Cell. Mol. Biomed. Rep. (ISSN: 2823-2550)
https://doi.org/10.55705/cmbr.2021.354911.1053

2021, 1(3): 122-128

Case Study

Clinical analysis of diagnosing a case with tuberculous peritonitis from Afghanistan

Mohammad Reza Mohammadi[1,*], Mahram Ali Mehran[2], Amir Hossein Omidi[3], Mohammad Hadi Hassani[2]

Article info
Received: 02 May 2021
Revised: 09 Jul 2021
Accepted: 12 Aug 2021

Use your device to scan and read the article online

Keywords:
Adenosine deaminase, CT, *Mycobacterium Tuberculous*, PPD test, T-SPOT test

ABSTRACT

Tuberculosis is a contagious infectious disease. This disease is called tuberculosis and is abbreviated as TB. Tuberculosis is one of the most important infectious diseases of this century, which can involve all the organs of the body, but the lungs are most affected by tuberculosis. The occurrence of 10 million new cases of tuberculosis and the treatment of only two-thirds of them, which unfortunately was incomplete in more than 50% of cases, shows the depth of the disaster in these years. The occurrence of three epidemics of this disease in the last two decades shows that the prospect of controlling tuberculosis soon is very uncertain. Today, more than 8 million people are infected with this disease in the world every year, and until now, one-third of the world's people have been infected with the germ of tuberculosis without feeling sick. Tuberculous peritonitis is an uncommon disorder; sometimes, it is not considered in the initial evaluation of ascites. A negative 5-TU PPD test, or a low level of ascitic fluid protein, can mistakenly divert attention from tuberculosis. Tuberculosis peritonitis can be fatal if not diagnosed in time. Here we report a 67-year-old patient who was confirmed to have tuberculous peritonitis after clinical examination and laboratory diagnosis. The patient recovered after diagnosis with prescribed drugs.

1. Introduction

Tuberculosis (TB), one of the most dangerous threats to human health, is mainly caused by two bacteria: *Mycobacterium tuberculosis* and *Mycobacterium africanum*. This bacteria often affects the lungs and other organs. *M. tuberculosis* has spread dramatically, but *M. africanum* is restricted to Africa [1].

The incidence of abdominal tuberculosis is gradually increasing in many countries. Because of its non-specific clinical presentation may resemble other celiac diseases such as colon cancer and inflammatory bowel disease[2]. Most patients do not have a relevant and suggestive history of TB, so it is often misdiagnosed. In this article, a patient with tuberculosis peritonitis admitted to the gastroenterology department of Wazir Akbar Khan Hospital, located in Kabul, Afghanistan, was examined and reported as follows.

2. Case Presentation

The male patient, 67 years old and retired, was admitted to the hospital on August 05, 2021, because of "abdominal pain for more than 20 days". Nearly 20 days ago, the patient had dull pain around the belly button cord and lower abdomen without apparent causes, had no abdominal distension and had nothing to do with eating, accompanied by no fever, no cough, no expectoration, no diarrhea, no dizziness, headache, nausea or vomiting, so he came to our hospital, the whole abdomen CT

[1]*Department of Bacteriology, Faculty of Medical Sciences, Tarbiat Modares University, Tehran, Iran*
[2]*Faculty of Medical Sciences, Khatam Al-Nabieen University, Kabul, Afghanistan*
[3]*Department of Epidemiology and Biostatics, Research Centre for Emerging and Reemerging Infectious Diseases, Pasteur Institute of Iran, Tehran, Iran*
***Corresponding Author:** Mohammad Reza Mohammadi (mreza_mohammadi@modares.ac.ir)*

examination showed: turbidity in abdominal mesenteric fat space, obvious exudation, inflammatory change was possible, it was recommended to sure enhance the examination of pelvic effusion (Figure 1).

Gastroscopy showed: Chronic non-atrophic gastritis and hiatal hernia of the esophagus. Colonoscopy showed: Terminal ileitis and ascending colon polyp (Figure 2).

