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Surgical aspects of intestinal tuberculosis in children: Our experience

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ABSTRACT

Background: Tuberculosis (TB) is a major health problem in resource-constrained countries. Intestinal TB is especially notorious as a number of cases have to be dealt surgically, which too have morbidity and mortality. This study was conducted to identify various presentations of intestinal TB necessitating surgical intervention, their management, complications, and outcome in our hospital. **Materials and Methods:** This was a retrospective study carried out at the Department of Paediatric Surgery, The Children's Hospital and The Institute of Child Health Lahore, Pakistan, from December 2007 to January 2010. The information about the demography, clinical presentations, investigations, management performed, complications encountered, and outcome of patients with intestinal TB were reviewed. **Results:** There were a total of 18 patients with intestinal TB who were managed surgically during this period. Five were male and 13 female patients (M : F 1 : 2.6). Mean age of presentation was 8.3 years. Clinical presentations were acute peritonitis in 7 patients, pneumoperitoneum in 5 patients, complete intestinal obstruction in 4 patients, pain in right iliac fossa in 2 patients, and irreducible inguinal hernia in 1 patient. Four patients had concurrent pulmonary TB. Surgical interventions included primary repair of perforation in one, repair of perforation with diversion ileostomy in 8, and merely peritoneal drainage (haemodynamically unstable patients) in 3 patients. The post-operative complications were high output ileostomy in 3, faecal fistula in 1, wound dehiscence in 3, wound infection 5, and prolonged ileus in 1 patient. In three patients stoma was reversed during the same admission. There was one expiry in our study. **Conclusion:** Acute peritonitis, intestinal obstruction and intestinal perforation are the main clinical presentations requiring surgical interventions. Optimal surgical strategy should be adopted to avoid such pitfalls in the management.

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INTRODUCTION

Tuberculosis (TB) is still a very deadly disease and its presence has been confirmed as far as 2400 BC in the fossil's record. It is a chronic granulomatous inflammatory disease involving almost any part of the body but has special affection for lungs, bones, intestine and lymphatic tissue.[1]

In case of intestinal TB the lesion can be found anywhere from mouth to anus. Intestinal TB has a variable spectrum of presentations ranging from merely pain abdomen to the extreme conditions like peritonitis, intestinal obstruction, and intestinal perforation. The management of intestinal TB is very intricate needing surgical interventions in many patients that too have high morbidity and mortality.[2] This study was conducted to evaluate presentations of intestinal TB requiring surgical interventions, its management, complications, and outcome in our unit.

MATERIALS AND METHODS

Pakistan is a developing country and most of its population is living in villages with a very low socio-economic status and also remote to the basic health facilities. That is why we are receiving a significant number of patients of TB in outpatient and emergency departments. A handsome number of these patients with intestinal TB respond well to anti-tuberculosis therapy (ATT), but surgical interventions have to be performed in a number of patients.

During the study tenure we managed 108 patients of intestinal TB. We retrospectively analyzed those patients of intestinal TB in whom surgical management

was performed in any way and excluded other patients which did well on ATT.

The records of these patients including demographic information, history, clinical examination, investigations, and management performed, complications, and outcome, were reviewed retrospectively. A short-term follow-up of some of the patients was also presented.

The study population had a confirmed diagnosis on intestinal TB, based on two main parameters; one is direct visualization of the lesion during surgery and the other is histological evidence of the submitted biopsy. In three patients the diagnosis of intestinal TB was based on history, clinical examination, investigations, and response to the ATT.

RESULTS

General considerations

There were a total of 18 patients, with diagnosis of intestinal TB, in whom surgical interventions were performed. There were 5 male and 13 female patients with male to female ratio of 1 : 2.6. The age of presentation was ranged between 4 and 15 years with an average of 8.3 years (SD ±2.4).

Thirteen patients (70%) belonged to poor socio-economic status. Only six (33%) of them were vaccinated with BCG. Eight (44%) patients had a history of contact with TB patient in the family. Ten patients (55.5%) had a history of overt constitutional symptoms. Four (22%) patients had been previously diagnosed as a case of intestinal TB basing upon the history, clinical features, erythrocyte sedimentation rate (ESR), and Mantoux test. These patients were taking ATT for few months, but presented with acute abdomen in our department.

Clinical presentation

The clinical presentation was acute peritonism in seven patients, and pneumoperitoneum with features of peritonitis in five patients. Frequency of clinical presentation is presented in Table 1.

Investigations

In 15 patients, haemoglobin was less than 10 g/dl and eight patients had to be transfused before operation. Ten patients had elevated total leukocyte counts and sixteen patients had elevated ESR. X-ray abdomen-erect revealed air under diaphragm in five patients and air fluid levels indicative of intestinal obstruction in four patients. Chest X-ray revealed concurrent pulmonary TB in 4 patients. Ultrasound abdomen gave debrinous fluid collection in the pelvis in 13 patients and enlarged mesenteric lymph nodes in 16 patients.

