VKS Leung 梁景燊
ST Law 羅兆棠
CW Lam 林貞華
ISC Luk 陸常青
TN Chau 周泰年
TKL Loke 陸國倫
WH Chan 陳偉康
SH Lam 林少豪

Intestinal tuberculosis in a regional hospital in Hong Kong: a 10-year experience

香港一所地區醫院過去十年治療腸結核病的經驗

Objective. To study the clinical and pathological characteristics of patients with intestinal tuberculosis.
Design. Retrospective study.
Setting. United Christian Hospital, Hong Kong.
Patients. Patients with intestinal tuberculosis diagnosed between January 1995 and December 2004 inclusive.
Results. The median age of the 13 male and 9 female patients was 53 years (range, 12-81 years). Nineteen (86%) had a definitive diagnosis of intestinal tuberculosis confirmed by the presence of caseating granulomas and/or acid-fast bacilli in histological specimens. In three (14%) the diagnosis was based on histology revealing non-caseating granulomas and a positive response to anti-tuberculous treatment. Common symptoms included abdominal pain (82%), diarrhoea (55%), weight loss (55%), and fever (45%). Three (14%) of the patients were complicated by intestinal obstruction, and another two (9%) had intestinal perforation. Four (18%) had concomitant active pulmonary tuberculosis. The most frequently involved site was the ileocaecal region, which was affected in 19 (86%) patients. Other sites included the jejunum, ascending and sigmoid colon. The diagnosis of intestinal tuberculosis was facilitated by examination of colonoscopic biopsy specimens (11 patients), and by examination of resected surgical specimens in the remainder. Two patients died from terminal malignancy. The remainder completed anti-tuberculous therapy and responded satisfactorily.
Conclusions. The diagnosis of intestinal tuberculosis is difficult due to the lack of specific signs or symptoms. Colonoscopy with ileoscopy are useful tools in the search for colonic and terminal ileal tuberculosis. Surgical exploration is reserved for equivocal cases and for those who present as emergencies.

Key words:
Cecum;
Colonoscopy;
Granuloma;
Ileum;
Tuberculosis, gastrointestinal

目的：研究腸結核病病人的臨床和病理特徵。
設計：回顧研究。
安排：香港基督教聯合醫院。
患者：1995 年 1 月至 2004 年 12 月期間被診斷患上腸結核病的病人。
結果：13 名男病人和 9 名女病人的年齡中位數是 53 歲（介乎 12 至 81 歲）。19 人（86%）透過顯微解剖學驗出乳酪化肉芽腫及 / 或抗酸性杆菌而確定為腸結核病。其餘 3 人（14%）的顯微解剖學驗出非乳酪化肉芽腫，對結核治療則呈陽性反應。病人普遍的病徵包括腹痛 (82%)、腹瀉 (55%)、體重下降 (55%) 和發熱 (45%)。3 人（14%）出現腸阻塞，另 2 人（9%）腸道受損。4 人（18%）併發肺結核。最普遍的發病位置是迴腸（19 人，86%），其餘則包括空腸、昇結腸和乙狀結腸。11 人以結腸鏡抽取活組織樣本檢查確診為腸結核，其餘病人則以手術中切除的樣本而確診。2人因末期惡性瘤死亡，其餘病人則完成結核治療療程並且反應滿意。
結論：由於缺乏明顯的徵狀，腸結核的診斷十分困難。裝設迴腸鏡的結腸鏡活組織檢查可以找到結腸結核和末期迴腸結核，至於無法確定或緊急病例則須以手術作進一步診斷。

關鍵詞：
盲腸；
結腸鏡活組織檢查；
肉芽腫；
迴腸；
結核，胃腸的

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United Christian Hospital, Kwun Tong, Hong Kong:
Department of Medicine and Geriatrics
VKS Leung, FRCP (Lond, Edin, Glasg), FHKAM (Medicine)
ST Law, MRCP (UK)
TN Chau, MRCP (UK), FHKAM (Medicine)
WH Chan, MRCP (UK)
Department of Surgery
CW Lam, FRCS (Glasg), FHKAM (Surgery)
SH Lam, FRCS (Glasg), FHKAM (Surgery)
Department of Pathology
ISC Luk, FRCPath, FHKAM (Pathology)
Department of Radiology
TKL Loke, FRCR, FHKAM (Radiology)

