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Original Research Article

A clinical study of various presentations of intestinal tuberculosis, evaluation, management and its complications

Maruti Basa, Karnati Prakash*

Department of General Surgery, NIMRA Institute of Medical Sciences, Ibrahimpatnam, Vijayawada, Andhra Pradesh, India

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***Correspondence:**
Dr. Karnati Prakash,
E-mail: prakashgmc@gmail.com

ABSTRACT

Background: Abdominal tuberculosis includes tuberculous infection of gastrointestinal tract, mesentery, lymph nodes and omentum, peritoneum and solid organs like liver and spleen. The initial clinical presentations are nonspecific and no single laboratory investigation is pathognomonic. Bacterial culture and tissue histopathology though confirmatory are time consuming, and immunological tests though rewarding is expensive. Moreover, abdominal tuberculosis with an acute abdomen presents as an enormous challenge to the surgeon.
Methods: This one-year prospective observational study of 25 patients who presented with intestinal tuberculosis at the Department of General Surgery, NIMRA Medical College from February 2019 to January 2020. The causes of intestinal tuberculosis were determined along with clinical profile and were monitored for outcome based on the morbidity and mortality.
Results: Among the 25 patients, all had intestinal tuberculosis on the basis of operative findings and histopatholoigcal reports. Age of the patients ranged between 9 to 70 years; majority (75%) were in the age group of 20 to 40 years. Female to male ratio was 1.7:1. The commonest operative findings were hyperplastic ileocaecal tuberculosis (16%), followed by strictures (20%), and perforations (24%). The overall mortality was 8% due to sepsis and septic shock.
Conclusions: Intestinal tuberculosis is a common problem presenting to general surgical units in the developing countries, often in an acute form. A high index of suspicion, proper evaluation and therapeutic trial in suspected patients is essential for an early diagnosis, in order to minimize complications.

Keywords: Intestinal tuberculosis, Acute abdomen, Intestinal obstruction, Peritonitis, Koch's abdomen

INTRODUCTION

Tuberculosis (TB) is a common and major health problem, especially in developing countries where, ignorance, poverty, overcrowding, poor sanitation and malnutrition are prevalent.[1] It has been declared a global emergency by the World Health Organization (WHO). Approximately one third of the world population is infected with tuberculosis and about three millions die each year from this disease.[1,2] The incidence of tuberculosis is on the rise due to the influx of immigrants from third world countries, increasing incidence of human immunodeficiency virus (HIV) infection, an ageing population, alcoholism, increased use of immunosuppressive drugs, and the emergence of multi-resistant strains of *Mycobacterium tuberculosis*.[3]

Most cases of tuberculosis are caused by *M. tuberculosis* and the reservoir of infection is humans with active tuberculosis. Most cases of tuberculosis are pulmonary and acquired by person to person transmission of air-borne droplets of organisms. Abdominal tuberculosis

may be contracted by drinking dairy milk contaminated with *Mycobacterium* bovis.[4] Tuberculosis can affect any part of the body and abdomen is the next common site after lungs affected by the disease.[5] In the abdomen, tuberculosis may affect the gastro-intestinal tract, peritoneum, lymph nodes, and solid viscera. Approximately 1-3% of total tuberculosis cases are extra pulmonary of these abdominal tuberculosis (ATB) accounts for 11% to 16%.[6-8] In HIV positive patients the incidence of extra pulmonary tuberculosis is up to 50%.[9]

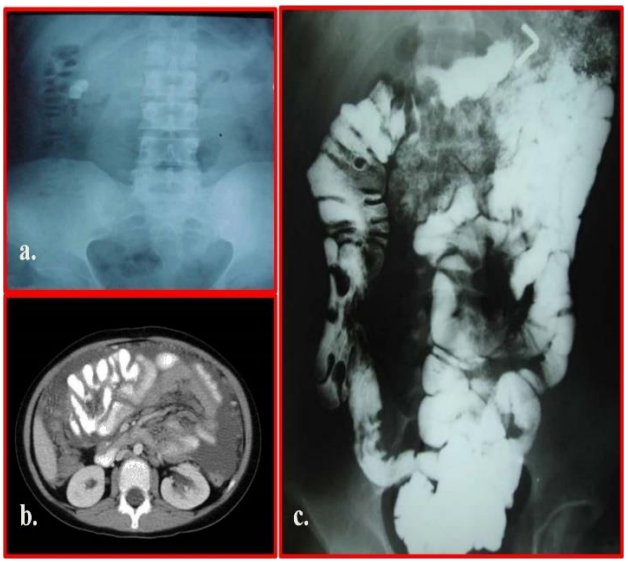

Figure 1: (a) X-ray abdomen with calcified lymph node, (b) computed tomography of abdomen showing peritoneal and bowel wall thickening, (c) barium enema showing non-visualization of colon.