The patient was admitted to the hospital with "abdominal pain to be examined" by our department for further diagnosis and treatment. More than three months ago (April 27, 2021), laparoscopic repair of duodenal bulb ulcer perforation was performed in our hospital because of duodenal bulbar ulcer with perforation and diffuse peritonitis.

There was no particular situation in the patient's history and family history, with no history of infectious diseases and no significant change in body weight recently. Physical examination after admission: T36.8 ℃, P82 beats/min, R18 beats/min, Bp130/80mmHg, clear consciousness, lack of spirit, and no enlarged superficial lymph nodes. Cardiopulmonary PE (-). The abdomen was flat and soft; there was mild tenderness around the belly button and right lower abdomen, no rebound pain or muscle tension, liver and spleen were normal, Murphy's sign was negative, there was no mass in the whole abdomen or no percussion pain in both kidneys, with shifting voiced sounds and bowel sounds were four times/minute.

After admission, the relevant examinations were performed. On the second day, the patient developed fever, the highest body temperature was 38.3 ℃ and blood routine + hypersensitive CRP showed: Cell count of 3.4*10E9/L, neutrophils (%) 71.3%, lymphocytes (%) 13.7%, monocytes (%) 12.4%, hemoglobin 121g/L, hypersensitive C-reactive protein 109.9mg/L; procalcitonin (PCT) (electrochemiluminescence) 0.06ng/mL; erythrocyte sedimentation rate (ESR) 40 mm/h; (Figure 3): The effusion in the perihepatic and abdominal pelvic cavity was more than that seen in the previous film.

Immunization Globulin + complement test: Immunoglobulin G 7.41 g/L, immunoglobulin. White M 0.26 g/L, Qinglian Kappa 5.84 g/L; Stool routine examination +OB: No obvious abnormality; The chest CT plain scan was further performed, showing: Chronic bronchitis and emphysema in both lungs; inflammation of the lower lobe of the left lung, its change was not evident from the previous; obsolete changes in the apical segment of the left upper lobe; and fibrous foci in the lower lingual section of the left upper lobe and the right lower lobe (Figure 4).

Enhanced CT of the whole abdomen showed: turbidity in abdominal mesenteric fat space, obvious exudation, and inflammatory change was possible, with more aggravation than in the previous film. The effusion in the perihepatic and abdominal pelvic cavities was more than in the previous film. Slightly larger lymph nodes were observed in the appendage and diaphragmatic angle of the right heart (Figure 3).

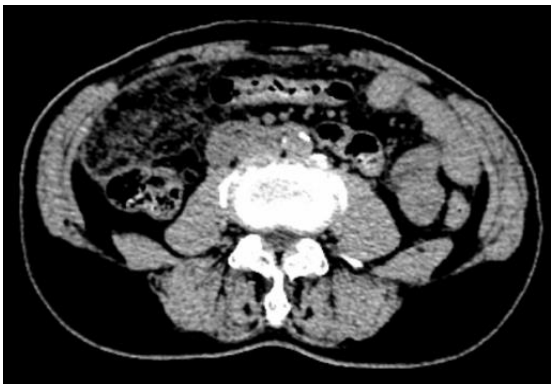

Fig. 1. The abdominal mesenteric exudation was evident; it was likely to be inflammatory changes.

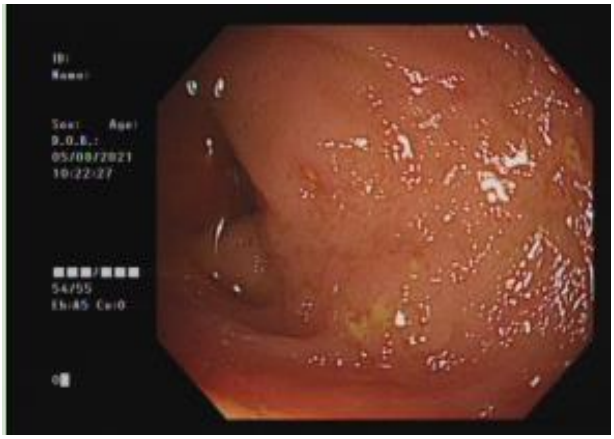

Fig. 2. Terminal Ileitis

We pumped the patient for medical history and found that the patient had a history of low fever and coughing more than 20 years ago. At that time, he was diagnosed with "possible tuberculosis," but no further examination and diagnosis were performed, and no antituberculosis treatment was given. A PPD test and T-SPOT examination were completed to further confirm the diagnosis, showing negative.