Correspondence to: Dr VKS Leung
(e-mail: vinju@netvigator.com)

Introduction

In recent years, the incidence of intestinal tuberculosis (TB) in developed countries has been increasing along with the overall resurgence of TB.[1,2] There were an estimated 8.3 million new TB patients globally in 2000; newly

Table 1. Number of patients with (i) tuberculosis (TB) and (ii) intestinal TB attending the Tuberculosis and Chest Clinics and at the United Christian Hospital (UCH)

Year	No. of TB notifications[5]	No. of new TB cases attending TB and Chest Clinics[11]	No. of new intestinal TB cases attending TB and Chest Clinics[11]	No. of TB notifications at UCH[11]	No. of new cases of intestinal TB at UCH
1995	6212	5080	11 (0.22%)	-	1
1996	6501	5189	15 (0.29%)	-	0
1997	7072	5357	17 (0.32%)	-	0
1998	7673	5531	21 (0.38%)	-	4
1999	7512	5304	18 (0.34%)	191	1 (0.52%)
2000	7578	5294	27 (0.51%)	325	6 (1.85%)
2001	7262	5116	22 (0.43%)	239	0
2002	6602	4740	41 (0.86%)	280	2 (0.71%)
2003	6024	4118	25 (0.61%)	248	1 (0.40%)
2004	6226	4186	31 (0.74%)	278	7 (2.52%)

diagnosed cases increased at a rate of 1.8% per year between 1997 and 2000.[3] This resurgence is, in part, due to the pandemic of human immunodeficiency virus (HIV) infection.[1-3] The overall incidence of TB in Hong Kong has remained high with about 90 cases per 100 000 inhabitants in the year 2005,[4] but details pertaining to intestinal TB are not available.[5] The clinical manifestations of intestinal TB are non-specific; a high index of suspicion is therefore important to ensure a timely diagnosis; missed or delayed recognition can result in avoidable morbidity and mortality.[1,2] The purpose of this study was to retrospectively evaluate the clinical and pathological characteristics, diagnostic modalities, and treatment response of patients with intestinal TB.

Methods

Patients who presented to the United Christian Hospital (a regional hospital in Kowloon East serving a population of over 600 000) between January 1995 and December 2004 inclusive diagnosed to have gastro-intestinal (GI) TB were identified. Their medical records, chest radiographs (CXR), and histological sections were reviewed. Patients were classified as having either confirmed or presumed intestinal TB. The diagnosis of confirmed TB was based on affected tissues with one or more of the following: (1) histological evidence of granulomas with caseating necrosis, (2) demonstration of acid-fast bacilli (AFB) by Ziehl-Neelsen (ZN) stain, or (3) culture of *Mycobacterium tuberculosis*.[6] Patients in whom the diagnosis was suspected though unconfirmed by histology or microbiology were regarded as having presumed intestinal TB, if they were treated successfully with anti-tuberculous chemotherapy. A telephone survey was conducted on all patients to confirm completion of anti-tuberculous treatment and resolution of symptoms.

Results

Over the 10-year period, 58 patients at our institution were diagnosed with abdominal TB. Sites of infection were: the peritoneum (n=34; 59%), the GI tract (n=22; 38%) and in the liver (n=1) and mesenteric lymph nodes (n=1). Table 1 lists the numbers of all TB patients and those with intestinal TB diagnosed at our institution according to the year of diagnosis. Six intestinal TB patients presented during the first 5 years of the study, and 16 during the last 5 years.

Patient characteristics

All 22 patients with intestinal TB were of Chinese ethnicity; 13 were male and 9 female. Their median age was 53 (range, 12-81) years; 54 years for the six patients presenting during the first 5 years and 53 years for the 16 presenting later.

Seven (32%) of the patients had a history of prior treatment for pulmonary TB, and one for tuberculous cervical lymphadenitis. Four (18%) had active pulmonary TB when intestinal TB was diagnosed, and one of them also had a perianal abscess.

