

An unexpected presentation of tuberculosis-related abdominal sepsis: A case report and a short review of literature

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Abstract

The current case report is about tuberculosis septic shock in a 45-years-old man without history of immunosuppression. The patient came to Emergency Department because of an acute abdomen with radiographic signs of perforation. An emergent laparotomy was performed and it revealed a visceroadhesive syndrome with caseous nodules disseminated in the peritoneal cavity. Microbiological exams confirmed the tubercular etiology and the patient was treated through target anti-tuberculous therapy and organ support, given the development of a septic shock. During the surgery, any perforation was not found, thus a laparostomy was done in first moment, until clinical stabilization. The most common extra-pulmonary tuberculosis is the abdominal one whose diagnosis is complicated due to the lack of specific symptoms and imaging exams. A high grade of suspicion allowed a quick diagnosis and an effective treatment, that includes the target antimicrobial therapy and, in case of acute abdomen, urgent surgery.

Keywords

abdominal tuberculosis; septic shock; emergency laparotomy

Abbreviations

HCV: Hepatitis C virus; ICU: Intensive care unit; TB: Tuberculosis; HIV: Human immunodeficiency virus; MDR: Multidrug-resistant; CT: Computer tomography; MRI: Magnetic resonance imaging; PCR: polymerase chain reaction; PCT: Procalcitonin; GCS: Glasgow coma scale; US: Ultra-sound; BAL: Broncho-alveolar lavage; PaO₂: Partial pressure of oxygen in arterial blood; FiO₂: Fraction of inspired oxygen; VCV: Volume-controlled ventilation; PEEP: Positive end-expiratory pressure; Cstat: Static compliance; MAP: Mean arterial pressure; Svo₂: Mixed venous oxygen saturation; Lac: Lactate; CRP: C reactive protein; DIC: Diffuse intravascular coagulation.

Introduction

Tuberculosis (TB) is an increasingly public health problem in both developing and underdeveloped countries. According to World Health Organization, the incidence and mortality of TB is decreasing globally at about 2% and 3% per year, respectively; in 2017, in Italy have been notified 3955 TB cases [1]. Despite that in the last decades this infectious disease was particularly spread in poor countries, nowadays it is diffused also in the richest ones, because of HIV co-infection, iatrogenic immunosuppression, immigration from endemic areas and multidrug-resistant (MDR) mycobacteria [2]. TB patients can be often admitted in Intensive Care Unit (ICU) for many reasons, for example multi-organ failure (first of all, respiratory failure) [3]. TB can virtually affect every organ or tissue of the body, even if lungs are the most common sites of primary infection. Extra-pulmonary forms are not uncommon but intra-abdominal TB is more unusual and occurs in 3.5 % of patients with extra-pulmonary TB [4]. The early diagnosis of abdominal TB is often challenging due to non-specific symptoms and lack of effective diagnostic tools. Although radiological inspection can be helpful (ultrasound, computer tomography, magnetic resonance imaging), the definitive diagnosis is performed through positive Ziehl-Neelsen stain, culture of the bacillus, positive Polymerase Chain Reaction (PCR) or positive histology (caseous granulomas) [5]. However, emergency surgery is required for a minority of patients presenting an acute abdomen [6]. In this report we describe the case of an unusual TB presentation which occurred in a non-immunocompromised patient without history or clinical signs of pulmonary TB.