The patient underwent peritoneal puncture and intra-abdominal catheter drainage; the ascites were faint yellow and slightly turbid; Rivalta test showed positive, red blood cells 4000*10E6/L, nucleated cell count 7400*10E6/L, neutrophils 10%, lymphocytes 85%, adenosine deaminase (ADA) 30U/L. No acid-fast bacilli and tumor cells were found in the pathological smear.

Enteroscopy pathology report: (terminal ileum) mucosal chronic inflammation, interstitial lymphocytes, plasma cells, and a small amount of eosinophil infiltration, no granuloma, and no typical acid-fast bacilli were found in special staining. After treatment with moxifloxacin (0.4 g get QD) for three days, the body temperature returned to normal and then repeated low fever occurred, and the abdominal pain was not significantly relieved. Due to insufficient diagnostic evidence, a tracheoscopy was performed after communication with his family members.

Bronchoalveolar lavage fluid was submitted to examine acid-fast bacilli, X-pert, tuberculosis DNA, RNA, and culture. Acid-fast bacilli (1+) were found in bronchoalveolar lavage fluid smears. The DNA assay of tuberculosis and non-*M. tuberculosis* and the RNA detection of *M. tuberculosis* were positive. Therefore, tuberculous peritonitis was possible, and the patient was advised to go to a tuberculosis hospital for specialist treatment. During the follow-up half a month later, the patient was currently receiving regular antituberculosis treatment, and the abdominal pain was improved than before.

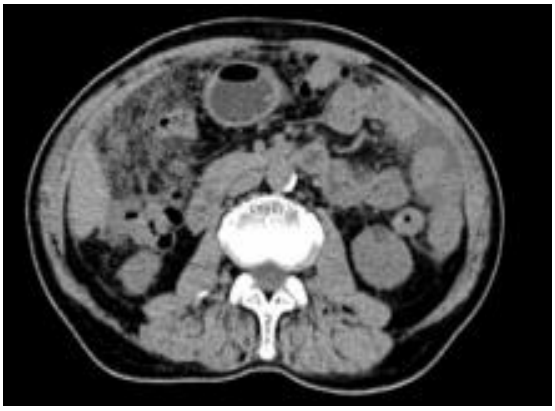

Fig. 3. The effusion in the perihepatic and abdominal pelvic cavities was more than in the previous film.

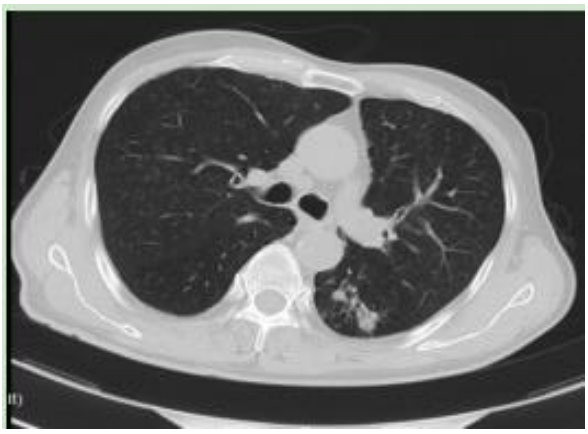

Fig. 4. Obsolete changes in the apical segment of the left upper lobe

3. Discussion

The incidence of tuberculosis in Afghanistan is increasing, so it is necessary to give great importance to tuberculosis in clinical practice[3]. Tuberculous peritonitis (TBP) is a chronic diffuse peritoneal infection caused by the transfer of Mycobacterium[3], primarily secondary to other tuberculosis lesions, accounting for about 3.1%-6.1% of extrapulmonary tuberculosis[4]. It is typical for extrapulmonary tuberculosis. TBP appears mostly in young and middle-aged women between 20 and 40 years old, and the incidence rate of male to female patients is about 1: 1.2 to 2.0 [5]. TBP has symptoms like right lower abdominal pain, abdominal distension, ascites, anorexia, or typical tuberculosis manifestations such as low fever, night sweats, and emaciation. Abdominal palpation has a sense of flexibility or touches a mass in the right lower abdomen. Since most of the symptoms are atypical, it is easy to be

clinically misdiagnosed and misdiagnosed, and there is a common lag in diagnosis [6].

