

Diagnostic and surgical challenges in disseminated tuberculosis presenting as acute abdomen during COVID-19 pandemic

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Abstract

Due to the lack of much insight into the SARS-CoV-2 and overlapping symptoms and signs with other respiratory infections, diagnosis and management is often challenging in chest ailments particularly tuberculosis.

Keywords

SARS-CoV-2, disseminated tuberculosis, panenteric perforation, CO-RADS, COVID-19

Coronavirus disease 2019 (COVID-19) pandemic has tremendously influenced the management of the non-coronavirus disease patient, not even sparing surgical emergencies like enteric perforation. Currently, novel coronavirus 19 is known to target lungs as the primary organ but abdominal symptoms such as diarrhoea and vomiting have also raised concerns about possible gastrointestinal involvement, spectrum resembling tuberculosis. This case report is an excellent example of a diagnostic dilemma between severe acute SARS-CoV-2 and tuberculosis, with tuberculosis be the final diagnosis, and surgical challenges to overcome in damage control surgery for Koch's abdomen.

Case report

A 21-year-old lady, without any known comorbidity and illness history, presented to our emergency department in the state of shock and respiratory distress with vague abdominal discomfort and distension for the last two weeks, raising suspicion of abdominal sepsis. She had fever, cough, breathing difficulty at presentation with two weeks prior history of loose stools, and reported from a red zone area (designated by Government of India) for severe acute respiratory syndrome coronavirus 2 in northern India, suggesting her to be a coronavirus disease 2019 suspect. She had a negative IgM/IgG rapid test at presentation. Abdominal examination revealed signs of peritonism

and bowel sounds were normal. The patient was intubated in the emergency room and kept on mechanical ventilation with ionotropic support in coronavirus disease intensive care unit (ICU). The coronavirus disease real-time polymerase chain reaction (RT-PCR) test was done as per institute protocol which reported positive.

Laboratory workup revealed haemoglobin: 7.2 g/dl, total leucocyte count: $16 \times 10^9/L$ and platelet count: $99 \times 10^9/L$. Ultrasound abdomen showed a large well defined thick-walled collection in the abdominopelvic region, displacing small bowel loops posteriorly. A percutaneous pigtail drainage with radiological control revealed a purulent output. The chest X-ray showed bilateral lower lobe atelectasis with prominent bronchovascular markings. On stabilisation of the blood pressure, the patient was subjected to a contrast-enhanced computed tomography (CECT) scan of thorax that demonstrated bilateral basal atelectasis with ground-glass opacities and a COVID-19 Reporting and Data System (CO-RADS) score of 4 (Figure 1). Contrast enhanced computed tomography of the abdomen reported sealed off perforation with a localised large pelvic collection. Hence a diagnosis of sealed off enteric perforation with suspicion of severe acute SARS-CoV-2 based on the computed tomography report was under consideration.

She subsequently underwent exploratory laparotomy because of the non-improving condition and increasing abdominal distension, as per coronavirus disease 2019 surgical guidelines wearing personnel protective equipment. Intraoperative findings were faecopurulent peritoneal collection and dense inter-bowel adhesions with greater omentum smeared to the clumped bowel loops. After meticulous adhesiolysis using sharp dissection technique, five perforations in the distal ileum (Figure 2) and a jejunal perforation 5 cm near to the duodenojejunal junction were identified. All perforations were repaired primarily, and a loop ileostomy was created to divert

Figure 1. (a) Chest X-ray showing prominent bronchovascular markings with basal atelectasis, (b) Contrast enhanced computed tomography thorax showing ground-glass opacities in the periphery of lung parenchyma.

