Intestinal tuberculosis and tuberculous peritonitis

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Objectives

1. To master the clinical manifestations, complications, diagnosis and differential diagnosis.
2. To master the diagnosis and differential diagnosis of ascites, especially SAAG and ADA;
3. To be familiar with the pathogenesis, classification, prevalence and the therapy of the diseases.
Pathogen

- Mycobacterium tuberculosis is the pathogen in most cases.
- Mycobacterium bovis in some parts of the world with no pasteurization of milk.
- Mycobacterium avium intracellulare has become a major pathogen in HIV patients.
- *M. africanum, M. microti, and M. canetti*
Estimated TB incidence rates, by country, 2009

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Epidemiology

- Second infectious disease in China
- The epidemic is being accelerated by co-infection with HIV and compounded by multi-drug resistant TB;
- The incidence of GI TB is unknown;
- 20% pulmonary TB cases have extra-pulmonary TB including GI TB;
- 15-20% GI TB case have pulmonary TB.
Estimated HIV prevalence in new TB cases, 2009

HIV prevalence in new TB cases, all ages (%)
- 0–4
- 5–19
- 20–49
- ≥50
- No estimate

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• Following infection, the incubation period of TB range from a few weeks to a lifetime.

<table>
<thead>
<tr>
<th>TB infection and no risk factors (about 10% over a lifetime)</th>
<th>TB infection and diabetes (about 30% over a lifetime)</th>
<th>TB infection and HIV infection (a very high risk over a lifetime)</th>
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<td>For people with TB infection and <strong>no risk factors</strong>, the risk is about 5% in the first 2 years after infection and about 10% over a lifetime.</td>
<td>For people with TB infection and <strong>diabetes</strong>, the risk is 3 times as high, or about 30% over a lifetime.</td>
<td>For people with TB infection and <strong>HIV infection</strong>, the risk is about 7% to 10% PER YEAR, a very high risk over a lifetime.</td>
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</tbody>
</table>

*Figure 1.6 Risk of developing TB disease over a lifetime.*
Intestinal Tuberculosis
Infective Route

• Ingestion of infected food or milk
• Swallowing of infected sputum from active lung disease
• Hematogenous spread from active pulmonary TB
• Direct spread from adjacent viscera
Site of disease

TB can involve any region of GI tract;

• Ileum and cecum
• Ascending colon
• Jejunum
• Duodenum
• Stomach
• Esophagus
• Sigmoid colon
• rectum
Why is ileocecal region?

• Its richness of lymphoid tissue

• Relative stasis

• Increased absorption rate
Pathogenesis of TB:

Infection - Immunity
FORMS OF GI TB

Ulcerocentricrative
60% of patients
Highly virulent
Mostly small Intestinal

Hypertrophic
10% of patients
Chronic
Mostly ileocecal

Mixed 30% of patients

(Howell & Knapton, 1964)
Three types of intestinal tuberculosis

- Ulcerative lesion (common)
- Hypertrophic lesion
- Ulcerohypertrophic lesions
T.B. transverse girdle ulcer small intestine
Sub mucosal muscular and subserous granulomas

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Figure 6. ITB with large granuloma.
Figure 4. ITB with solitary AFB in ZN section highlighting how sparse AFBs may be.
Pathology

- Bowel wall-thicken
- Inflammatory mass
- Multiple transverse, circumferential ulcer, often with normal segments in between
- Mucosa-hyperemtic, cobblestoned, edematous, ulcerated
- Serosal-tubercles; lymph nodes-enlarged
The approach to the subject was directed to these main points.

- Country and continent of origin.
- Age
- Gender
- Associated HIV infection
- Associated pulmonary disease
- Constitutional signs and symptoms
- Signs and symptoms related to the site of involvement in the G.I. tract
Manifestation

- Non-specific, usually insidious
- Abdominal pain (80-90%), distension,
- Diarrhea: mucoid, liquid to semisolid stools, rarely containing pus or blood
- Abdominal mass
- Fever, weight loss, night sweat
Complication

• Intestinal hemorrhage
• Perforation
• Obstruction
• Fistula formation
• malabsorption
Local manifestations of ileoocoecal cases (n= 520)
Local manifestations of colorectal cases (n= 463)

- Pain: 39.1%
- Rectal bleeding: 21.8%
- Mass: 12.1%
- Distention: 9.0%
Local manifestations of esophagus cases (n=86)

- Dysphagia: 57.0%
- Fistula: 32.6%
- Haematemesis: 12.8%
- Esophageal diverticula: 2.3%
- Epigastric pain: 1.2%
- Free mediastinal air: 1.2%
- Mediastinitis: 1.2%

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Local manifestations of gastroduodenal cases (n = 42)
Local manifestations of small intestinal cases (n= 112)
Laboratory finding

- Blood routine test
  - mild anemia
  - normal white blood cell count
  - lymphopenia or lymphocytosis
- High erythrocyte sedimentation rate
- Tuberculin skin tests
  - PPD test, less helpful
Laboratory findings

• Identification of organism in tissues
• acid-fast stain
• culture of the excised tissue
• PCR assay
• T-spot test
Radiological examination

- Chest X-ray
  - abnormality (37-57%)
  - active pulmonary tuberculosis
- Plain X-ray films
  - diffuse abdominal calcifications
- Barium studies
X-ray