Case Presentation

A 45-year-old male patient, prisoner, with history of chronic gastritis and clinically silent HCV infection, was admitted to the Emergency Room with acute diffuse abdominal pain and clinical symptoms compatible with diffuse peritonitis. He was alert, orientated, cooperative, but suffering (GCS 15). The body temperature was 38,7°C. The patient was tachypnoeic with an oxygen saturation of 97% without any respiratory support. The heart rate was 125 bpm and had blood pressure of 140/80 mmHg. Laboratory data at admission and during the first days after admission are shown in Table 1. Chest and abdominal x-Rays showed free gas in the peritoneal cavity and an increased right-sided pleural effusion (Figure 1), while abdominal-US revealed a moderate ascites without hepatic and splenic alterations. Antibiotic empirical therapy was started: Amoxicillin-clavulanic acid (2,2gx4/die), Metronidazole (500mgx4/die), Amikacina (1g/die). An urgently exploratory laparotomy revealed an extended viscero-adhesive syndrome engaging the entire bowel and serum-corpusecular abdominal effusion on all abdominal quadrants without visible perforation. Moreover, many caseous nodules were disseminated on all the intestinal loops (Figure 2). Intraoperative samples taken from the peritoneal liquid and from nodules were sent to perform the microbiological exams (Ziehl-Neelsen stain, culture, PCR) due to the high suspicion of *M. tuberculosis* infection; a Broncho-Alveolar Lavage (BAL) was then executed for the same purpose. Despite a long exploration of the abdominal cavity, no intestinal perforation was evident; thus, a laparostomy was done to monitor the abdominal framework. The patient was admitted in ICU in an isolated negative-pressure room and supported by mechanical ventilation. During the first post-operative day, the patient was sedated and he was mechanically ventilated because of a respiratory failure ($\text{PaO}_2/\text{FiO}_2$ 197) with the following parameters: Volume-controlled Ventilation (VCV)

6 ml/kg, Positive End-Expiratory Pressure (PEEP) 14 cmH₂O, Static Compliance (C_{stat}) 37 ml/cmH₂O. The patient was hemodynamically unstable and required vasopressors (noradrenaline 0,15 mcg/Kg/m) to maintain MAP>60mmHg. Furthermore, diffuse hypoperfusion was documented by a reduced value of SvO₂ (SvO₂ 63 %) and an increased level of lactates (Lac 3.2 mmol/L). A diagnosis of septic shock was confirmed. One day later, the first results of the microbiological exams were available: concerning the intraoperative culture, both the microscopic exam and the PCR were positive for *M. tuberculosis*, underlying a sensibility for Rifampicin. Also, one of the three BAL was positive for the search of the bacillus, while it was isolated neither in the blood nor in the urine. With the confirmation of tubercular etiology, the following antibiotic therapy was started, replacing the initial one: Piperacillin/tazobactam (4,5gx3/day), Rifampicin (600mg/day), Isoniazide (300mg/day), Ethambutol (300mgx3/day), Pyrazinamide (500mgx3/day), Streptomycin (900mg/day). The same day, the patient was conducted to the Operating Room to check the abdominal state. Due to the absence of evidence of intestinal perforation, the laparostomy was closed, synthesizing the midline laparotomy. In the following days a progressive normalization of the laboratory exams occurred, including a reduction of CRP and PCT until the physiologic values. Furthermore, in the second post-operative day, the patient did not require further vasopressors administration and the lactates level returned in the range. Moreover, the trend of fluid balance was positive in the first 72 hours, then negative in the following hours, until its normalization. The cultural results also confirmed the tubercular etiology and they showed even the presence of *E. coli* and *E. faecium* in the peritoneal liquid. The weaning from mechanical ventilation occurred on the 9th day of ICU. The patient was then discharged from the ICU after 2 days of spontaneous breathing. In the following months, the patient returned to the Emergency Room due to weakness and abdominal pain, but did not need additional hospital admissions. A combination therapy of four drugs for two months followed by isoniazid and rifampicin for four additional months was prescribed. A pathologic decrease of weight was documented and parental nutrition was started. The patient is still alive after 180 days.