Only one patient with intestinal TB was in receipt of immunosuppressive agents (prednisolone and azathioprine for the treatment of optic neuritis and transverse myelitis). This patient also had a pelvic liposarcoma and post-radiation proctosigmoiditis. Other coexisting medical illnesses include diabetes mellitus in three patients, previous stroke in two, and advanced colonic adenocarcinoma in two. Sixteen (73%) of the patients had no coexisting medical illness. One patient reported consumption of unpasteurised milk prior to the development of abdominal symptoms.

Clinical presentation

Eleven (50%) of the patients with intestinal TB presented insidiously, while nine (41%) presented abruptly, six of whom had an acute-on-chronic presentation. The median duration of symptoms was 1.5 months (range, 0.03-12 months). Two patients with advanced adenocarcinoma of the colon (one in the caecum, another in the sigmoid colon) were diagnosed to have coincidental mycobacterial infection in the resected tumour specimens.

The presenting symptoms of intestinal TB are listed in Table 2, the most frequent being abdominal pain (82%). Others included diarrhoea, constipation, nausea and

Table 2. Presenting symptoms among patients with intestinal tuberculosis

Symptoms	No. of patients (n=22)
Abdominal pain	18 (82%)
Diarrhoea	12 (55%)
Weight loss	12 (55%)
Fever	10 (45%)
Anorexia	10 (45%)
Nausea and vomiting	4 (18%)
Constipation	4 (18%)
Rectal bleeding	4 (18%)
Cough and sputum	4 (18%)

Table 3. Sites of involvement and colonoscopic features of intestinal tuberculosis

	No. of patients
Location (n=22)	
Jejunum	1 (5%)
Terminal ileum	7 (32%)
Ileocaecum	5 (23%)
Caecum	7 (32%)
Ascending colon	4 (18%)
Sigmoid colon	1 (5%)
Colonoscopic features (n=12)	
Ulcers	12 (100%)
Deformed ileocaecal valve	4 (33%)
Mucosal nodules	2 (17%)
Polypoid lesions	1 (8%)

vomiting, and rectal bleeding. About half of them had fever, anorexia, and weight loss. Respiratory symptoms were noted in the four patients with concomitant active pulmonary TB.

Four (18%) patients presented with acute right lower quadrant pain masquerading as acute appendicitis. Three (14%) presented with intestinal obstruction, which resolved after conservative treatment and colonoscopy, except in one patient who was subjected to exploratory laparotomy. Two (9%) patients presented with intestinal perforation and one developed perforation at the terminal ileum 3.5 months after starting anti-tuberculous chemotherapy for pulmonary and perianal TB.

Laboratory and radiological abnormalities

Ten (45%) patients had anaemia, of whom two also had colon cancer. Leukocytosis was present in 10 (45%) patients, the erythrocyte sedimentation rate was elevated in nine (41%), and eight (36%) had hypoalbuminaemia. All patients with an abrupt-onset presentation had one or more abnormal laboratory parameters detected, whereas eight of the 11 patients who presented insidiously had no abnormalities detected in routine blood tests. Test for HIV antibodies was performed in nine individuals and all were negative.

Eight (36%) patients had radiological evidence of prior pulmonary TB, and four (18%) of active pulmonary TB. Only one of these patients underwent abdominal radiological imaging (computed tomographic scan and a small bowel enema), which revealed mucosal irregularities and ulcerations in the terminal ileum.

Sites of involvement

The frequencies of different sites of involvement along the GI tract and the colonoscopic features that were noted are shown in Table 3. Most of the patients (86%) had ileocaecal involvement. Skip lesions along the intestine were described in three (14%) patients—two had involvement of terminal ileum and ascending colon, and one involved the caecum and ascending colon.

Diagnosis of intestinal tuberculosis

The diagnosis of intestinal TB was made by examination of biopsy specimens obtained at colonoscopy (n=11), and surgical specimens obtained at laparotomy (n=11). Intestinal TB was suspected before colonoscopy in only four patients—three of whom had concomitant active pulmonary TB, and in the fourth patient terminal ileal ulcerations had been detected by radiological imaging. None of the patients who underwent surgery were suspected to have intestinal TB preoperatively.

