

Original Article

Abdominal tuberculosis requiring surgical intervention: A 10-year single-center experience

Hana Arbab,^{1*} Nawal Khan,¹ Farhana Amanullah,² Lubna Samad¹

¹ Department of Pediatric Surgery, The Indus Hospital, Karachi, Pakistan

² Department of Pediatric Medicine, The Indus Hospital, Karachi, Pakistan

Cite as: Arbab H, Khan N, Amanullah F, Samad L. Abdominal tuberculosis requiring surgical intervention: A 10-year single-center experience. J Pediatr Adolesc Surg. 2024; 2: 7-10.

This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited (<https://creativecommons.org/licenses/by/4.0/>).

ABSTRACT

Background: Although uncommon in children, abdominal tuberculosis (ATB) can be a life-threatening condition with a subset requiring emergency surgical intervention. This study aims to determine the presentation, surgical procedures performed, and outcomes in children affected by abdominal tuberculosis.

Methods: A retrospective chart review of all children undergoing surgical intervention for ATB from July 2007 to December 2018 was conducted. Data were analyzed using SPSS version 22.

Results: Of 340 children with a diagnosis of ATB seen at the Indus Hospital's TB clinic, 14 (4%) underwent laparotomy. Females were affected more commonly (57%), with a mean age at presentation of 11 years (range 8-14). Nine children required laparotomy for documented perforation, while 5 had an intestinal obstruction. Most children (n=10) had an established diagnosis of ATB before the surgical intervention; 2 children had completed 6–9 months anti-tuberculous treatment (ATT) courses, while 8 children had been on ATT for a mean period of 2.5 months at the time of developing acute surgical symptoms. Diversion ileostomy was made in 64%. Postoperative complications included sepsis (n=4), wound infection (n=3), abdominal collection (n=2), enterocutaneous fistula (n=2), and abdominal wound dehiscence requiring formal closure (n=2). There were 4 mortalities (29%); 10 patients were discharged after a median in-hospital stay of 12 days (range 6-35) of which 6 with ileostomies underwent reversal after completion of the ATT course.

Conclusion: ATB has high morbidity and mortality. Perforation and obstruction can occur during or after the completion of ATT. Management requires early recognition and surgical intervention as indicated.

Keywords: Abdominal TB, Tuberculosis, Surgery, Complications.

INTRODUCTION

Tuberculosis (TB) is one of the top ten causes of death worldwide.[1] TB is a major cause of childhood mortality, and 95% of these deaths occur in developing countries.[1] An estimated 10% – 25% of affected children have an extrapulmonary disease (EPTB); abdominal TB (ATB) is the 6th most common extrapulmonary site reported.[2] Pakistan is ranked fifth among the high-TB burdened countries worldwide [3] and correspondingly, have a high incidence of children suffering from ATB.[4]

The Indus Hospital operates the largest private pediatric TB and Drug-Resistant (DR-TB) program in Pakistan

with over 3000 children enrolled and treated since its inception in 2008.

Children affected by abdominal tuberculosis frequently present to the pediatric surgery service; they are either referred from the pediatric TB clinic, or present to the emergency room with acute abdominal symptoms which are later determined to be secondary to TB, or sequelae of ATB.

This study aims to determine the presentation patterns, surgical procedures performed, and outcomes in children affected by abdominal tuberculosis and treated surgically at the Indus Hospital, Karachi.

METHODS

A retrospective chart review of all children that underwent surgical intervention for complications of abdominal tuberculosis at our institute from July 2007 to December 2018 was conducted.

Children up to 14 years of age, diagnosed with ATB either on microbiology of specimen obtained through gastric aspiration or histopathology of the specimen obtained either pre or post-procedure and requiring the surgery due to ATB-related complications were included in the study. Those children with symptoms caused by ATB that were admitted under surgical care but responded to non-operative management were excluded from the study.

Variables reviewed were age, gender, symptoms at presentation, history of BCG vaccination, initiation and duration of anti-tuberculosis treatment (ATT) - pre and post-procedure, compliance to ATT, indication for laparotomy, type of surgery performed, surgical findings, postoperative complications, and microbiological and histopathological findings. The latter two investigations were performed on any tissue specimens obtained during surgery.