The modes of infection of abdominal tuberculosis include hematogenous spread from a primary lung focus that reactivates later or miliary tuberculosis, spread via lymphatics from infected nodes, ingestion of bacilli either from the sputum or from infected sources such as milk products, or by direct spread from adjacent organs.[10] Intestinal (enteric) tuberculosis exists in one of the three main forms i.e. ulcerative, hypertrophic or ulcerohypertrophic, and fibrous stricturing form, peritoneal involvement (tuberculous peritonitis) exists in four main forms namely ascitic, loculated (encysted), plastic (fibrous) and purulent forms.[9,11,12] The lymph nodes in the small bowel mesentery and the retroperitoneum are commonly involved, and these may caseate and calcify (Figure 1).[12] Disseminated abdominal tuberculosis involving the gastrointestinal tract, peritoneum, lymph nodes and solid viscera has also been described.[9]

The diagnosis of abdominal tuberculosis in initial stages is difficult as the clinical features are vague, diverse and there is no specific diagnostic test.[9] It remains a considerable diagnostic challenge, especially in the absence of pulmonary infection, as the disease can mimic various gastrointestinal disorders, particularly the inflammatory bowel disease, colonic malignancy, or other gastrointestinal infections.

Abdominal tuberculosis is characterized by different modes of presentation, viz, chronic, acute and acute-on-chronic, or it may be an incidental finding at laparotomy for other diseases. The clinical presentation depends upon the site and type of involvement. It usually runs an indolent course and presents late with complications especially acute or sub-acute intestinal obstruction due to mass (tuberculoma) or stricture formation in small gut and ileocaecal region or gut perforation leading to peritonitis.[4]

The management of abdominal tuberculosis poses diagnostic and therapeutic challenges to general surgeons practicing in resource-limited countries.[9] Late presentation of the disease coupled with ignorance, poverty, overcrowding, poor education, malnutrition and lack of modern diagnostic and therapeutic facilities are among the hallmarks of the disease in these countries. Despite advances in medical imaging, the early diagnosis of abdominal tuberculosis is still a problem and patients usually present when complications had occurred.

This study was conducted to describe the clinicopathological profile and outcome of surgical treatment of abdominal tuberculosis in our setting and compare with what is described in literature.

Aims and objectives

The objectives of the study were to document the nature of different types of presentation in abdominal tuberculosis according to involved sites and surgical pathology, to discuss the indications and extent of surgery.

METHODS

The study is prospective study of inpatients at Department of General Surgery, NIMRA Medical College from February 2019 to January 2020. on 25 patients after obtaining ethical committee approval.

Inclusion criteria

Patients aged between 9-70 years, both males and females, patients presenting with symptoms of generalised abdominal pain, evening rise of temperature, loss of weight, symptoms of obstruction, palpable mass in right iliac fossa, cases detected incidentally during routine clinical examination and investigations, patients from low socio economic status and endemic population were included.

Exclusion criteria

Patients aged less than 9 years and above 70 years of age, immuno-compromised patients, cases having evidence of

genitourinary tuberculosis, cases having active pulmonary tuberculosis were excluded.

Methods of collection of data

A detailed clinical history about mode of onset and progression was taken from all the patients. After clinical examination and risk assessment, all patients underwent hematological investigations and imaging like erect X ray abdomen, ultrasound abdomen and contrast enhanced computed tomography (CECT abdomen) were done in required cases. Surgical management was tailored depending on the intra-operative findings. Post operative recovery assessment with histopathological reports including complications. Further, patients were followed up for 90 days in surgery OPD.

Statistical analysis

Descriptive and inferential statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean±SD (min-max) and results on categorical measurements are presented in number (%). Significance is assessed at 5% level of significance. Chi-square/ Fisher Exact test has been used to find the significance of study parameters on categorical scale between two or more groups.