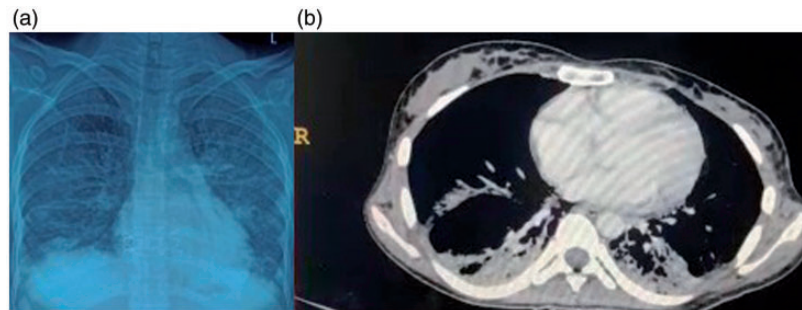
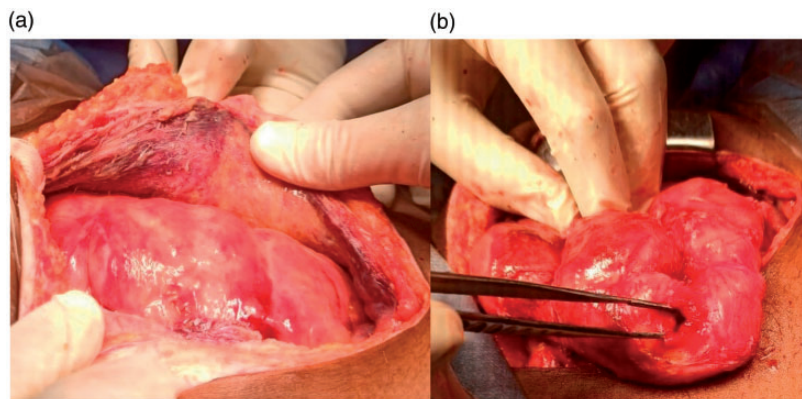


Figure 2. Intraoperative photograph showing (a) conglomerate of intestinal loops surrounded by thickened omentum (b) tip of the forceps pointing to one of the ileal perforations in the inflamed bowel.



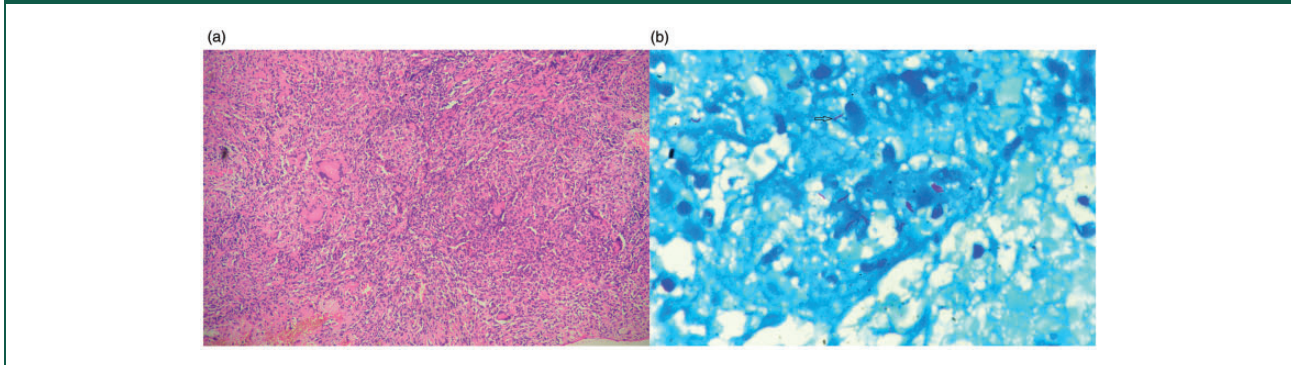
the ileal perforations. The construction of loop ileostomy was technically challenging owing to the short, broad mesentery and friable, inflamed bowel. Small bowel mesentery was mobilised and an oversized abdominal wall defect made to avoid undue tension over stoma because of the short and thickened mesentery. Although not ideal, a flush to skin loop ileostomy was fashioned on left side supraumbilical region approximately 5 cm away from the midline. A nasojejunal tube was inserted and its tip negotiated beyond the repaired jejunal perforation for feeding purpose.

The patient remained in coronavirus disease intensive care unit until the repeat second COVID-19 real time sample test done on postoperative day five, was reported negative. The stomal viability was assessed by a pinprick test that revealed fresh blood, and a lubricated transparent tube inserted through the stomal opening showed pink mucosa on torch illumination. Nasojejunal tube feeding was started on postoperative day two after stoma became functional.

The histopathological examination (HPE) report of perforation edge and omental tissue showed granulomatous inflammation. Ziehl-Neelsen staining demonstrated acid-fast bacilli (Figure 3). In view of overlap of radiological findings between severe acute respiratory syndrome coronavirus SARS-CoV-2 and tuberculosis in lungs, a possibility of pulmonary tuberculosis was kept in mind too. No acid-fast bacilli could be visualised on sputum examination. However, GenXpert-Mtb/Rif, which is a cartridge-based nucleic acid amplification test, detected *Mycobacterium tuberculosis*. Based on the histopathology report and positive CBNAAT test, a diagnosis of disseminated tuberculosis was made and the patient started on an anti-tubercular regime.