In time, the suspected patients should receive combined cytology, imaging, and pathology examinations. The primary screening methods are the tuberculin test (PPD test), tuberculosis infection T-cell spot test (T-SPOT test), ESR, chest CT, sputum smear, and sputum culture. Ascites detection is essential for patients with ascites, A discovery of *M. tuberculosis* in smears or culture of peritoneal effusion is a vital standard to confirm the diagnosis of abdominal tuberculosis. However, some studies have shown that [6], the positive rate of ascites smear is only 3%, Murray 10%, and ascites culture is 20% - 50%, which is time-consuming.

It was proposed [7] that the elevation of adenosine deaminase (ADA) in ascites was instructive to some extent for the diagnosis of abdominal tuberculosis, which is different from general malignant tumors and lymphomas. The ADA index increased in this case without *M. tuberculosis* detected in ascites. It was further proposed [6] that the combined detection of ADA, lactate dehydrogenase (LDH), and T-cell spot test (T-SPOT) is of high value in the diagnosis of tuberculous peritonitis. Therefore, the ADA index can be an essential clue to consider in this case to have suffered from tuberculosis peritonitis.

In addition, the ascites chylous test and detection of *M. tuberculosis* complex nucleic acid (TB-LAMP) also have specific diagnostic significance for TBP. Clinically, imaging examination is an essential means to screen for tuberculous peritonitis[8]. The typical CT manifestations of tuberculous peritonitis include large-scale ascites, which may be distributed in various spaces of the abdominal cavity, and often manifest as hepatosplenic ascites, paracolonic ascites, greater omental ascites, and lesser omental ascites, accompanied by thickening peritoneum, nodular and mass-like changes, or annular enhancement. Some patients have enlarged lymph nodes with annular enhancement, mesentery thickening, intestinal adhesion, and so on [9].

MDCT may show an obvious "armor sign" [10]. However, in this case, CT manifestation was atypical. Laparoscopy is also a gold standard for the diagnosis of tuberculosis peritonitis. In laparoscopic exploration, tuberculous peritonitis is often seen with thickened peritoneum, scattered peritoneum or extensive white granular nodules, or yellow nodules and cheese-like substances may be found on the peritoneum of the parietal lobe, which has become noticeably thickened. Laparoscopic exploration has the advantages of direct observation of the whole peritoneal space and biopsy of suspicious tissues, which is more accurate than puncture biopsy, and its diagnostic accuracy is significantly higher than that of puncture biopsy [11]. However, laparoscopy has some limitations in the diagnosis of clinical tuberculosis.

At present, molecular biology is developing dramatically. The studies by Guo Chen et al. suggested [12] that the detection of T lymphocyte subsets in ascites by flow cytometry is of great significance in the diagnosis and differential diagnosis of abdominal tuberculosis. Wang Qi et al. proposed [4] that the sensitivity and specificity of Xpert MTB/RIF in the diagnosis of extrapulmonary tuberculosis were 77% and 97%, respectively, which could effectively enhance the diagnostic efficiency of extrapulmonary tuberculosis and could be used in different clinical specimens. The specificity of the thoracic and abdominal effusion specimens could be up to 100%.

By reviewing the course of the disease, it was visible that the patient went to see a doctor because of abdominal pain; the pain was mild and located in the right lower abdomen and around the belly button, with diarrhea, nausea, fever, and other symptoms. Enteroscopy suggested terminal ileitis and ileal polyps. After admission, the patient developed a fever, high procalcitonin, and accelerated ESR. Abdominal CT indicated that the abdominal effusion and inflammatory changes were more progressive. Since the onset of the disease, the symptoms and the specificity of the examination results have been low. Intestinal tuberculosis can manifest as an annular cecum ulcer under colonoscopy, mostly with pseudopolyps [13, 14].