Nineteen (86%) patients had confirmed intestinal TB (positive histology alone in 2, positive histology and positive ZN stain for AFB in 1, positive stain for AFB only in 13, positive stain for AFB plus positive culture for mycobacteria in 2, and positive culture for mycobacteria alone in 1). The diagnosis of intestinal TB could not be confirmed in three (14%) patients who eventually responded to anti-tuberculous treatment. One of the latter had concurrent active pulmonary TB, and had already commenced anti-tuberculous treatment at the time of colonoscopy. A 12-year-old boy, who had consumed unpasteurised milk and had terminal ileal ulcerations revealed by radiological imaging, had also started empirical anti-tuberculous treatment at the time of colonoscopy. All three patients were presumed to have intestinal TB and after anti-tuberculous treatment they experienced symptom resolution and disappearance of mucosal abnormalities on follow-up colonoscopy.

Only two of the six cases of intestinal TB identified during the first 5 years of the study were diagnosed before the onset of severe symptoms or complications; in one of them the diagnosis was facilitated by colonoscopy. Whereas, during the latter half of the study period, 11 (69%) of 16 cases were diagnosed in the early stages of infection, and colonoscopy helped to confirm the diagnosis in nine of these patients.

Colonoscopy findings

Colonoscopy was attempted in 13 patients, in whom full colonoscopy with successful terminal ileal intubation was achieved in 12 cases. In one patient, colonoscopy was incomplete as advancement of the endoscope was limited

