

## Original Research Article

# Koch's abdomen- management of surgical complications and outcomes at a remote hill area tertiary care center

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## ABSTRACT

**Background:** Abdominal tuberculosis needs surgical intervention in a subset of patients; both in emergency and elective settings, requiring surgeons to be familiar with its varied and non-specific modes of presentation and their diagnosis and management.

**Methods:** Patients of abdominal tuberculosis, having undergone surgical management at our Institute, VCSGGMS&RI-UT, between April 2015 to March 2019, numbering eighty (n= 80), were included in this concurrent observational study.

**Results:** Middle age-group patients (20-50 years; 56.3%) with a male majority (73.8%) predominated. Reinfection/relapse of tuberculosis infection might occur despite BCG (Bacillus Calmette-Guerin) immunisation (46.3%) and course of anti tubercular therapy (ATT) (16.3%); complications like bowel obstruction (28; 35%), perforation etc. need laparotomy to effect relief, with stomy formation required (51.3%) frequently; inadequate recovery warranting a secondary/re-look laparotomy (15; 18.8%). Prolene suture for abdominal wound closure is advantageous with a lesser rate of complications and incisional hernia. Septicemia, multi-organ dysfunction, wound infection should be aggressively managed to prevent adverse outcomes, including death (10; 12.5%).

**Conclusions:** Adequate, intensive and timely surgical intervention/laparotomy, with nutritional support, stomy care, management of sepsis, better transport & referral system in hilly topography, and concurrent ATT can result in prompt relief and speedy recovery of patients with abdominal tuberculosis.

**Keywords:** Koch's abdomen, Tuberculosis, Laparotomy, Ileostomy

## INTRODUCTION

Tuberculosis (TB) has a high degree of prevalence among the Indian population, including of Uttarakhand, and affects the "cream", i.e. adults in the age-group of 21 to 40 years (M>F), and also the pediatric age-group, more commonly among weaker sections of the society.<sup>1-3</sup> Abdominal involvement occurs in  $\approx >11\%$  of patients with extra-pulmonary tuberculosis; some of whom are multi drug resistant/ totally drug resistant/extensively drug resistant (MDR/TDR/XDR-TB) &/or re-treatment

cases.<sup>1,4-7</sup> *Mycobacterium tuberculosis* and uncommonly, *M. bovis* or MAC (*Mycobacterium avium* complex) in debilitated or immunocompromised or HIV/AIDS co-infection patients, cause the various subtypes of abdominal tuberculosis (Koch's abdomen); namely: intestinal, other abdominal solid-organ/miliary, peritoneal, ascitic, mesenteric lymphadenitis, etc.<sup>1,5,6,8-10</sup>

Chronic abdominal pain, palpable abdominal lump, with other non-specific and protean manifestations make an early diagnosis difficult; added, the difficulty in obtaining

appropriate and adequate tissue material for analysis and the tedious detection methods available, prompting clinicians/surgeons to administer anti tubercular therapy (ATT) in microbiologically confirmed as well as clinically diagnosed cases of tuberculosis for treatment; and some patients requiring surgical intervention for management of the abdominal complications, including perforation and ulcerations, strictures and obstruction, etc., followed by a course of ATT thereafter.<sup>5,9-11</sup>

### Aim

We aim to outline modes of treatment and outcomes of patients of surgically-managed abdominal tuberculosis, at our institute, in a remote hilly area tertiary care center, whether presenting in the elective, semiemergent or urgent condition with complications thereof, and followed-up for appropriate periods thereafter.

### METHODS

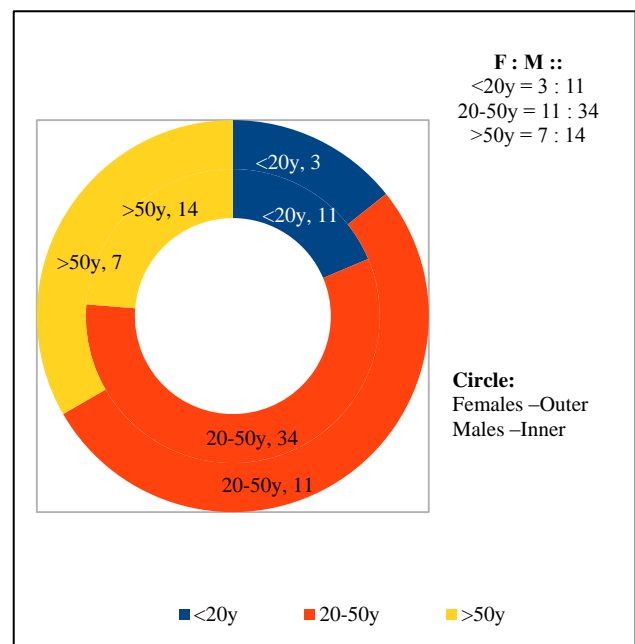
This concurrent observational study has been conducted at Department of Surgery, VCSGMS&RI (HNBS Base Teaching Hospital, Srikot, Srinagar, Uttarakhand, India). Data was collected concurrently as well as retrospectively from patient case-records and intra/post-operative findings, between April 2015 to March 2019, and tabulation and analysis done, regarding the etiopathology and mode(s) of management, complications and outcomes in surgically managed patients with appropriate follow-up periods, of abdominal tuberculosis, hailing from the hill areas of Uttarakhand.<sup>2,8,9</sup>