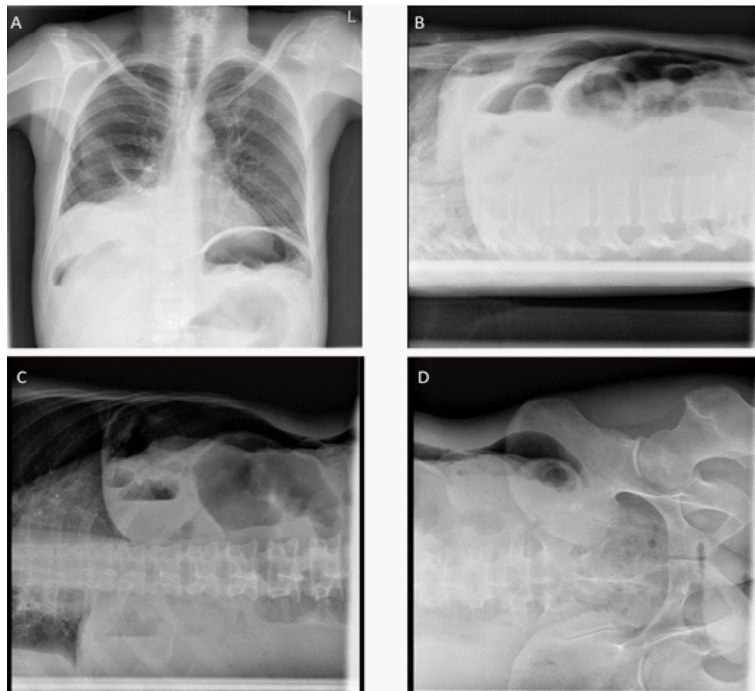


Figure 1: Abdominal and Chest X-rays revealing free gas in abdomen

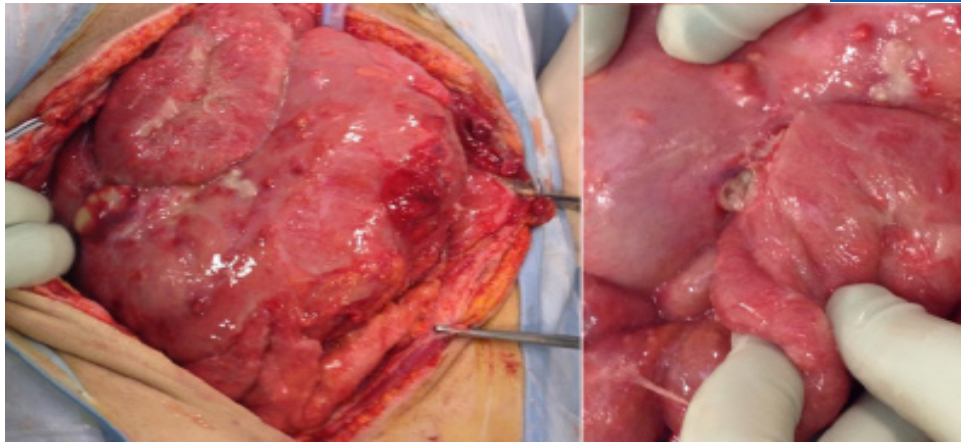


Figure 2: Intraoperative frameworks

Table 2: Laboratory data

	ER admission	ICU admission	1° day	3° day
Hemoglobin (g/dL)	11.9	9.9	10.9	10.3
WBC (cells/mm³)	20990	26120	17950	15070
Creatinine (mg/ml)	0.57	0.78	0.4	0.5
Bilirubin	1	2.1	2.2	2.45
INR	1.3	1.51	1.46	1.23
Lactate (mmol/l)	4.9	3.2	1.9	1.6
SvO₂ (%)	63%	63%	82%	74%
pH	7.28	7.27	7.24	7.4
CRP (mg/dl)	15.7	55.2	48.1	33.1
PCT (ng/ml)	42.80	-	37.5	14.6

CRP: C-reactive protein; PCT: procalcitonin; WBC: white blood cells.

Table 2: Comparison of case reports of acute abdominal TB

Author, year	Clinical presentation	Age, gender immunological status	Imaging	Surgical management	Intraoperative framework	Septic shock	Outcome
Sabooni <i>et al.</i> , 2015 [14]	High-grade fever (40°C), generalized abdominal pain, bowel obstruction signs	26-year-old, male Immunocompromised (HIV)	Chest X-ray, abdominal US	Laparotomy (removing adhesions)	Free intraperitoneal fluid, adhesive syndrome	No	Alive after 6 months
Massalis <i>et al.</i> , 2012 [15]	Low-grade fever, pain of the right iliac fossa, bowel obstruction signs	42-year-old, male Non-Immunocompromised	Chest X-ray, abdominal US	Laparotomy, (right hemicolectomy)	Multiple and large masses (compatible with carcinoma) involving terminal ileum and ascending colon	No	Alive after 6 months
Sousa <i>et al.</i> , 2016 [16]	Weight loss, nocturnal sweating, abdominal colic pain, bowel obstruction signs	37-year-old, female Non-Immunocompromised	Abdominal X-ray, abdominal-pelvic CT	Laparotomy, (gastric decompression)	Frozen abdomen and pelvis with multiple whitish small plaques in all bowel loops and omentum (compatible with carcinomatosis)	No	Alive after 5 months
Huang <i>et al.</i> , 2011 [17]	Generalized abdominal pain, nausea and vomiting	24-year-old, female Non-Immunocompromised	Abdominal-pelvic CT	Laparoscopy (peritoneal washing)	Extensive millet seedings of the peritoneal wall, liver, omentum, and pelvic organs	No	Alive after 6 months