Data collected was entered on a standardized form and analyzed using SPSS version 22. A Chi-square test was employed to check the association between categorical variables such as age, gender, clinical history, physical examination findings, and imaging results.

All data collected were de-identified prior to analysis. All forms and data were accessible to the authors. The ethical review committee approved the study and provided an exemption.

RESULTS

A total of 2843 children were managed for TB during the study period, of which 340 (12%) were diagnosed with ATB of which only 14 (4%) underwent laparotomy. The male to female ratio was 1 to 1.3 (6 males, 8 females). The mean age at presentation and surgery was 11 years (median 10 years, range 8 - 14 years).

Table 1. Signs and symptoms

Symptoms and Signs	n	%
Abdominal Pain	11	79
Vomiting	8	57
Fever	4	29
Discharging Enterocutaneous Fistulae	2	14
Umbilical Discharge	1	7
Anorexia	1	7
Constipation	1	7
Abdominal Tenderness	6	43
Abdominal Distension	5	36
Absent Bowel Sounds	2	14

The presenting symptoms (in varying combinations) included abdominal pain (n=11, 79%), vomiting (n=8, 57%), fever (n=4, 29%), discharging enterocutaneous fistulae (n=2, 14%); purulent discharge from the umbilicus, constipation and anorexia were seen in 1 patient each. On examination, the commonest sign was abdominal tenderness (n=6, 43%), followed by abdominal distension (n=5, 36%) and absent bowel sounds (n=2, 14%) (Table 1). The mean duration of symptoms was 6 days (median 1.5 days, range less than a day to 30 days).

In 10 children, a diagnosis of TB had already been established prior to presentation to the surgical service. Antituberculosis therapy (ATT) had been initiated based on a high index of clinical suspicion of abdominal TB (n=4, 40%), or clinical presentation supported by radiological findings (n=4, 40%), whereas a diagnosis of EPTB with lymph node involvement confirmed on histopathology had been established and ATT initiated in 2 (20%). Overall, 2 of these 10 children had completed the full course of ATT, 3 and 6 weeks prior to presentation, while the remaining 8 children had been on ATT for a mean period of 2.5 months at the time of acute presentation to the surgical service. In the remaining 4 children, ATB was suspected at the time of surgery and confirmed on microbiological and histopathological examination of the specimens obtained.

Records for BCG vaccination were present for only 3 of the 14 patients, 2 of whom had received the vaccine. Tuberculin sensitivity tests were done in 7 patients, of whom 3 had a positive reading.

The indication for surgery was an intestinal perforation in 9 children, and intestinal obstruction not responding to non-operative management in 5 children. The site of one or more perforations was the distal ileum in all but 1 child, who was noted to have a jejunal perforation. A diversion ileostomy was made in 9 patients with a concurrent proximal anastomosis for higher perforations being required in 2 instances. Resection anastomosis, primary repair, division of adhesions secondary to a previous surgery (for which no records were available) with diversion stoma formation, and a right hemicolectomy (for extensive involvement with multiple perforations) with drain placement was performed in 1 patient each.

Postoperative complications included sepsis (n=4), wound infection (n=3), abdominal collection (n=2), fecal/enterocutaneous fistula (n=2), and abdominal wound dehiscence requiring formal closure (n=2). Four children died during the postoperative period of sepsis and its sequelae (mean time of death was the 10th postoperative day, range 1 to 29th postoperative day). The 10 surviving patients were discharged after a mean hospital stay of 17 days (range 6-35 days). Of these the 6 children with diversion stomas underwent reversal at our institute after completion of ATT.

DISCUSSION

Tuberculosis (TB) continues to be a leading cause of morbidity and mortality worldwide, contributing significantly to the health and economic burden, particularly in developing countries.[5-9] Abdominal tuberculosis (ATB) has been widely reported in the literature, but very few publications have focused on the surgical manifestations of ATB in children. Our study demonstrates that although a small number of children are affected, the morbidity and mortality in children requiring surgery for abdominal tuberculosis is significant.

The mean age at the presentation at our center was 11 years, which is older than the commonly reported age of 6 to 9 years.[10-13] The gender of affected patients has varied in different reports, but a female predominance has been noted [11, 14] which is consistent with our patient population, as reported by Codlin et al.[15] Young women are vulnerable because they are often socially and economically marginalized in Pakistani society. In poorer communities, women often care for the young, elderly, and sick in the home, creating the potential for sustained transmission of the mycobacteria.