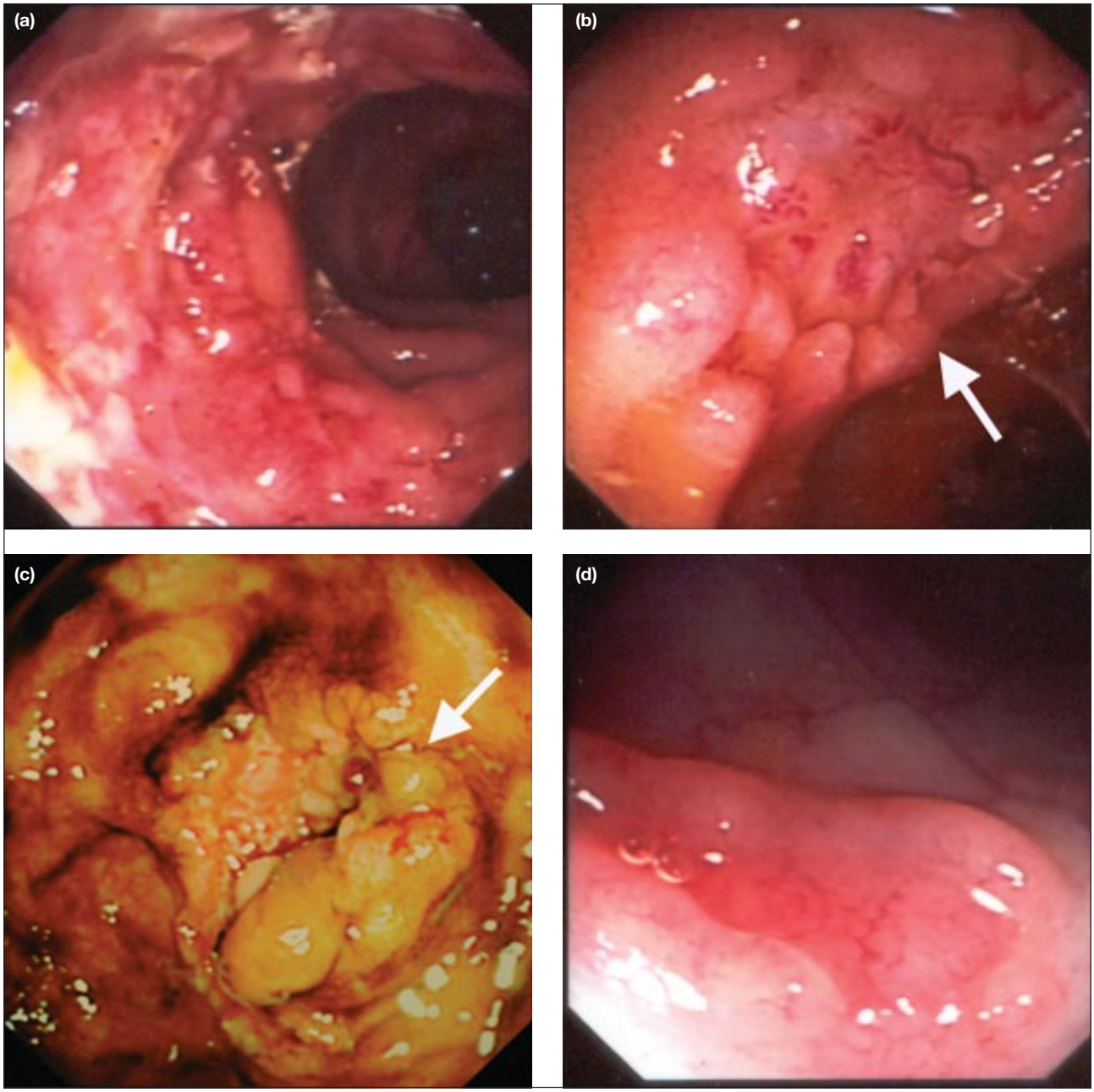

Fig. Colonoscopic appearance in patients with intestinal tuberculosis
(a) a circumferential ulcer in the terminal ileum, (b) a discrete ulcer with nodular edges in terminal ileum (arrow), (c) an ulcerated and deformed ileocaecal valve (arrow), and (d) mucosal nodules in the ascending colon

by severe histology-confirmed post-radiation colitis affecting the rectosigmoid colon. The endoscopic features noted in these 12 cases of complete colonoscopy are listed in Table 3. Ulceration was present in all cases; most ulcers being discrete and ranged from 0.3 to 2.5 cm in diameter. One patient had a large circumferential ulcer in the terminal ileum (Fig a). Ulcers with nodular edges (Fig b) were found in five patients; four individuals had a deformed ileocaecal valve (Fig c), two had mucosal nodules (Fig d), and one had polypoid lesions. In four (33%) patients, terminal ileal ulcers were the only abnormalities encountered at endoscopy. In all 12 patients undergoing colonoscopy, biopsy specimens were obtained from the site of the abnormal mucosa, of which all were sent for histological examination and seven for mycobacterial culture.

Operative findings and management

Exploratory laparotomy was carried out in 11 patients, of which two were for symptoms attributed to complications from cancer of the colon. Among the other nine, four had a working diagnosis of acute appendicitis, two were believed to have perforated peptic ulcers, and two were suspected to have intestinal obstruction (from recurrence of a pelvic liposarcoma, and a malignant caecal tumour). Three patients were found to have an ileocaecal mass, all of whom underwent right hemicolectomy with primary ileocolonic

Table 4. Histological and microbiological features of intestinal tuberculosis (ITB)

	Colonoscopic biopsy specimens (n=12)			Surgical specimens (n=11)
	Confirmed ITB (n=8)	Presumed ITB (n=3)	Inconclusive* (n=1)	Confirmed ITB (n=11)
Granulomas	8	3	0	11
Caseating necrosis	1	0	0	7
Positive Ziehl-Neelsen stain for acid-fast bacilli	7	0	-	9
Positive tissue culture for mycobacteria	3/5	0/2†	-	1/3

* This patient subsequently underwent laparotomy
† One patient had positive culture of mycobacteria from sputum

anastomosis. Two patients were found to have solitary perforations in the terminal ileum; right hemicolectomy with primary ileocolonic anastomosis was performed for one and segmental resection of the terminal ileum with primary anastomosis for the other. Two others had an ulcerative caecal mass; one was treated by right hemicolectomy with primary anastomosis, and the other only had excisional biopsies of the enlarged mesenteric lymph nodes. One patient with an inflamed and ulcerated segment of jejunum (identified at surgery), had the affected bowel resected and a primary anastomosis performed. Another had multiple transverse ulcers in the terminal ileum in association with a fibrotic and stenosed ileocaecal valve, resulting in intestinal obstruction. This patient had a right hemicolectomy with primary anastomosis to relieve the obstruction. Mesenteric lymphadenopathy was present in nine patients (including the two with colon cancer), and all underwent excisional biopsies to establish a tissue diagnosis. Other abnormalities included fibrous adhesions of bowel loops in four patients, and visceral and parietal peritoneal nodules in one. In three patients, tuberculous infection was suspected at the time of operation and only the surgical specimens of these patients were sent for culture of mycobacteria.

