibrous bands.

## CONCLUSION

In spite of specific antituberculous drugs and vast measures against the disease, including chemoprophylaxis and pasteurization, abdominal tuberculosis remains a fairly common disease even today. Young adults between 20-40 years are the most commonly affected. The patient often comes with vague clinical features, and hence it is difficult to diagnose the condition. Diagnosis of abdominal tuberculosis can only be made after correlating clinical presentation with biochemical and radiological investigations. Plain X ray chest and abdomen coupled with ultrasonography of the abdomen are the investigations of choice in acute cases. The disease has high morbidity and mortality in emergency surgery probably due to inadequate bowel preparation, contamination and fluid electrolyte imbalance. Tuberculosis is common in patients with HIV infection, necessitating screening for HIV for all patients. Neither clinical signs and symptoms, laboratory investigations, radiological and endoscopic methods, nor bacteriological and Histopathological findings provide a gold standard by themselves in the diagnosis of abdominal TB. Therefore, a large number of Koch's abdomen cases still remain undiagnosed. Management requires combination of antitubercular drugs and surgery for diagnosis as well as therapy. Treatment outcome is favorable if started earlier and supported with balanced diet. Along with vaccination and chemoprophylaxis, special tuberculosis programmes, education, sanitation, improving living standards, nutrition and socio economic status are very important to decrease the incidence of tuberculosis.

## REFERENCES

1. S.P.Sahoo H.S,Sukla..... Abdominal Tuberculosis 187-198- Tuberculosis J.P Brothers 2004.
2. Khan M-R, Khan I-R, Pal-K-M, Diagnostic Issues in

Abdominal tuberculosis. Journal of Pak Medical Association, 2001- April; 51(4): 138-2.

3. JIMA – Volume 101: Number 83 – March 2003 ISSN 00195843 – 136
4. Eaders-M, Zuber-M-A, Venzke-T, Kohler-M, Zeitz-M, Duchmann-R, Abdominal tuberculosis A rare differential Diagnosis of Pancreatic Carcinoma, Dtsch-Med-Wochenschr, 2001 March 30; 126(13): 360-363.
5. Moatter-T, Mirza-S, Siddiqui-M-S, Soomro-I-N, Detection of Mycobacterium tuberculosis in paraffin embedded intestinal tissue specimen by polymerase chain reaction characterization of IS6110 element negative strains, J-Pak-Med-Assoc, 1998 June; 48(6): 174-8.
6. Suri-R, Guptha-S-K, Singh-K, Suri-S, Ultra Sound guided time need aspiration cytology in abdominal tuberculosis, Br-Jour-Radiology 1998 July; 71(847): 723-7.
7. Bhansali SK. Abdominal tuberculosis. Experiences with 300 cases. *Am J Gastroenterol* 1977; 67: 324-37.
8. Aston-N-O, De Costa A.M. 1985- tuberculosis performa of small bowel psot graduate Med J. 51(1); 251-252 pp.
9. Chen Y.M. Lee, P.Y. Perang R.P. 1995 Abdominal tuberculosis I Taiwan: A report from Vesperan Gen. Hospital Taipei J. tuberculosis long dresses 76(1): 35-38pp
10. Veeragandhrm R.S. Lynch S.P. et al., 1996, Abdominal tuberculosis in children review of 26 cases J. pediation sug 31(1): 170-176 pp
11. Kuvsajerwala N.K. Bapal RD Joshi A.s. 1997 Mesentri Vasculopathy in intestinal tuberculosis Ind. J. Garno enterlogy 16(4): 134-36 pp
12. Wang H.S. Chen W.S. et al., 1998 The changing pattern of intestinal tuberculosis 30 experinece Int. J. tuberculosis and dring Dvscae 2(7): 569-574 pp.
13. Hovasth K.D. Whelan R.L. 1998 intestinal tuberculosis return of old diseases Am. J. Gastro enterlogy 93(5) : 692-96 pp
14. Phillipo L Chalya, Mabula D Mchembe, Stephan E Mshana, Peter F Rambau, et al. Clinicopathological profile and surgical treatment of abdominal tuberculosis: a single center experience in northwestern

