

Original Article

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

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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 burden 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).

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).

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

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 sepsis.[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

Due to the significant complications and mortality associated with ATB, physicians should have a high index of suspicion in children with non-specific abdominal symptoms in TB endemic areas. Early screening and diagnosis allow for timely initiation of ATT, and for surgical intervention if needed. It is important to remember that intestinal perforation and obstruction can occur during or after completion of ATT; families should be counseled and monitored accordingly.

Conflict of Interest: None.

Consent to Publication: No clinical figure is 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.

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