RESULTS

A total of 25 patients are included in the study. The predominant age group is 20 to 29 yrs and male:female is 1:1.7. The most common presenting symptom (Table 1) is pain abdomen (100%) which is seen in all the patients, followed by abdominal distension (80%) and constipation (64%). On clinical examination, tenderness was seen in 23 patients (92%) followed by distension in 20 patients (80%). Abdominal rigidity is seen in 12 patients (48%) and absent bowel sounds are seen in 12 patients (48%). Abdominal mass is seen in 5 patients (25%), ascites 10 patients (40%) and increased bowel sounds in 4 patients (16%). The most common intra-operative finding (Table 2) is ascites with multiple peritoneal tubercles seen in 8 patients (32%) followed by single ileal perforation seen in 4 patients (16%). Ileo-cecal hyperplastic tuberculosis is seen in 3 patients (12%), ileo-cecal hyperplastic tuberculosis with perforation is seen in 1 patient (4%). Multiple ileal perforations is seen in 1 patient (4%), Single stricture in patients (8%), multiple strictures in 3 patients (12%), frozen abdomen is seen in 2 patients (8%). Acute tuberculous peritionitis is seen in 1 patient (4%). The most common postoperative complication is wound infection seen in 4 patients (16%) followed by chest complications in 3 patients (12%). 2 patients (8%) each had cardiac complications, septicemia and malnutrition. 1 patient each had burst abdomen, renal failure and anastomotic leakage.

Table 1: Results.

Variable	No. of cases
Mean age	25 years
M:F	1:1.7
Presenting symptoms	
Abdominal pain	25
Abdominal distension	20
Constipation	16
Borborygmi	5
Diarrhoea	4
Fever	13
Weight loss	20
Night sweats	2
Vomitings	5
Abdominal signs	
Distension	20
Tenderness	23
Rigidity	12
Mass	5
Ascitis	10
Visible peristalsis	1
Absent bowel sounds	12
Increased bowel sounds	4

Table 2: Operative data and complications.

Variable	No. of cases
Operative findings	
Ileo-cecal hyperplastic tuberculosis	3
Ileo-cecal hyperplastic tuberculosis with perforation	1
Single ileal perforation	4
Multiple ileal perforations	1
Single strictute	2
Multiple strictures	3
Frozen (plastic abdomen)	2
Acute tuberculosis peritonitis	1
Ascitic form with peritoneal tubercles	8
Complications	
Wound infection	4
Burst abdomen	1
Anastomotic leakage	1
Chest complication	3
Cardiac complication	2
Septicaemia	2
Malnutrition	2
Renal failure	1

DISCUSSION

Tuberculosis has re-emerged as a devastating disease during the last decade with a high morbidity and mortality. It can affect any part from mouth to anus but ileocecal area is the most common, accounting for about

more than 75% of the cases. Involvement of duodenum in intestinal tuberculosis is very rare, contributing only 2-2.5% of all gastrointestinal tuberculosis.

Abdominal tuberculosis can affect any age group but is more common in adolescence. The ages of the patients in this study ranged from very young to very old, majority were in between 20 to 40 years, which is consistent with other studies also.

Tuberculosis can involve any part of the gastrointestinal tract, which is the sixth most frequent site of extra pulmonary involvement. Females are slightly more affected than males. The female to male ratio in our study was 1.7:1. Some authors have not reported any sex prediction. And there are examples when even more male patients have presented with abdominal tuberculosis. This present study supports the prevalence of the disease in females. Symptoms of intestinal TB are unspecific and varied. Pathognomonic syndrome does not occur in any of its forms. The various symptoms include weight loss, fever, abdominal pain (usually located in lower right quadrant), weakness, diarrhea, and nausea. Chronic diarrhea caused by TB usually occurs with gastrointestinal bleeding. In classic ileocaecal TB, a tender, fixed mass is palpable in about 50% patients.[5]