Appropriate informed and written consent taken from patients included in this study. Appropriate documentation of all cases done and preserved. Appropriate Ethical Clearance sought from Institutional Ethical Committee/IRB. LibreOffice (<https://www.libreoffice.org/>) and Google ([https://gsuite.google.co.in/intl/en\\_in/](https://gsuite.google.co.in/intl/en_in/)) used for data analysis, tabulation, manipulation, interpretation, graphing & charting, with

results as observation numbers / percentages and relevant comparisons.

### RESULTS

Patients of abdominal tuberculosis, requiring surgical management at our Institute in the hill region of Uttarakhand, and presenting between April 2015 and March 2019 (Table 1) numbered eighty (N=80), who were admitted on an elective basis or sought emergency treatment or were transferred in from Depts. of medicine/TB, chest and respiratory diseases and other allied specialties; majority (59; 73.8%) of which were male patients and 21 were females, distributed across various age-groups, with most in the 20-50 year working-population, middle-aged group (56.3%), more from rural background (Figure 1).



**Figure 1: Demography.**

**Table 1: Demography [age/sex-wise distribution of patients (April 2015 – March 2019)].**

Age-group in years N (%)	Sex (M:F)	BCG immunisation (Y: ?N)	↑ESR (as per age and sex)	?Pulm TB on CXR	Prior ATT	Built (BMI) and nutrition (<:WNL:>)	Microbiological / histo-pathological confirmed diagnosis
<20 (14) (17.5)	11:3	10: 4	8	7	2	8: 5: 1	11 (78.6%; 13.8%)
20-50 (45) (56.3)	34:11	25: 20	25	26	9	24: 16: 5	35 (77.8%; 43.8%)
>50 (21) (26.3)	14:7	2: 19	14	16	2	11: 6: 4	16 (76.2%; 20%)
<b>Total (n=80)</b>	59: 21 (M 73.8%: F 26.2%)	37: 43 (Y 46.3%)	47 (58.8%)	49 (61.3%)	13 (16.3%)	43: 27: 10 (53.8%: 33.8%: 12.5%)	62 (77.5%)

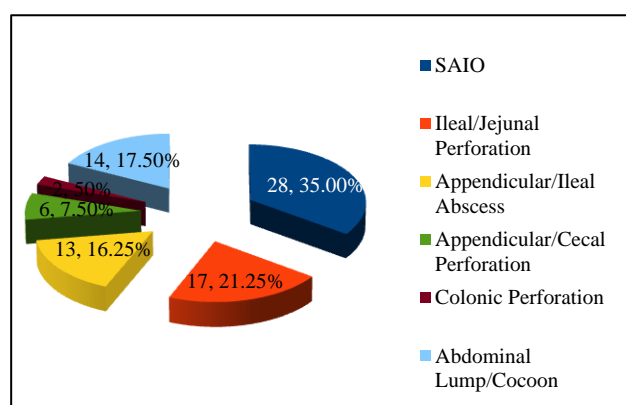
BCG=Bacillus Calmette-Guerin; ESR=Erythrocyte sedimentation rate; ATT=Anti tubercular therapy; TB=Tuberculosis; WNL=Within normal limits.

Table 2: Presentations, procedures and outcomes.