- A thickened bowel wall with distortion of the mucosal folds, ulceration, bowel stenosis, and pseudopolyps formation
Radiologic examination

- Stierlin Sign
Radiologic examination

- Fleischner's sign
Radiologic examination

hypertrophic type
Radiologic examination

ulcerohypertrophic type

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CT

• Thickening of the ileocecal valve and medial wall of cecum
• Massive lymphadenopathy with central necrosis
Colonoscopy
ascending colon (ulcerative lesion)
Hypertrophic lesion
Ileum and cecum: ulcerohypertrophic

Ulcer

Proliferation
Diagnosis

- History
- Clinical features
- X-ray
- PPD
- Anti-tuberculosis therapy
- Colonoscopy with biopsy
Differential diagnosis

• Crohn’s disease
• Carcinoma
• Amebiasis
• Schistosomiasis
• Syphilis and lymphogranuloma
• Gastrointestinal lymphoma
Treatment

• General: rest and nutrition
• Standard anti-tuberculosis treatment
• Ciprofloxacin, oxfloxacin, fluoroquinolone
• Corticosteroids
Surgery

- Assist diagnosis
- Treat complications
  - bowel obstruction
  - perforation
  - fistulae
  - hemorrhage
  - abscess perforation
Tuberculous peritonitis
Infective route

• Direct spread from (ruptured) lymph nodes and intraabdominal organs
• Hematogenous seeding
Multiple small, hard, raised, whitish tubercles studding the peritoneum

A cecal tuberculoma, matterd lymph nodes, or omental involvement may form a palpable mass
Manifestation

• **Systemic:**
  – Fever, night sweat, weight loss

• **local:**
  – Abdominal pain
  – Abdominal distension-ascites
  – Diarrhea
  – Nausea and vomiting
  – Abdominal mass
  – Doughy abdomen
Local manifestations of peritonitis cases (n= 881)
Laboratory finding

• Blood routine test
• ESR
• PPD test
• Test of ascites!!!
Paracentesis

- Exudative fluid
- High protein content
- Leukocytosis (lymphocytic)
- Adenosine deaminase (ADA) increases
• Gravity >1.016

• SAAG<11g/L

• Protein: >30g/L

• White cell: >500 \times 10^6/L with lymphocyte 40-92\%
Abdominal ultrasound

• Quick and inexpensive

• Detecting subclinical ascites and abdominal lymphadenopathy

• Assistant paracentesis
Radiology

• Chest X-ray
• CT
- detecting lymphadenopathy
- diffuse thickening of peritoneum
- help differentiation
laparoscopy

- Correct diagnosis 72-95%
- Laparoscopic appearance at operation is more accurate than subsequent histology or microbiological culture
- Biopsy
- Contraindication-extensive adhesion
Laparoscopy

• Thickened. Hyperaemic, occasionally hemorrhagic, inflamed peritoneum
• Diffuse, white-yellowish uniform (3-5mm) tubercles deposits on peritoneum, omentum and organs
• Adhesions between organs and peritoneum
Typical tubercles

- Caseating granulomas epitheloid and with langerhans cells
- Chronic inflammation
T.B. peritonitis granulomata with fibrosis in the omentum
Makram Milad

Peritoneal T.B. Laparoscopy
Hunter, Cairo University

Fudan University Zhongshan Hospital
Calcified T.B lymph nodes
C.T. scan

Peritoneal T.B with adhesions
Laparoscopy

T.B. Peritoneal adhesions
Ultrasonography
Diagnosis

- History
- Clinical features
- Ascites
- X-ray
- PPD
- Diagnostic treatment
- Laparoscopy and biopsy
Differential diagnosis

- **Ascites:**
  - malignant tumor
  - cirrhosis
  - Meigs’ syndrome
  - Budd-Chiari syndrome
  - constrictive pericarditis, etc.

- **Abdominal mass:** tumor, crohn’s disease

- **Abdominal pain**

- **Fever**
treatment

- General treatment: rest and nutrition
- Standard anti-tuberculosis chemotherapy
- Abdominal paracentesis
Key Concepts for GI tuberculosis

- Sites: any region of the gastrointestinal tract. The most frequent sites are the ileum and cecum.
- Histological lesion: caseating granulomas.
- The common symptoms and signs: abdominal pain, weight loss, fever, diarrhea or constipation, and blood in the stool.
Key Concepts for GI tuberculosis

- The definitive diagnosis is made by identification of the organism in tissue, either by direct visualization with an acid-fast stain, by culture of the excised tissue, or by a polymerase chain reaction (PCR) assay.
- Standard anti-tuberculosis treatment gives a high cure rate.
Key points for tuberculous peritonitis

- Manifestations include low-grade fever, abdominal pain, anorexia, weight loss, and ascites.
- The peritoneal fluid characteristics:
  - protein concentration above 30 g/L;
  - SAAG ≤11 g/L;
  - lymphocyte-predominant leukocytosis;
  - elevated ADA activity.
- Characteristic peritoneal nodules in laparoscopy in >90% of patients.
- Treatment is by standard anti-tuberculosis drugs.
CONCLUSION

- The disease is still and will remain a serious public health threat worldwide
- HIV infection is a main risk factor.
G.I. TUBERCULOSIS, A FINAL WORD

Be aware of Abdominal Tuberculosis

(Bouma et al., 1997)

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