The most common mode of presentation was perforation peritonitis in 64% of patients, with the rest presenting with intestinal obstruction. These findings were similar to a study reported by Lal [17], Jaskani [18], and Malik [19]. In contrast, Pathak et al. reported a higher number of patients presenting with intestinal obstruction (65%) as compared to perforation peritonitis (29%).[20] However, these studies included adult patients only. Ileal involvement was most commonly seen in our study (57%); a similar involvement has been reported in adult populations.[19, 20] These findings emphasize the need to keep ATB as a differential diagnosis for all children presenting with acute abdomen in TB endemic settings.

In a study of 80 adults with ATB by Keshri et al [21], 13 (16.3%) had been on ATT prior to developing complications requiring surgical intervention. Mirza et al reported that 4 of 18 children (22%) on ATT required surgery [22]; most of our patients were diagnosed to have tuberculosis and were on ATT prior to the acute presentation. This calls attention to the need to be constantly vigilant during and even after completion of treatment for ATB, and to be prepared for early intervention in affected children and adults.

In pediatric patients with abdominal tuberculosis, the commonest postoperative complications reported in the literature are enterocutaneous fistula [14, 16] and sep-

sis.[16] We encountered sepsis, wound infection, and wound dehiscence in our patients, with 80% of surviving children in our series developing complications. Almost a fifth (19%) of children in our cohort died during the management course; an even higher mortality rate (44.7%) was observed in adult ATB patients in a hospital in Rawalpindi [18], with prolonged in-hospital stays (mean: 17 days, range: 6-35 days) which is in keeping with other reports.[23] Even higher mortality rates have been reported by other authors.[15, 25] It can only be postulated that delays in diagnosis of both obstruction and perforation lead to bacterial stasis and proliferation. This places a demand on the already nutritional and immune-deficient patient, now suffering from TB, that can often not be overcome, leading to high morbidity and mortality rates. Children have less reserve than adults and are at an even greater disadvantage. Therefore, it is essential to keep a high index of suspicion during treatment; it is recommended that the treating physicians work closely with the surgical team to ensure early identification and timely intervention as needed. Regarding the limitations of our study, this was a retrospective review, and all data were not documented in some cases, as reflected in our results.

CONCLUSION

Whenever there is a pandemic, the first and foremost step is the preparation. This involves changes not only in the infrastructure but also in the mindset and practices. Setting up COVID OR, providing PPEs, explaining all steps with regular teachings, PPE drills and simulations are one aspect. The other most challenging aspect is implementation and strict compliance with the protocols. Bringing a change is always difficult even if it is risking lives. As Pediatric anesthesiologists, we should play our part in collaboration with the surgical team. The more our team is organized, the better it performs in terms of patient management and the protection of health care workers.

Conflict of Interest: None

Source of Support: Nil

Consent to Publication: No clinical figure is being used in this manuscript.

Authors Contribution: Author(s) declared to fulfill authorship criteria as devised by ICMJE and approved the final version. Authorship declaration form, submitted by the author(s), is available with the editorial office.

Acknowledgements: None

REFERENCES

1. Tuberculosis. Available from: <http://www.who.int/en/news-room/factsheets/detail/tuberculosis>.
2. Sharma MP, Bhatia V. Abdominal tuberculosis. *Ind J Med Res.* 2004; 120:305-15.
3. Pakistan: Tuberculosis. Available from: <http://www.emro.who.int/pak/programmes/stop-tuberculosis.html>.
4. Aston N. Abdominal tuberculosis. *World J Surg.* 1997; 21:492-9.