Age-Group (n)		Pathology								Co-Morbid Factors				Management										Complications			Deaths																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
		Ileal/Jejunal Perforation				SAIO (Bands / Adhesions / Ileal Strictures)				Appendicular / Terminal Ileal Abscess				Appendicular / Cecal Perforation				Colonic etc. Perforation				Abd. Lump / Cocoon / Omental				Shock / MOSF / MODS				HIV/AIDS / Hepatitis / Other Co-Infection				Pulmo / Reno / Hepatico / Others Dysfunction				Pri. Lap &Definitive Procedure (n= 80)				Stomy				Sec./Re-Lap (prior to full recovery / discharge)				Incisional Hernia				Malnutrition / Failure to Gain Weight				Septicemia																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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**Table 3: Wound complications (stitch sinus vs. wound dehiscence/incisional hernia).**

Age-group in years (N)	Primary laparotomy (peritoneal wound closure suture material)				Secondary lap. (Prolene suture)	Stomy closure (on follow-up) (Prolene suture closure)	Incisional hernia repair (Prolene/Mesh)
	Prolene	PDS	Vicryl	Overall			
<20 (14)	6 (1: 1)	5 (2: 1)	3 (0: 0)	14 (3: 2) (3.8%:2.5%)	1 (1: 0) (1.3%)	6 (1: 0) (7.5%)	2
20-50 (45)	34 (6: 2)	11 (6: 2)	0	45 (12: 4) (15%:5%)	9 (4: 2) (11.3%)	24 (5: 1) (30%)	7
>50 (21)	17 (4: 1)	4 (2: 1)	0	21 (6: 2) (7.5%:2.5%)	5 (1: 1) (6.3%)	11 (2: 1) (13.8%)	4
<b>Total (n=80) N (%)</b>	57 (11: 4) (71.3) (13.8: 5)	20 (10: 4) (25) (12.5: 5)	3 (0: 0) (3.8) (0: 0)	80 (21: 8) (26.3:10)	15 (6: 3) (18.8) (7.5: 3.8)	41 (8: 2) (51.3) (10: 2.5)	13 (16.3)

**Figure 2: Etiology.**

BCG immunisation among the patients was variable overall (46.3%), being more prevalent among the younger population. A raised ESR, as per age and sex of the patient, was seen in 47 (58.8%), while positive signs of pulmonary tuberculosis on chest X-rays were present in 49 (61.3%) cases. Based upon both physical and biochemical parameters, 27 (33.8%) of the patients had a normal BMI range and level of nutrition, while 43 (53.8%) had values lower than the normal. A positive microbiological &/or histopatho-logical confirmation of tuberculosis could be obtained in about 62 (77.5%) patients based upon tissue and other materials (pus, ascitic fluid, serum/blood, etc) obtained during intraoperative procedure or pre-operative samples.

Based upon radiological criteria and clinical findings, and subsequently confirmed upon exploratory laparotomy, intestinal obstruction (sub-acute/acute) due to bands/adhesions or bowel strictures was the commonest etiology among the operated patients (28; 35%) (Table 2); followed by ileal/jejunal perforations either by itself or proximal to luminal obstruction (17; 21.3%), and thereafter abdominal lump/omental cocoon formation (14; 17.5%), appendicular/terminal-ileal abscess in

relation to appendicular/terminal ileal lymph nodes or bowel perforation or mesenteric lymph nodes (13; 16.3%), appendicular/cecal perforation (6; 7.5%) and colonic perforation (2; 2.5%) (Figure 2). Forty-four of the 80 patients (55%) were received in shock/multi organ system failure (MOSF)/ multi organ dysfunction syndrome (MODS), which needed prolonged and active resuscitation, ongoing in the peri-operative period; human immunodeficiency virus (HIV)/ acquired immuno deficiency syndrome (AIDS) co-infection was present in two of the patients, while four others were inflicted with hepatitis B/C, usually presenting with chronic and more severe forms of the disease and ATT drug resistance being more frequent among them. Concurrent pulmonary/renal/hepatic and other system dysfunction, or inadequate recovery from MOSF, based upon serum biochemistries, blood-gas level analyses, etc. was observed in 33 (41.3%) cases, which required intensive support during the management period, with expert opinion sought from physician/intensivist and other concerned Dept. faculty colleagues.

All these patients underwent appropriate primary surgical management of their pathology as per the etiology, during exploratory laparotomy, along with diverting/ protective/definitive primary stomy formation needed in 41 (51.3%) of them (Table 2). Resection and Anastomosis of the involved bowel segment was the most commonly performed definitive procedure (25; 31.3%), followed by adhesiolysis and band excision (14; 17.5%), appendectomy (14; 17.5%), stricturoplasty (13; 16.3%), primary repair of bowel perforation (10; 12.5%), and 4 (5%) of the patients requiring a "limited right hemicolectomy" procedure. Some (15; 18.8%) of the above patients did not have an expected full recovery and needed a secondary/re-laparotomy procedure before discharge for various complications, including: re-perforation of the bowel (4; 5%), anastomotic leak (4; 5%), enterocutaneous fistulae (3; 3.75), adhesive bowel obstruction/SAIO (2; 2.5%) and stomal complications (2;

2.5%), with 11 of the 15 patients (73.3%) requiring stomy formation. Malnutrition and failure to gain weight was observed in 24 (30%) of the patients during peri-operative/follow-up period. Major complications, including septicemia and multi-organ failure developed in 13 (16.3%) of the patients, and overall, 10 (12.5%) patients died in the post-operative period prior to discharge in spite of intensive care and management.