The colonoscopic findings of the patient cannot be ruled out. PPD test and T-SPOT test were negative. No acid-fast bacilli and tumor cells were found in ascites smears, but ADA was significantly higher. Colonoscopy pathology reported no granulomatous lesions, and no typical acid-fast bacilli were found by special staining. However, after anti-infective treatment, the symptoms were not relieved. Since there was a history of suspicious pulmonary tuberculosis in the supplementary medical history, bronchoscopy was performed and bronchoalveolar lavage fluid was submitted for examination. Acid-fast bacilli (1 +) were found in the smears. The DNA assay of tuberculosis and non-*M. tuberculosis* and the RNA detection of *M. tuberculosis* were positive. It was considered to be tuberculous peritonitis[15].

The diagnosis of tuberculous peritonitis is complicated, and the sensitivity and specificity of each examination are different. Diagnostic anti-tuberculosis treatment is also an essential option if the ideal examinations cannot be completed for various reasons and tuberculosis infection is highly suspected due to the ineffectiveness of general anti-infection treatment. After the patient was transferred to a specialist hospital for anti-tuberculosis treatment, the uncomfortable symptoms such as low fever and abdominal pain improved, con tuberculosis infection.

4. Conclusions

In this study, the clinical process of the patient was investigated, and the diagnostic methods for the diagnosis of tuberculous peritonitis were confirmed. In Afghanistan, the prevalence of tuberculosis is very high and affects thousands of patients annually. Therefore, accurate and timely diagnosis and appropriate treatment are crucial for the patient's recovery. The best methods for diagnosing tuberculosis are the sputum test and, real-time PCR, tuberculin skin test (PPD). Once the diagnosis is confirmed and even if it is probable, antituberculosis combination chemotherapy should be started. Isoniazid and rifampin are therapeutic drugs that should be continued for 18 months after the operation.

Abbreviations

TB: tuberculosis

PPD: purified protein derivative

TBP: Tuberculous peritonitis

LDH: lactate dehydrogenase

Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

Informed Consent

The authors declare not to use any patients in this research.

Ethics approval and consent to participate

No human or animals were used in the present research.

Consent for publication

All authors read and approved the final manuscript for publication.

Availability of data and material

All the data are embedded in the manuscript.

Funding

There was not any financial support for this study.

Author contributions

All authors are equally involved in the preparation of this manuscript and endorse the manuscript.

References

1. Silva ML, Cá B, Osório NS, Rodrigues PN, Maceiras AR, Saraiva M (2022) Tuberculosis caused by *Mycobacterium africanum*: Knowns and unknowns. PLoS Pathogens 18(5):e1010490. doi:https://doi.org/10.1371/journal.ppat.1010490
2. Coscolla M, Gagneux S, Menardo F, Loiseau C, Ruiz-Rodriguez P, Borrell S, Otchere ID, Asante-Poku A, Asare P, Sánchez-Busó L (2021) Phylogenomics of *Mycobacterium africanum* reveals a new lineage and a

complex evolutionary history. Microbial genomics 7(2):000477. doi:https://doi.org/10.1099%2Fmgen.0.000477