Sakorafas <i>et al.</i> , 2008 [18]	Mild fever (37,5°C), right lower quadrant abdominal pain, nausea and vomiting	28-years-old, female Immunocompromised (pregnancy)	Abdominal US	Laparotomy (planned appendectomy not performed)	Small masses in the peritoneum and omentum	No	Discharged alive
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US: ultrasound; CT: computer tomography

Discussion

We presented a case report of an septic shock due to abdominal TB mimicking bowel perforation. A high rate of abdominal TB arises (up to 40%) as an acute abdomen [4,6,7], like the clinical case presented, and the surgical approach is required to face a suspected perforation. Patients with abdominal TB are often between 30 and 50 years of age and common symptoms are abdominal pain, weight loss, night sweats and fever [8]. There is not a specific radiological exam to obtain a definitive diagnosis of abdominal TB: the association between X-Ray/thoracic-abdominal CT/gastroscopy can be non-significant up to 50% of cases, as it was in ours [5,9]. Furthermore, all of these tests have a limited role in an emergency context and the definite diagnosis still needs some microbiological tests. However, the growth of the *M. tuberculosis* is slow up to 6 weeks, and direct microscopic examination in the search of acid-fast bacilli using the Ziehl-Neelsen requires a large number of bacteria in the sample [10]. Thus, the genetic test for bacterial DNA appears really useful, because it allows us to verify the susceptibility or resistance to Rifampicin and thus to ensures the antimicrobial therapy [4,9]. Of note, we achieved a diagnosis of TB in the first 24-hours of ICU compared to a median of 3 days reported in an observational study in ICU [11]. Such effective diagnosis was permitted by the high grade of suspicion of TB, due to the macroscopic findings during the urgent laparotomy. However, the high rate of TB in prisoners (between 5-8 times more than normal) [12] and to the severity of the clinical picture could have raised the clinical suspect even before surgery. Probably, despite the higher mortality risk, the main reason of the therapeutic success with a positive course of the abdominal disease was the quick diagnosis and, consequently, the timely and appropriate treatment. Anyway, the definitive diagnosis was obtained through the results of the intraoperative samples.

As mentioned, given both the radiological evidences of bowel perforation and the development of post-operative septic shock, the patient was admitted in ICU. Interestingly, we reported very high levels of PCT at ICU admission. Serum PCT is not usually elevated in HIV-negative pulmonary TB patients and therefore is considered a useful biomarker for discriminating between pulmonary TB and community acquired pneumonia [13]. However, in our patient, the *Mycobacterium* spread together with the *E. coli* and *E. faecium* co-infection, which could explain the PCT of 42.8 ng/ml raised. It is worth stating that the *E. coli* and *E. faecium* were isolated in the peritoneal fluid without any signs of bowel perforation.

To compare our case reports with other similar already described, we performed a short systematic review. Studies eligible for inclusion had following criteria: 1) a case report, 2) clinical presentation as acute abdomen, 3) diagnosis of TB. We identified 104 articles, found by searching the database PubMed. We excluded 30 records not in English language. Therefore, we assessed 74 cases reports for eligibility. We excluded 11 studies including children, 43 studies non focused on abdominal TB, 4 cases reports included patients with a positive TB history, 9 have not an urgent presentation, 1 study did not perform on humans, and 1 did show bowel perforation due to TB. We retrieved 5 case reports (Table 2) [14-18]. When comparing

our case reports with other similar already described, we can argue that our case has a peculiarity: this is the first case reporting a septic shock related to abdominal TB.

Conclusion

We presented a case report of an abdominal TB mimicking bowel perforation. Even in absence of history of TB, acute abdomen evaluation should take TB as differential diagnosis, particularly in patients with high risk of *M. tuberculosis* exposure such as prisoners. In acute abdominal TB, the antibiotics treatment should consider the risk of co-infection.

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