It is difficult to make early and prompt diagnosis of intestinal TB because of its varied clinical presentations. Negative tuberculin test does not rule out the diagnosis. Tissue culture is not always positive.[6] Chest X-ray examination could help establish the diagnosis if concomitant pulmonary TB is found. More modern cases have been reported with no evidence of pulmonary TB.[9] It should be noted that negative chest x-ray does not rule out intestinal TB. Serologic examinations, such as PCR and anti-cord factor, are very sensitive and highly specific, but are also very expensive. Colonoscopy is very important in distinguishing TB from other diseases. Segmental ulcerative and hypertrophic lesions are commonly found. Tissue biopsy reveals specific histopathological characteristics such as granuloma, tubercle and caseation necrosis. Prior antituberculous treatment could change gross appearance and microscopic descriptions and may mislead in the diagnostic process.[7]

Common complications of intestinal TB are perforation, abscess, gastrointestinal bleeding, fistula formation, peritonitis and malnutrition. Management of intestinal TB consists of anti-tuberculous drugs and surgery, the regimen is the same as for other extra-pulmonary TB. Rifampicin, isoniazid, pyrazinamide, and ethambutol are given for 9 months (2RHZE/7RH). There are still controversies about the length of treatment. Conventional therapy suggests 18 to 24 months, but others consider short treatment course as also effective. It is sometimes difficult to establish the diagnosis of intestinal TB, and it is frequently discovered only from surgical findings. Intestinal TB with no evidence of pulmonary TB makes early and prompt diagnosis difficult. However, delayed treatment of this disease can be fatal. Diagnostic confirmation is obtained from histologic findings of TB, such as granuloma, tubercles and caseation necrosis.[7] History of anti-tuberculous drug intake is very important, since it could change the macroscopic and histopathologic appearance of the lesions, due to the healing process.

Treatment of underlying disease and iron supplementation will gradually improve the condition. Response to anti-tuberculous treatment was very good. Such good response is also included in diagnostic criteria for intestinal TB. Relapse rarely happens if antituberculous drugs are given adequately. We plan to administer the drugs for 9 months (2RHZE/7RH) according to the WHO treatment guideline for TB. This is the same as for other extra-pulmonary TB. Surgical treatment is only needed if there is a serious life threatening complication, such as obstruction, perforation or massive bleeding. Patients on anti-tuberculous treatment must be observed carefully because complications such as obstruction may occur due to the healing process. Fibrotic post therapeutic lesions may cause stenosis and obstruction.[7] Therapeutic response can be evaluated objectively by endoscopy within approximately 2 or 3 months. Intestinal TB is rarely recurrent and the prognosis is good.[7]

Complications

Ileocecal tuberculosis can present with symptoms, like anorexia, weight loss, fever, diarrhea, constipation, bleeding per rectum. Colonoscopy with biopsy for histopathology and AFB culture is the most useful diagnostic test for ileocecal TB. Three types of intestinal lesions are commonly seen-ulcerative, stricturous, and hypertrophic. Cicatricial healing of the ulcerative lesions results in strictures and can cause acute or subacute intestinal obstruction.[8] Intestinal perforation is a relatively uncommon but a serious complication of abdominal tuberculosis occurring in 1 to 15% of patients, and usually occurs due to reactivation of a dormant focus.[7] Tuberculous perforations are predominantly solitary and located immediately proximal to the site of stricture; although there are reports of multiple perforations they are usually uncommon.[10] In a study, the terminal ileum was the site of perforation in 54% of the cases and the clinical features of perforation were consistent with those of generalized peritonitis in 72.72% of the cases. Ascitic fluid adenosine deaminase activity has been proposed as a useful diagnostic test for abdominal TB especially in countries with a high incidence of TB and in high risk patients. Ultrasound (US) guided FNAC of lymph nodes or a solid organ lesion is a useful diagnostic tool due to its safety and rapid definitive diagnosis of tuberculous granulomas. CT scan (Figure 1) can be carried out in case of inconclusive US examination which can show high density ascites and caseous necrosis of lymph nodes. Crohn's disease should

be differentiated from abdominal TB due to the harm associated with steroids and immunomodulatory agents. The combination of these agents would have adverse consequences in cases of abdominal TB misdiagnosed as Crohn's disease.[11]