- Tanzania. *BMC Infectious Diseases* 2013, 13:270. Available form: <http://biomedcentral.com/1471-2334/13/270>
15. M B Islam, M K Rahman, M K Islam, S M Mahmudul Haq. Clinicopathological Study of Intestinal Tuberculosis & its Management. *TAJ* 2003; Volume 16 Number 1
  16. Darbari A et al. *Int J Res Med Sci.* 2014 Nov;2(4):1453-1461
  17. Ricahrd S, Snell: M.D. PhD-1990 P-69-75 Grants Anatomy
  18. Chimmy S. Sinnatamby – Last Anatomy Regional and applied 10<sup>th</sup> edition New York; churchis living stne 2000: 246-252 PP.
  19. Marshall JB. Tuberculosis of the gastrointestinal tract and peritoneum. *Am J Gastroenterol* 1993;88:989-99.
  20. Rangabashyam N. Abdominal tuberculosis. In: Morris PJ, Malt RA. editors *Oxford textbook of surgery.* New York: Oxford University Press; 1994.p.2484-92.
  21. Mann CV, Russel RCG, Williams NS, editors. *Bailey and Love's short practice of surgery-* London: English Language Book Society; 1995.
  22. Sohocky S, Tuberculous peritonitis: a review of 100 cases. *Am Rev Respir Dis* 1967;95:398-40.
  23. Bhargava DK, Shrinivas, Chopra P, Nijhawan S, Dasarathy S, Kushwaha AK. Peritoneal tuberculosis: laparoscopic patterns and its diagnostic accuracy. *Am J Gastroenterol* 1992 : 87:109-1
  24. Aguado JM, Pons F, Casafont F, san Miguel G, Valle R. Tuberculous peritonitis: a study comparing cirrhotic and noncirrhotic patients. *J Clin Gastroenterol* 1990:550-4.
  25. Cheng IKP, Chan PCK, Chen MK. Tuberculosis peritonitis complicating long-term peritoneal dialysis: report of 15 cases and review of literature. *Am J Nephrol* 1989;9:155-
  26. Tribedi BD, Gupta DM. Intestinal tuberculosis in Bengal. *J Indian Med Assoc* 1941; 11:41.
  27. Ukil AC. Early diagnosis and treatment of intestinal tuberculosis. *Indian Med Gazette* 1942:77:613.
  28. Chuttani HK. Intestinal tuberculosis. In: *Modern trends ingastroenterology.* Card WI, Creamer B. editors. London: Butter-worth: 1970-p. 309-27.
  29. Bhansali SK, Seilina JR. intestinal obstruction: a clinical analysis of 348 rases. *Indian J Surg* 1970:32:57-70.
  30. Bhansali SK. Gastrointestinal perforations: clinical study of 96 cases. *J Postgrad Med* 1967:13:1-12.
  31. PimparkarBD, DondeUM. Intestinal tuberculosis I. Clini cal and radiological studies. *J Assoc Physicians India* 1974: 22:205-18.
  32. Das P, Shukla HS. Clinical diagnosis of abdominal tuberculosis. *Br J Surg* 1976:63:941-6.
  33. Bhansali SK. The challenge of abdominal tuberculosis in 310 cases. *Indian J Surg* 1978:40:65-77.
  34. Singh V, Jain AK, Agrawal AK, Khanna S, Khanna AK, Gupta JP. Clinicopathological profile of abdominal tuberculosis. *Br J c:-i Pract* 1995:49:22-4.
  35. Fujimura Y. Functional morphology of microfold cells [M cells] in Peyer't patches-phagocytosis and transport of BCG by M cells iro rabbit Peyer's patches. *Gastroenterol Jpn* 1986:21:325-35.
  36. Tandon HD, Prakash A. Pathology of intestinal tuberculosis and its distinction from Crohn's disease. *Gut* 1972; 13:260- 9.
  37. Das P, Shukla HS Abdominal tuberculosis: demonstration of tubercle bacillin tissues and experimental production of hyperplastic e.'teric lesion. *Br J Surg* 1975; 62:610-9.
  38. Lockard LB. Esophageal tuberculosis: a critical review. *Laryngoscope* 1913:23:561-84.
  39. DowCJ. Oesophageal tuberculosis: four cases. *Gut* 1981; 22:234-6.
  40. Rosario MT, Raso CL, Comer CM. Esophageal tuberculosis. *Dig Dis Sci* 1989:34:81-4.
  41. Gordon AH, Marshall JB. Esophageal tuberculosis: definitive diagnosis by endoscopy. *Am J Gastroenterol* 1990:85: 174-7.
  42. Eng J, Sabanathan S. Tuberculosis of the esophagus. *Dig Dis Sci* 1991:36:536-40.
  43. Laajam MA. Primary tuberculosis of the esophagus: pseu-dotumoral presentation. *AmJ Gastroenterol* 1984:79:839-41.
  44. Hancock BW, Bamett DB. Case of post-primary tuberculosis and massive haematemesis. *BMJ* 1974:3:722-3.
  45. Robbs JV, Bhoola KD. Aorto-oesophageal fistula complicating tuberculous aortitis: a case report. *S Air*