Pathology and microbiology

Histological and microbiological features in the colonoscopic biopsy and surgical specimens are summarised in Table 4. Granulomas were identified in 11 of 12 colonoscopic biopsy specimens, but caseating granulomas in only one patient and AFB were identified by ZN stain in seven. Three colonoscopic biopsy specimens had a positive yield for culture of mycobacteria, one of which had been negative for AFB with ZN stain. Among the three patients whose tissue cultures grew mycobacteria, one also had positive cultures from sputum and gastric aspirates, and another had positive cultures from sputum and bronchial aspirates. One patient who had unrevealing histology in colonoscopic biopsy specimens and eventually underwent exploratory laparotomy.

Granulomas were demonstrated in all surgical specimens (in the lymph nodes of the nine patients with mesenteric lymphadenopathy, and in the peritoneal nodules in one other), and in seven of these there was caseating necrosis. Caseating granulomas were found in the intestinal pathology and mesenteric lymph nodes in four cases, and were present only in the mesenteric lymph nodes in three. Ziehl-Neelsen stain demonstrated AFB in nine cases, and in another case in which the stain for AFB was negative, mycobacteria were nevertheless cultured.

All four isolates of mycobacteria from intestinal tissues were of the mycobacterium TB complex, and further identification of the specific species was performed for three isolates, which demonstrated they were all *M tuberculosis*. All isolates were susceptible to isoniazid, rifampicin, ethambutol, and streptomycin.

Chemotherapy and treatment outcome

Three patients were already on anti-tuberculous treatment at the time intestinal TB was diagnosed. The remaining 19 patients commenced anti-tuberculous drugs after being diagnosed—18 received standard treatment (rifampicin, isoniazid, pyrazinamide, and ethambutol in the initial 2 months followed by rifampicin and isoniazid in the continuation phase). One elderly patient commenced a three-drug regimen consisting of rifampicin, isoniazid, and pyrazinamide, because monitoring for ethambutol-related visual impairment appeared unreliable. Seventeen of these 22 patients were referred to TB and Chest Clinics operated by the Department of Health of Hong Kong for continuation of anti-tuberculous therapy. Twenty patients completed their anti-tuberculous treatment (mean duration, 9.8 months; range, 6-12 months). All 22 patients enjoyed resolution of abdominal symptoms after anti-tuberculous treatment and there was no mortality from TB, but two who had colon cancers died from their terminal malignancy before completion of their treatment course.

Discussion

Mycobacterium tuberculosis, along with *Mycobacterium bovis*, *Mycobacterium africanum*, and *Mycobacterium microti*, cause TB and are members of the mycobacterium TB complex. In Hong Kong, *M tuberculosis* is the species most commonly associated with mycobacterial infection.[5,7] *Mycobacterium tuberculosis* is also the most common species causing TB of the GI tract.[8] *Mycobacterium bovis* is a major cause of TB in cattle, and can be transmitted to humans through consumption of unpasteurised milk products from infected cows resulting in GI tract infection. Nowadays, *M bovis* is an uncommon human pathogen in western countries.[8]

Intestinal TB was common in the early 20th century. Old postmortem reports showed that up to 80% of patients who had died from pulmonary TB also had intestinal involvement.[8] However, by the mid-20th century, all forms of TB had declined dramatically in developed countries as a result of increased standards of living, control of bovine TB through slaughter of infected cattle herds, pasteurisation of milk, and the introduction of anti-tuberculous chemotherapy.[2] In recent years, the incidence of intestinal TB has increased again along with an overall resurgence of TB.[1,2] This resurgence is probably related to the pandemic of HIV infection, increased use of immunosuppressive drugs, and an ageing population.[1,2,9,10]