Intestinal obstruction (acute or subacute) was the commonest mode of presentation of abdominal tuberculosis also in other studies. This ranges between 64 to 92.8%. The most common site of involvement is the terminal ileum and ileocaecal region. A palpable abdominal mass in the next most common presenting feature, usually in the right lower quadrant. Adhesive peritonitis and ileal loops can be the cause. Twenty five percent of the patients in our study presented as abdominal mass while per-operatively ileocaecal mass was present in all of the cases. Caecal mass may sometimes be misdiagnosed as tumor, or may simulate crohn's disease. 44% patients presented with symptoms and signs of intestinal obstruction secondary to strictures or stricture with perforation. Strictures usually form in the terminal ileum but they are also found in jejunum and colon. Quite a large number of patients present with tuberculous peritonitis with or without ascitis. Tuberculous peritonitis should be considered in patients with fever, abdominal fullness and exudative ascitic fluid. In the present study 40% of patients has ascites. A case of exudative ascites due to tuberculous peritonitis with fever of unknown origin may be culture negative for mycobacterium if examination of ascitic fluid, stool, sputum and pleural fluid is carried out. If the diagnosis of tuberculous peritonitis is confirmed with no evidence of intestinal perforation or obstruction, then the cases can be treated conservatively.

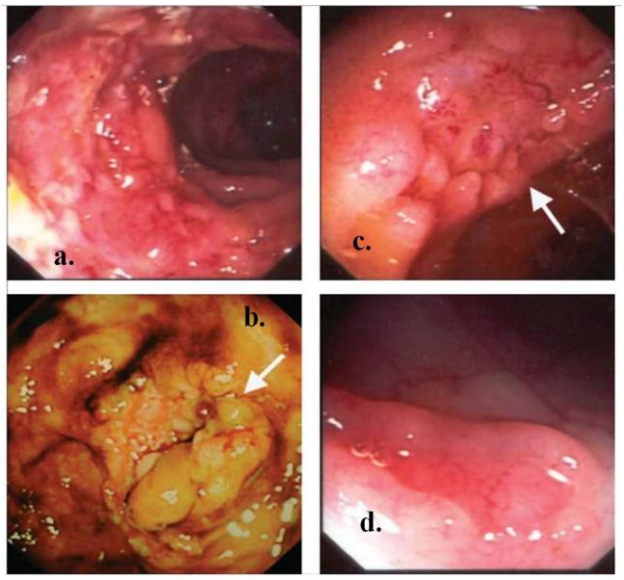

Figure 2: (a) A circumferential ulcer in terminal ileum, (b) ulcerated and deformed ileo-ceacal valve (arrow), (c) discrete ulcer with nodular edges in terminal ileum (arrow), (d) mucosal nodules in ascending colon.

Fever, weight loss, anorexia are nonspecific constitutional symptoms occurred in 52%, 80% and 48% of cases respectively. A tissue-based diagnosis was established in 100% of patients, while radiological diagnosis was made in 65.22% of patients. ESR was raised in 90.91%. The decision about the operative procedure was taken according to the individual assessment of the patient's condition at the time of laparotomy. The confirmation of clinical diagnosis of any tuberculous lesion is either by demonstration of the characteristic tuberculous granuloma, or the isolation of *M. tuberculosis* from the specimens obtained from the lesion or a combination of both procedures (Figure 3). Current available diagnostic facilities should be properly utilized to reach the diagnosis before starting treatment. Chu et al reported that laparoscopic observation in combination with a biopsy could establish the cause of ascites of unknown origin (86.0%) among which 20.2% belonged to tuberculous peritonitis.[12]

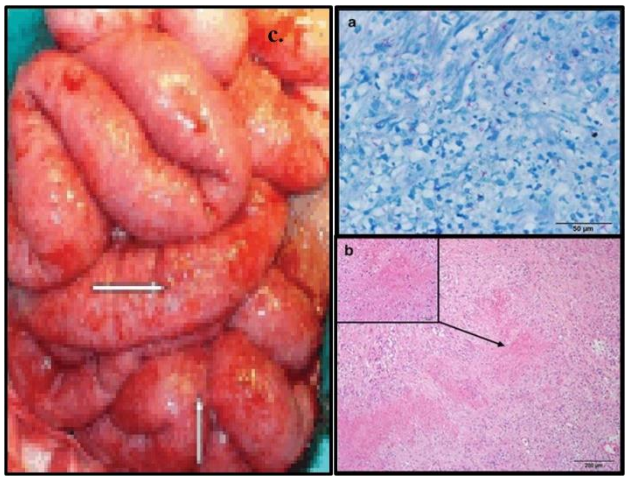

Figure 3: (a) Presences of acid-fast bacilli in bowel (acid fast stain), (b) granulomatous inflammation with caseating necrosis (H & E stain), (c) abdominal tuberculosis with small gut involvement.