Table 1: Presentations of intestinal tuberculosis necessitated surgical interventions

Presentations	Frequency	Proportions (%)
Acute peritonitis	7	38
Pneumoperitoneum	5	27
Acute intestinal obstruction	4	22.2
Pain in the right iliac fossa	2	11.1
Irreducible inguinal hernia	1	5.6

Surgical interventions

Twelve patients underwent emergency exploratory laparotomy for acute abdomen and rapid deterioration of clinical condition of the patients. In these, six patients had multiple strictures in small intestine with one or two intestinal perforations; and three patients had multiple circumferential ulcers with multiple perforations throughout the small intestine; the remaining three patients showed a matted mass of gut and omentum. The management offered to these patients, with perforations, was primary repair of perforation in one and repair of perforations with proximal diverting ileostomy in 8 patients (along with biopsies from omentum, mesenteric lymph nodes, peritoneum and margins of the perforation). In those patients with matted mass of intestine and omentum only biopsy was taken and abdomen closed after placing the peritoneal drains.

In two patients in whom there was acute pain abdomen localized in right iliac fossa (preoperative suspicion was of acute perforated appendicitis), the operative findings were ileocecal tuberculosis as characterized by thickened and oedematous ileocecal region and 1–2 strictures in the terminal ileum. In these patients the patency of involved intestine was confirmed by squeezing the gut contents and biopsies taken from omentum, mesenteric lymph nodes and appendix (appendectomy).

There were three other patients who were not vitally and haemodynamically stable, they were given peritoneal drainage with 22-Fr Nelaton catheter under local anaesthesia.

In another patient presented with irreducible right inguinal hernia; during herniotomy the contents of the hernial sac were omentum and small intestine, which were covered with a large number of tubercles on it. This patient, then, had an exploratory laparotomy that confirmed the findings of intestinal TB [Figure 1].

Adhesiolysis was performed and biopsies taken from omentum and mesenteric lymph node.

Table 2 describes the operative findings and management performed in these patients.

Postoperative course

Each patient was started on injectable ATT (streptomycin, ethambutol and ciprofloxacin) along with general postoperative measures such as nothing per oral, intravenous fluids, H_2 blockers, and analgesics. The injectable ATT was then switched to oral ATT once the patients started orally.

In three patients the ileostomy was high output which was then reversed after three weeks of giving ATT in the same admission. During that period these patients were managed by giving extra intravenous fluids and total parental nutrition for converting them into positive nitrogen balance. These patients did well after reversal of stoma.

One of the patients in whom merely peritoneal drainage was given developed faecal fistula and disseminated TB. He eventually went into multi-organ failure and expired. The other two patients responded well to the ATT. The amount of pus in the drains reduced gradually and in three weeks the drains were removed.



Figure 1: Image showing intestine covered with multiple tubercles.

Histopathology confirmed the diagnosis of granulomatous inflammation in each patient.

Complications

The complications encountered in our patients were wound infection in five patients, wound dehiscence in three patients, faecal fistula in one, and high output ileostomy in three patients. In one patient in whom there was irreducible hernia with intestinal TB, the patient had prolonged ileus that took about ten days to settle down.

Hospital stay

The mean hospital stay was 20 days (SD ± 8). The hospital stay was shortest in the ileocecal TB (7 days) and longest in patients that needed ileostomy reversal in the same admission (>1 month).

Follow-up

All the patients were on regular follow-up and only few of them showed mild symptoms related to the ATT itself. About 10 patients had a follow-up of more than a year with no relapse of the disease. Others have a variable period of follow-up ranging from two months to eight months. One patient in whom the perforation was primarily repaired presented thrice for sub-acute intestinal obstruction that managed conservatively.

DISCUSSION

TB is a chronic granulomatous inflammatory disease characterized by worldwide distribution and special affection for resource poor countries. It is more prevalent in underdeveloped and developing countries; however, an increasing incidence of TB is observed in developed countries in the last decade. This is due to increasing incidence of HIV infections in these countries.[1,2]

Intestinal TB produces two types of lesions. One form

Table 2: Operative findings and procedures performed in the study population

No. of patients	Operative findings	Procedures
6	Multiple strictures in the small bowel with 1–2 perforations	Primary repair of perforation in 1 patient Repair of perforations and diversion in 5 patients + biopsies
3	Multiple circumferential ulcers with multiple perforations	Repair of perforations with diversion + biopsies
3	Matted mass of intestine and omentum	Biopsies taken from omentum, peritoneum.
3	Not fit for operation	Drain placed
2	Thickened ileocecal region with 1–2 strictures in the terminal ileum	Biopsies from omentum, mesenteric lymph nodes, and appendix
1	The contents of the hernial sac were omentum and small bowel. Both were adherent and covered with tubercles. When laparotomy done then small bowel was adherent and covered with tubercles.	Adhesiolysis and biopsy taken

is ulcerative variety characterized by multiple ulcers, lying transversally; in the ileum and the overlying serosa is thickened, reddened and covered in multiple tubercles. Cicatricial healing of these circumferential ulcers produces strictures. The other pathological variety of intestinal TB is hyperplastic variety featured by presence in ileocecal region and lymphoid hyperplasia due to chronic inflammation, resulting in thickening of intestinal wall and luminal narrowing. Both the varieties may coexist in many patients.[1,3-8] In our series there were two patients with hyperplastic variety and 10 patients with ulcerative variety. The nature of the lesion in remaining patients was not overt as three were having a matted mass of intestine and three patients were managed by merely peritoneal drain placement. However the matted intestinal mass is usually a feature of ulcerative variety of intestinal TB.