- Med J 1976;50:702-4.
46. Good RW. Tuberculosis of the stomach: an analysis of cases recently reviewed. Arch Surg 1931;22:415-25.
  47. Palmer ED. Tuberculosis of the stomach and the stomach in tuberculosis: a review with particular reference to gross pathology and gastroscopic diagnosis. Am Rev Tuberc . 1950;61:116-30.
  48. Page RE. Williams RE. Benson EA. Primary gastric tuberculosis: a case report. Br J Surg 1975;62:618-20.
  49. Tromba JL. Inglese R. Rieders B, Todaro R. Primary gastric tuberculosis presenting as pyloric outlet obstruction. Am J Gastroenterol 1991;86:1820-2.
  50. Vijayraghavan M. Arunabh. Sarda AK, Sharma AK. Chatterjee TK. Duodenal tuberculosis: a review of the clinicopathologic features and management of twelve cases. Jpn J Surg 1990;20:526-9.
  51. Deshpande SG. Mehta MJ. Tuberculous strictures of duodenum. J Indian Med Assoc 1975;65:306-7.
  52. Tandon RK. Pasiakia B. Duodenal tuberculosis as seen by duodenoscopy. Am J Gastroenterol 1976;66:483-6.
  53. Deshmukh J. Value of exploratory laparotomy in the diagnosis of duodenal tuberculosis. J Postgrad Meet 1969; 15:1 14-9.
  54. Singh MK. Arunabh. Kapoor VK. Tuberculosis of the appendix: a report of 17 cases and a suggested aetiopathological classification. Postgrad Med J 1987;63:855-7.
  55. Gupta SC. Gupta AK. Keswani NK. Singh PA. Tripathi AK. Krishna V. Pathology of tropical appendicitis. J Clin Pathol 1989;42:1169-72.
  56. Al-Hilaly MA. Abu-Zidan FM. Zayed FF. Suleiman JD. Fand LS. Tuberculous appendicitis with perforation. Br J Clin Pathol 1990;44:632-3
  57. Colin JF. Stevvan RJ. Ano-rectal tuberculosis-a reminder. Tubercle 1971;52:301-2.
  58. Shukla HS. Gupta SC. Singh G. Singh PA. Tubercular fistula-in-ano. Br J Surg 1988;75:38-9.
  59. Brusko G. Melvin VS. Fromkes JJ. Ellison EC. Pancreatic tuberculosis. Am Surg 1995;61:513-5.