She developed low output enterocutaneous fistula through the midline wound on postoperative day seven which was managed conservatively. Her sepsis subsided gradually over the subsequent two weeks. The patient started accepting oral feeds well following which nasojejunal tube was removed.

Figure 3. Microphotograph of the perforation edge (a) 10× ematoxylin and Eosin stain showing multiple caseating granulomas, (b) Ziehl-Neelsen stain demonstrating acid-fast bacilli.



Discussion

In a report of World Health Organization, there is a 25% reduction in tuberculosis patient detection over the past eight months during the COVID-19 pandemic possibly due to the diagnostic challenge of severe acute respiratory syndrome coronavirus 2 and disruption of tuberculosis services.¹ Tuberculosis is rampant in developing countries like India, prevention and cure has been a matter of concern to national as well as global health authorities for decades. Globally, tuberculosis is the leading cause of mortality seen due to a single infectious agent ahead of HIV/AIDS.² In 2018, eight countries accounted for two-thirds of the total new cases with India at the top position in the list. These facts illustrate that diagnosis and treatment of tuberculosis should not be compromised in this COVID-19 pandemic and clinicians must have equal concern for both diseases.

SARS-CoV-2 and tuberculosis are both severe respiratory infections caused by Coronavirus disease 2019 and *M. tuberculosis*, respectively. Since Coronavirus disease 2019 pandemic is on the upsurge and has overwhelmed the healthcare system, tuberculosis detection and cure is seen compromised, raising concerns in developing nations. Sustainable development goals target rolling-up tuberculosis by the end of 2030 which needs constant endeavour.²

In a multicentre study by Tadolini et al., severe acute respiratory syndrome-coronavirus 2 boosts active tuberculosis and delays its diagnosis and treatment due to coronavirus disease 2019-related enthusiasm.³ In a case report by Guiqing He et al., three patients with active pulmonary tuberculosis suffered co-infection with severe acute respiratory syndrome coronavirus 2.⁴ These studies emphasise the possibility of severe acute respiratory syndrome coronavirus 2 in pulmonary tuberculosis patients.

In our case of disseminated tuberculosis, the diagnosis of tuberculosis was made based on the histopathology and cartridge based nucleic acid amplification test report. The hallmark histological feature seen in tuberculosis is caseation necrosis in granulomas, which are usually multiple and coalescent in mucosa and submucosa.⁵ The suspicion of coronavirus disease 2019 infection was strengthened by computed tomography thorax which reported Coronavirus disease 2019 Reporting and Data System score of 4.

The Dutch Association of Radiology has released a Computed Tomography scoring system for coronavirus disease 2019 pulmonary involvement known as

Score	Suspicion level of COVID-19 pulmonary involvement	CT findings
1	Very low	Normal or non-infectious
2	Low	Abnormalities consistent with infections other than COVID-19
3	Equivocal	Compatible with COVID-19 but also other diseases
4	High	Suspicious for COVID-19
5	Very high	Typical for COVID-19
6	RT-PCR positive	

Coronavirus disease 2019 Reporting and Data System (CO-RADS), that is as follows (Table):⁶

coronavirus disease 2019 is mainly diagnosed by real time reverse transcription polymerase chain reaction and chest computed tomography examination. Chest chest tomography is especially helpful in cases with a high clinical suspicion and a negative RT-PCR test at initial presentation. The typical CT scan findings are the peripheral distribution of ground-glass opacities (GGOs), crazy paving (groundglass opacities and septal thickening), bronchovascular thickening, air space consolidation.⁷ These air bubbles seen in coronavirus disease 2019 pneumonia do not meet the previous definitions of a cyst or cavity.

Although stoma creation is rarely difficult, at times, it becomes challenging as witnessed in our case. Traditionally, the ileostomy is fashioned in the right iliac fossa, everted and abdominal wall opening is just enough in size to accommodate stoma. However, in difficult bowel conditions, the stoma can be made in supraumbilical position, especially in obese individuals, flushed to the skin and creating an oversized abdominal wall trephine.

Tuberculosis and coronavirus disease 2019 should be judiciously diagnosed and the co-infection is possible. Abdominal tuberculosis may manifest as multiple bowel perforations with peritonitis. The difficult stoma creation technique as described in this report is essential to avoid undue adverse events.

Declarations

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