In patients of intestinal TB the presentation might be acute or sub-acute/chronic. In acute type the patient presents with acute peritonitis, intestinal obstruction, and intestinal perforation. In case of sub-acute presentation, there might be sub-acute intestinal obstruction, alternating constipation and diarrhoea, a palpable mass of matted gut loops, chronic pain abdomen and a generalized wasting appearance.[9-11] In our series, the main presentation was acute peritonitis with and without intestinal perforation and intestinal obstruction. It is our opinion that intestine can perforate in two ways in this disease. One is perforation during ulceration phase which was characterized by multiple ulcers and multiple perforations or impending perforation. The other is a single minute perforation proximal to completely obstructing stricture. The other presentations of intestinal TB that needed surgical interventions in our series were acute pain in the right iliac fossa and incarcerated inguinal hernia. Many series have shown the presentation of ileocecal TB as pain or mass in the right iliac fossa. Few case reports are also available regarding presentation of intestinal TB as incarcerated inguinal hernia.[12]

The diagnosis of intestinal TB depends upon various factors including history, clinical examination, ESR, Mantoux test, radiological, operative, and histological findings. History of long-term low-grade fever, weight loss, and chronic pain abdomen with associated alternating episodes of constipation and diarrhoea, and raised ESR pointed towards the clinical diagnosis of intestinal TB. Ultrasound abdomen is a simple and reliable investigation for the diagnosis of intestinal TB. The ultrasonographic findings of intestinal TB include enlarged mesenteric lymph nodes, mesenteric and gut wall thickening and ascites. Mantoux test can be supportive but has pitfalls of false-positive and false-negative results. GIT contrast studies are also helpful in diagnosis of intestinal TB. The other modalities that are being employed for the diagnosis of intestinal TB are polymerase chain reaction (PCR) detection of mycobacterium DNA, laparoscopic confirmation of the findings and biopsy. CT scan with oral contrast is increasingly used to delineate the findings of intestinal TB.[1,13-15]

Most of the patients with uncomplicated intestinal TB are usually managed with medical treatment. The medical management includes general measures such as bed rest, proteins rich diet, clean environment and good hygiene; and ATT. Previously ATT was given for about 18–24 months, but, the work of Balasubramaniam *et al*., showed equal results with six months regime.[1,13] We are still using more than a year's duration of chemotherapy. This is because of poor compliance of therapy in our patients.

The surgical intervention has to be performed in case of acute peritonitis, intestinal perforation, and intestinal obstruction. Many studies depicted the high morbidity and mortality associated with surgical management of the intestinal TB. The morbidity is attributed to high rates of postoperative faecal fistula formation, wound infection, wound dehiscence and poor healing rate. The surgical procedure required is dependent upon the operative scenario. In case of strictures, stricturoplasty can be performed. If intestinal perforations are encountered, these can be repaired with and without covering stoma. In case of ileocecal TB, the management options are limited to right hemicolectomy or ileocecal valve bypass by performing ileo-transverse colon anastomosis or simply proximal ileostomy. In the case of matted gut mass the surgical approach should be as limited as possible because these are the cases where there are very high chances of postoperative faecal fistulas.[1,13-18]

We tried safer techniques to avoid postoperative faecal fistula formation. In most of our patients with intestinal perforations, we repaired the perforation and gave a diversion ileostomy, which worked well in five patients; however in three patients we have to reverse the stomas in the same admission for very high output stomas. This increased the total hospital stay in these patients; but, patients improved well and tolerated the management instituted. In cases where there were matted masses of intestine and omentum, our policy remained conservative, even at operation we just took the biopsy, at maximum. Two out of three patients who

were not fit for surgery became healthy with simple drain placement in the peritoneal cavity. In our two patients with ileocecal TB, we confirmed the potency by squeezing the faecal matter from ileum to ascending colon and did nothing but took biopsy. Similarly the same approach was tried in case of multiple strictures and we did not need any kind of stricturoplasty. These patients improved postoperatively on ATT; and the symptoms free follow-up is indicative of the successful management.

In conclusion, intestinal TB is a complex disease regarding its presentation and management. Acute peritonitis, intestinal obstruction and intestinal perforation are the main clinical presentations requiring surgical interventions. The operative morbidity and mortality can be reduced by adopting safer surgical procedures. A bit more conservative approach during operation may avoid various postoperative complications which is an attribution of this disease.

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