Primary laparotomy peritoneal wound closure suture material used was, depending upon individual patient's requirements and the operating surgeon's preference, prolene (57 cases; 71.3%), polydioxanone suture (PDS) (20; 25%) and vicryl (3; 3.8%) in pediatric cases (Table 3). Incisional hernia developed in 11 (13.8%) of the patients; in 8 (10%) post the primary laparotomy procedure and in 3 out of 15 post the secondary laparotomy, due to inadequate/improper healing of the laparotomy wound due to various patient factors and their debilitating conditions; furthermore, two of the forty-one patients having undergone stomy closure, developed incisional hernia at the local wound site (Tables 2 and 3). In total, 13 (16.3%) patients had to undergo repair of their incisional hernias during the follow-up period as a secondary procedure. Despite adequate care and antiseptic dressings, stitch sinus/ minor wound infection was common (Figure 3) among the patients during recovery: 21 of the 80 patients after the primary procedure, 6 of 15 patients after the secondary laparotomy and 8 of 41 patients after the stomy closure procedure.



**Figure 3: Major wound complications in an operated patient of abdominal tuberculosis.**

## DISCUSSION

Other recent studies, by Gohel et al, Agarwal et al, Sharma & Bhatia, Pathak et al, Charokar et al, Mishra et al, Arif et al on the surgical management of cases of abdominal tuberculosis, and also the above cited articles, point to similar trends in epidemiology and presentation, with most patients being males in the age-group 20-50years; of low socio-economic strata and lower

nutritional status, with concurrent signs of pulmonary TB as well as a high rate of intra/preoperative positivity of tissue samples for tuberculosis/acid-fast bacilli (AFB).<sup>12-18</sup> As with those studies, intestinal obstruction due to varied manifestations of abdominal Koch's was the commonest etiology for surgical intervention, followed closely by bowel perforation, intra-peritoneal abscess, etc.<sup>9-11</sup> Stoma formation was required in most cases, as was the wound complication rate, despite adequate care, whereas, death rate was low.<sup>19-23</sup> Abdominal wound closure with prolene suture was associated with less complications.<sup>24</sup>

BCG immunisation in childhood is important to confer some degree of resistance to development of Tuberculosis in patients, but other modes of contact prevention and protection is also required; similarly, prior ATT results in cure in most patients of pulmonary/extra-pulmonary TB, but rare patients may develop latent/resurgence of infection and complications thereafter, needing surgical intervention. BCG immunisation has wider coverage by health and community immunisation programmes in the recent years.<sup>1,3-5,9,25</sup>

Raised erythrocyte sedimentation rate (ESR) and chest X-ray signs of pulmonary TB are adjuncts to diagnosis; better and more specific results are obtained from tissue and other infected material samples on microbiological/histopathological/genetic analysis methods; at times, the surgeon playing a vital role by making a clinical diagnosis based upon the intra-operative findings despite negative tissue sample results and patient gaining relief on commencement of ATT.<sup>26-28</sup>

Wound complications are common, as shown by the other investigators, and need meticulous intra-operative techniques as well as good post-operative care and management, with involvement and support from the patients' families, for timely recovery.<sup>12-14,24</sup> Surgeon's clinical judgement plays a key role in diagnosis and management of such cases, given the late presentation, partly due to the rugged hilly terrain, at times in sepsis, by these patients.<sup>3,5-9,29</sup>

## CONCLUSION

The varied manifestations of abdominal tuberculosis, both in acute and chronic setting, may sometimes require surgical intervention, with concurrent ATT chemotherapy and nutritional support, with intensive care. Presentation in sepsis points to constraints in transport and topography, as well as limited health services in the rural/peripheral areas of hilly Uttarakhand. Protective/therapeutic diverting stomy formation may have to accompany many of the primary laparotomy procedures, with need for secondary/re-look laparotomy in those with inadequate recovery. Malnutrition, septicemia, MOSF needs to be aggressively managed in all these cases to prevent adverse outcomes or death.



Better and early referral and higher level intensive care facilities are warranted for better outcomes in these patients.

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