5. Chandir S, Hussain H, Salahuddin N, Amir M, Ali F, Lotia I, et al. Extrapulmonary tuberculosis: a retrospective review of 194 cases at a tertiary care hospital in Karachi, Pakistan. *J Pak Med Assoc.* 2010; 60:105-9.
6. Rajput MJ, Memon AS, Rani S, Memon AH. Clinicopathological profile and surgical outcomes of patients suffering from gastrointestinal tuberculosis undergoing laparotomy. *J Liaquat Uni Med Health Sci.* 2005; 5:119-21.
7. Khan IA, Khattak IU, Asif S, Nasir M, Zia ur R. Abdominal tuberculosis an experience at Ayub Teaching Hospital Abbottabad. *J Ayub Med Coll Abbottabad.* 2008; 20:115-8.
8. Arif AU, Shah LA, Asadullah, Sadiq M. The frequency and management of intestinal tuberculosis; a hospital based study. *J Postgrad Med Instit.* 2008; 22:152-6.
9. Ahmed M, Mughal MA, Mengal MA. Varied intestinal tuberculosis: an experience at Sandeman Hospital, Quetta. *J Coll Phys Surg Pak.* 2000; 10:246-8.
10. Basu S, Ganguly S, Chandra PK, Basu S. Clinical profile and outcome of abdominal tuberculosis in Indian children. *Singapore Med J.* 2007; 48:900-5.
11. Tinsa F, Essaddam L, Fitouri Z, Brini I, Douira W, Ben Becher S, et al. Abdominal tuberculosis in children. *J Pediatr Gastroenterol Nutr.* 2010; 50:634-8.
12. Kılıç Ö, Somer A, Hançerli Törün S, Keser Emiroğlu M, Salman N, Salman T, et al. Assessment of 35 children with abdominal tuberculosis. *Turk J Gastroenterol.* 2015; 26:128-32.
13. Gürkan F, Özateş M, Boşnak M, Dikici B, Boşnak V. Tuberculous peritonitis in 11 children: Clinical features and diagnostic approach. *Pediatr Int.* 1999; 41:510-3.
14. Lin YS, Huang YC, Lin TY. Abdominal tuberculosis in children: a diagnostic challenge. *J Microbiol Immunol Infect.* 2010; 43:188-93.
15. Codlin AJ, Khawaja S, Chen Z, Rahbar MH, Qadeer E, Ara I, et al. Gender differences in tuberculosis notification in Pakistan. *Am J Trop Med Hygiene.* 2011; 85:514-7.
16. Ozbey H, Tireli GA, Salman T. Abdominal tuberculosis in children. *Eur J Pediatr Surg.* 2003; 13:116-9.
17. Lal V, Deolekar S, Mahapatra B, Narayan P, Sheikh T. Study of gastrointestinal tuberculosis and role of surgery in its management in Navi Mumbai: analysis of 50 cases. *Ind J Basic Appl Med Res.* 2014; 4:363-74.
18. Jaskani S, Mehmood N, Khan NM, Khan HD, Anwar I. Surgical management of acute presentation and outcome of patients with complicated abdominal tuberculosis. *J Rawalpindi Med Coll.* 2016; 20:108-12.
19. Malik KA, Waheed I. Frequency of intestinal tuberculosis in cases of intestinal obstruction. *J Liaquat Uni Med Health Sci.* 2006; 5:119-21.
20. Pathak P, Sahu SK, Agrawal S. Clinicopathological profile and surgical outcome of patients of gastrointestinal tuberculosis undergoing laparotomy. *Chirurgia.* 2016; 111:487-92.
21. Keshri A, Kumar A, Prakash S, Singh KP. Koch's abdomen- management of surgical complications and outcomes at a remote hill area tertiary care center. *Int Surg J.* 2019; 6:1514-9.
22. Mirza B, Ijaz L, Saleem M, Sheikh A. Surgical aspects of intestinal tuberculosis in children: Our experience. *Afr J Paediatr Surg.* 2011; 8:185-9.
23. Pattanayak S, Behuria S. Is abdominal tuberculosis a surgical problem? *Ann R Coll Surg Engl.* 2015; 97:414-9.
24. Akbar M, Fakhar ul I, Haider IZ, Naveed D, Akbar I, Khattak I, et al. Surgical management of tuberculous small bowel obstruction. *J Ayub Med Coll Abbottabad.* 2010; 22:171-5.
25. Iqbal T, Khan A, Iqbal A, Tahir F. Obstruction due to intestinal tuberculosis: Stricturoplasty versus resection anastomosis. *Pak J Surg.* 2008; 24:177-81.
26. Charokar K, Garg N, Jain AK. Surgical management of abdominal tuberculosis: a retrospective study from Central India. *Int Surg J.* 2016; 3:9.