Lin et al emphasized that colonoscopy (Figure 2) with biopsy is also a useful diagnostic tool for early diagnosis and in avoiding unnecessary morbidity and mortality associated with exploratory laparotomy in colonic TB.[13] The colonoscopic appearance may include the following: ulcerated lesions, sessile firm polyps, masses, and small diverticula, ranging from 3 to 5 mm in diameter. The ileo-ceacal valve is a common site of intestinal infection owing to the presence of rich lymphoid tissue. However, the difficulty in differentiating segmental tuberculosis intestinal disease from Crohn's disease is always a challenge.[14] Undiagnosed and untreated abdominal TB can result in a mortality rate of 50-60%. However, this disease is usually curable after proper treatment. Chang et al and Chen et al reported that the mortality rate of treated abdominal TB were 13.2% and 14.8% respectively.[15,16] In our study, the overall mortality rate was 8% due to sepsis and septic shock. All these patients

had TB peritonitis. Thus, sepsis may be strongly associated with therapeutic failure in TB peritonitis.

Management

The main treatment of abdominal tuberculosis is essentially surgical and is mandatory to establish the diagnosis and to de-bulk the quantum of disease. The medical treatment plays its role post-operatively to reduce the systemic disease and arrest the progress of any local residual disease and pre-operatively in preparing the patient for an operation by improving the general condition of the patient.

Surgical treatment

In abdominal tuberculosis a single lesion is not common but combinations of various lesions are usually seen like ascites, mesenteric adenitis, ileo-caecal and small bowel for multiple strictures in a small segment of the bowel, ileo-caecal masses are treated by either right hemicolectomy with ileotransverse colostomy or by local resections. Now the trend being in favour of conservative approach in ileo-caecal tuberculosis. The value of surgical intervention in the treatment of hyperplastic form of ileo-caecal tuberculosis is recognized widely. In the purely ulcerative form surgical measures are rarely indicated and have been of use chiefly for complications like perforations, stenosis, abscess and fistulae. In hyperplastic tuberculosis when the diagnosis is certain and the patient has not yet developed obstructive symptoms treatment with anti - tubercular drugs may be advised. If obstruction results a right hemicolectomy or a localized limited resection is the treatment of choice. In patients with debilitating conditions a defunctioning ileo-colostomy is advisable. The results of two stage resection were slightly better than those of one stage operations.

CONCLUSION

52% of intestinal tuberculosis presenting to us required an emergency laparotomy. The mean age, is 25 years which is a very young age. Female: male ratio is 1.7:1 emphasizing that both sexes are equally affected, All the symptoms are nonspecific and vague. Pain abdomen of less than one-week duration is the most common symptom emphasizing that the lesion is acute and seen in very young probably reflecting increasing virulence of the pathogen and decreased resistance of the host.

Increased incidence of perforation reflects increased virulence of organism, decreased resistance of the host, multidrug resistant strains and HIV upsurge. Patient on ATT may develop perforation. Judicious interventions in emergencies combined with limited resections and post op. ATT will go a long way in achieving a cure. The causes of morbidity and mortality were mainly late presentation, poor general condition at the time of presentation, malnutrition, anaemia, hypoalbuminemia, acuteness of the lesion on laparatomy (perforation/obstruction) and positive history of pulmonary Koch's.

Finally, all cases of abdominal tuberculosis should be subjected to HIV test as there is high incidence of extra pulmonary tuberculosis in patients with AIDS. 50% of the AIDS patients with tuberculosis have extra pulmonary involvement compared only 15% of non-HIV patients. In any atypical clinical presentation such as perforation one should suspect underlying HIV infection. Tuberculosis precedes the diagnosis of AIDS by several months; tuberculosis frequently disseminates in AIDS patients; and progresses rapidly with a high mortality. A high index of suspicion, proper evaluation, and therapeutic trial in suspected patients is essential for an early diagnosis and timely treatment, in order to decrease the prevalence of complications.

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