3. Baray F, Noori MB, Aram MM, Hamidi H (2022) Misdiagnosis of Budd Chiari syndrome, a case report from Afghanistan. Annals of Medicine and Surgery 73:103218. doi:https://doi.org/10.1016/j.amsu.2021.103218
4. Liu R, Li J, Tan Y, Shang Y, Li Y, Su B, Shu W, Pang Y, Gao M, Ma L (2020) Multicenter evaluation of the acid-fast bacillus smear, mycobacterial culture, Xpert MTB/RIF assay, and adenosine deaminase for the diagnosis of tuberculous peritonitis in China. International Journal of Infectious Diseases 90:119-124. doi:https://doi.org/10.1016/j.ijid.2019.10.036
5. Zetola NM, Shin SS, Tumedi KA, Moeti K, Ncube R, Nicol M, Collman RG, Klausner JD, Modongo C (2014) Mixed *Mycobacterium tuberculosis* complex infections and false-negative results for rifampin resistance by GeneXpert MTB/RIF are associated with poor clinical outcomes. Journal of Clinical Microbiology 52(7):2422-2429. doi:https://doi.org/10.1128/JCM.02489-13
6. Luo Y, Xue Y, Mao L, Lin Q, Tang G, Song H, Wang F, Sun Z (2020) Diagnostic value of T-SPOT. TB assay for tuberculous peritonitis: a meta-analysis. Frontiers in medicine 7:585180. doi:https://doi.org/10.3389/fmed.2020.585180
7. Kumabe A, Hatakeyama S, Kanda N, Yamamoto Y, Matsumura M (2020) Utility of Ascitic fluid adenosine deaminase levels in the diagnosis of tuberculous peritonitis in general medical practice. Canadian Journal of Infectious Diseases and Medical Microbiology 2020:Article ID: 5792937. doi:https://doi.org/10.1155/2020/5792937
8. Ionescu S, Nicolescu AC, Madge OL, Marincas M, Radu M, Simion L (2021) Differential Diagnosis of *Abdominal Tuberculosis* in the Adult—Literature Review. Diagnostics 11(12):2362. doi:https://doi.org/10.3390/diagnostics11122362
9. Yu Y (2020) IDDF2020-ABS-0050 Spiral CT in the clinical significance of portal cavernous change in *hepatocellular carcinoma*. Gut 69(Suppl 2):A1–A95. doi:http://dx.doi.org/10.1136/gutjnl-2020-IDDF.136
10. Coulier B, Montfort L, Doyen V, Gielen I (2010) MDCT findings in primary amyloidosis of the greater omentum and mesentery: a case report. Abdominal imaging 35(1):88-91. doi:https://doi.org/10.1007/s00261-008-9487-2
11. Zhang F, Xu C, Ning L, Hu F, Shan G, Chen H, Yang M, Chen W, Yu J, Xu G (2016) Exploration of serum proteomic profiling and diagnostic model that differentiate Crohn's disease and intestinal tuberculosis. PloS one 11(12):e0167109. doi:https://doi.org/10.1371/journal.pone.0167109
12. Chester C, Dorigo O, Berek JS, Kohrt H (2015) Immunotherapeutic approaches to ovarian cancer treatment. Journal for immunotherapy of cancer 3(1):1-10. doi:https://doi.org/10.1186/s40425-015-0051-7
13. Huang X, Liao W-D, Yu C, Tu Y, Pan X-L, Chen Y-X, Lv N-H, Zhu X (2015) Differences in clinical features of Crohn's disease and intestinal tuberculosis. World journal of gastroenterology: WJG 21(12):3650. doi:https://doi.org/10.3748%2Fwjg.v21.i12.3650
14. Zhang J, Bao Y (2022) Value of MSCT plus MRI in the Detection of Colon Cancer. Evidence-Based Complementary and Alternative Medicine 2022:Article ID: 6507865. doi:https://doi.org/10.1155/2022/6507865
15. Ferrara G, Losi M, D'Amico R, Roversi P, Piro R, Meacci M, Meccugni B, Dori IM, Andreani A, Bergamini BM (2006) Use in routine clinical practice of two commercial blood tests for diagnosis of infection with *Mycobacterium tuberculosis*: a prospective study. The Lancet 367(9519):1328-1334. doi:https://doi.org/10.1016/S0140-6736(06)68579-6

How to Cite This Article:

Mohammadi MR, Mehran MA, Omidi AH, Hassani MH (2021) Clinical analysis of diagnosing a case with tuberculous peritonitis from Afghanistan. Cellular, Molecular and Biomedical Reports 1 (3): 122-128. doi:10.55705/cmbr.2021.354911.1053

Download citation:

RIS; EndNote; Mendeley; BibTeX; APA; MLA; HARVARD; VANCOUVER