There are no detailed data on the overall number of GI TB cases in Hong Kong, but it appears that the gut is uncommonly affected, despite the high number of all TB cases. Tuberculosis of the GI tract accounted for only 31 (0.74%) of the 4186 new TB cases attending TB and Chest Clinics in Hong Kong in 2004 and accounted for less than 2% of the 286 TB-related deaths in the same year.[11] Nevertheless, in recent years the number of new cases of intestinal TB attending TB and Chest Clinics appears to be on the rise (Table 1).[11] The reason for this increase is not apparent, since there has been no parallel increase in all cases of TB during the corresponding period (Table 1),[4] and in Hong Kong the prevalence of HIV-positive patients with TB remains low.[5] Our institution too has encountered an increasing number of intestinal TB cases in recent years, though none of our patients were HIV positive. Nor did immunosuppressive drug use or ageing appear to be major contributing factors. Although we encountered only a small number of intestinal TB cases, mostly they were diagnosed in the early phases of the infection, before the development of severe symptoms or complications. The increased use of colonoscopy as a tool for evaluation of abdominal symptoms may have facilitated early diagnosis of intestinal TB, and may, at least in part, explain the increased number of cases of intestinal TB in recent years.

The pathophysiology of intestinal TB has been attributed to four mechanisms: (1) haematogenous spread from active pulmonary or miliary TB, (2) swallowing of infected sputum in patients with active pulmonary TB, (3) ingestion of milk or food contaminated with *M bovis*, and (4) contiguous spread from adjacent organs.[2] In one of our patients with concomitant active pulmonary TB, growth of mycobacteria from gastric aspirate suggests swallowed infected sputum as the source of the infection. *Mycobacterium bovis* infection was suspected in one patient, who had consumed unpasteurised milk before the onset of abdominal symptoms.

The diagnosis of intestinal TB is notoriously difficult, as its presenting signs and symptoms and laboratory abnormalities are non-specific and non-diagnostic.[1,2,8-10,12] As illustrated in our cohort, routine blood tests being normal cannot exclude intestinal TB. An important clue is the presence of concomitant active pulmonary TB, but this was only present in about 15% to 25% of patients.[1,2,10] Intestinal obstruction is the most common complication and occurs in about 20% to 30% of patients.[1,9,10,12] Free intestinal perforations ensue in 1% to 15% of cases,[13-15] and may occur after the commencement of anti-tuberculous treatment.[16-18] In one report, paradoxically, a patient developed intestinal perforation 3.5 months after the initiation of anti-tuberculous treatment.[19]

Evidently, the most frequent site of GI TB is the ileocaecal region, where over 50% of the lesions are located.[1,2,8,10,12] This is also consistent with our observations in this study. Predilection of the bacillus for the ileocaecum is attributed to the abundance of lymphoid tissue in that region, the relative physiologic stasis and minimal digestive activity of the area causing increased contact time between the bacteria and the intestinal mucosa, as well as the high rate of absorption in the region.[2,8,10,12] Other commonly involved sites are the colon and the jejunum, whereas the oesophagus, stomach, duodenum, and anus are rarely involved.[1,8,10,12] Anal TB may present with ulcers, fistulae, abscesses, and as hypertrophic growths.[8,12] One of our patients also had a concomitant perianal tuberculous abscess, which could have been a complication of a tuberculous anal fistula, although we did not search for a fistula in this case. Concomitant tuberculous peritonitis, as seen in one patient, is encountered occasionally and related to contiguous spread from tuberculous lesions of the intestine.[1] Involvement of regional mesenteric lymph nodes, nonetheless, is common.[8]

Confirmation of the diagnosis of intestinal TB requires isolation of *M tuberculosis* from affected tissue or evidence of TB elsewhere with caseating granulomas in intestinal tissue.[8] In 1950, Hoon et al[20] proposed the following criteria: (1) growth of *M tuberculosis* from affected tissue, or (2) histological demonstration of mycobacteria in tissue, or (3) histological evidence of granulomas with caseating necrosis in tissue, or (4) typical gross pathological findings in the bowel and histological findings of granulomas with caseating necrosis in associated lymph nodes.

Traditionally, surgical exploration was used to obtain a tissue diagnosis. Although surgery may still be required in patients who present as emergencies, many cases of GI TB can now be diagnosed endoscopically. Colonoscopy with procurement of biopsy specimens is currently considered the most valuable diagnostic tool for identifying such lesions in the colon and terminal ileum.[21-26] Mucosal ulcers and nodules are the most commonly encountered endoscopic lesions, being present in over 80% to 90% of cases,[23-26] and in about half the ileocaecal valve is deformed.[24,25] Other endoscopic findings include: strictures, polypoid lesions, and fibrous strands.[23-26] Tuberculous ulcers are characteristically aligned transversely along the intestine or are circumferential,[8,10,12,26] however none of these endoscopic features are diagnostic. Therefore endoscopic biopsy specimens should

always be examined histologically for granulomas and AFB, and cultured for mycobacteria.[1,2,6,8,25] Four of our patients who underwent colonoscopy only had lesions in the terminal ileum, highlighting the importance of performing ileal intubation for the diagnosis of intestinal TB.[27]

The most pathognomonic histological lesions of intestinal TB are caseating granulomas, but their presence in colonoscopic biopsy specimens is highly variable (0-44%).[5,21-26] As in the present study, they are usually seen more frequently in surgically resected specimens than in colonoscopic biopsy material, reflecting the predominance of granuloma in the deeper layers.[26] Furthermore, they may be seen only in regional lymph nodes and would therefore not be included in an endoscopic biopsy specimens.[28,29] In the absence of caseation, Crohn's disease has to be considered, as clinically it closely mimics intestinal TB. The granulomas associated with TB have histological features that are distinct from those of Crohn's disease. The former are frequently large and multiple, tend to coalesce, often contain Langhans' giant cells, may caseate, and contain AFB; whereas in Crohn's disease they are often small, infrequent and never coalesce or caseate.[30] Disappointingly, as in the case of caseating granulomas the identification of AFB in colonoscopic biopsy specimens has likewise been reported with variable frequency (0-36%).[6,22-26] Sending specimens for culture of mycobacteria increases the yield but takes time.[21,23,31] More recently, polymerase chain reaction assays have been applied to endoscopic biopsy specimens, to facilitate rapid detection of mycobacterial infection.[32]

The management of GI TB relies on anti-tuberculous drugs, surgery being reserved for complications or uncertainty in diagnosis. Ideally, the diagnosis should be confirmed by histology or isolation of mycobacteria. However, the typical granulomas and AFB are not invariably detected in the affected tissues, and a trial of anti-tuberculous therapy may be indicated, whenever clinical suspicion of the infection is high. A 6 to 9-month course of anti-tuberculous chemotherapy is sufficient for immunocompetent patients treated with a standard regimen consisting of four first-line drugs. Typically this involves: isoniazid, rifampicin, ethambutol, and pyrazinamide for the initial 2 months, followed by isoniazid and rifampicin for another 4 to 7 months.[33,34] A longer duration of therapy is necessary if one or more of these four first-line drugs cannot be used because of intolerance or drug resistance.[33] Surgical therapy is usually reserved for intestinal TB complicated by perforation, obstruction, or uncontrollable haemorrhage.[1,2,8-10] If surgery is to be performed, the most conservative approach should be used.[1,2,9,10] Tuberculous perforations and obstructing lesions warrant surgical resection.[18] Nevertheless, conservative treatment has been advocated for tuberculous intestinal obstruction in stable patients, as most will improve with anti-tuberculous chemotherapy; surgery being carried out for those who fail to respond.[14,35] Remarkably, two of our three cases of tuberculous intestinal obstruction resolved with conservative treatment, even prior to the diagnosis of TB (by colonoscopy) and the institution of anti-tuberculous medications.

Conclusions

An increased number of patients with intestinal TB have been encountered in recent years. Due to the lack of characteristic specific symptoms and signs and the fact that laboratory findings are commonly non-specific or show no abnormality, diagnosing such cases is difficult. A heightened awareness of this potentially fatal yet readily treatable condition is therefore important. A notable clue is the presence of abdominal pain co-existing with active pulmonary TB, but such lung involvement is present in less than one fifth of the cases. The most common site of infection is the ileocaecal region, for which colonoscopy with ileoscopy plus biopsy is the diagnostic tool of choice. Surgery is usually reserved for patients with complications or those whose diagnosis cannot be ascertained by other means.

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