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RESEARCH ARTICLE

SIGNIFICANCE OF SURGICAL INTERVENTION IN DIAGNOSING DISSEMINATED MILIARY TUBERCULOSIS COMPLICATED BY SMALL BOWEL PERFORATION

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ABSTRACT

Tuberculosis (TB) is an infectious disease mainly caused by *Mycobacterium tuberculosis*. TB is an acid-fast staining rod that gets transmitted through aerosolized droplets. Even though TB cases in the United States are decreasing, it is still prevalent in the developing world, especially in travelers from countries with endemic TB. TB is primarily a lung infection because of its aerosol transmission. It can become a systemic infection and last in the body for long periods of time. When the infection becomes systemic, it gets labeled as miliary TB because of the lymphohematogenous and disseminated spread. In this case report, we present an exceedingly rare case of a young patient with latent miliary TB who presents to the hospital with gastrointestinal complaints, ultimately having a small bowel perforation and a complicated hospital course which followed. Of note, according to the CDC, US cases of TB are about 2.7% per 100,000, of which military tuberculosis is a rare complication as low as <2% (6). Secondarily, systolic blood pressure can range from as low as 7% up to 30% occurrence based on the etiology, and patient presentation. Combining both factors can elucidate how rare it is for SBP and disseminated TB to occur individually, let alone simultaneously.

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INTRODUCTION

Tuberculosis affects several key organ systems of which one critical area is abdominal tuberculosis. Gastrointestinal (GI) manifestations of TB are complex because of their nonspecific symptom presentation and delay in diagnosis due to similar GI pathology mimicry (4). For example, the clinical presentation can appear similar to Crohn's disease or superior mesenteric artery syndrome, based on whether there was jejunal and duodenal involvement, respectively. WHO estimates that there are 86 million TB cases annually worldwide, 1.3 million of these were fatal and 0.45 million of those cases being multidrug-resistant cases. Because of the unique presentation of abdominal symptoms, a high degree of suspicion and detection tools need to be employed early. Common presentations of tuberculosis in the abdomen are tuberculous lymphadenitis, peritoneal, visceral, and gastrointestinal tract tuberculosis.

Well-established methods of transmission in which TB can spread are through the intestinal tract, hematogenous, or through the lymphatic system (3).

Case Presentation: A 22-year-old male with a past medical history of autism, obesity, eczema, gastritis, gastric ulcer, hiatal hernia, acid reflux, and latent tuberculosis came to the ED brought in by his mother for abdominal pain, nausea, vomiting, diarrhea, and palpitations. The pain was epigastric, burning, non-radiating in nature associated with non-bloody, non-bilious vomiting, and non-tarry diarrhea. The mother stated it started about two months ago and had progressively gotten worse in the previous two weeks. He also had a 100-pound weight loss in the past three months. The patient was brought to the hospital for the same symptoms that week and was discharged with GERD esophagitis. He was placed on aproton pump inhibitor and given an outpatient gastroenterology follow-up. At that visit he was dehydrated andwas found to have hyperthyroidism.

An esophagogastroduodenoscopywas scheduled but canceled due to COVIDscheduling conflicts.The patient's mother denies any fever (documented at home, even though he is warm at times), chills, headache, sore throat, chest pain, shortness of breath, cough, dysuria, increased frequency(despite mild redness in the urine), sick contacts, recent travel, trauma, or coronavirus exposure. He also denied smoking, drinking, or any illicit drug use. His family history was significant for his mother having Wolff-Parkinson-White syndrome and type II diabetes mellitus while his father having heart disease. Physical examination at this hospital visit was unremarkable, however CT imaging revealed an abnormal appearance of the small bowel with areas of distension as well as collapsed and matted loops associated with nonspecific mesenteric edema and lymph nodes. It was unclear if this was secondary to partial obstruction from an inflammatory or infectious process or due to an internal hernia or adhesions. Surgery was consulted in the emergency department. Upon assessment, the patient endorsed epigastric pain which had not changed in character for the last two months. He was no longer nauseous or vomiting and stated that he was hungry. He felt like he had a bowel movement. The patient was passing flatus and his last bowel movement was before arrival which was loose. He was admitted for possible SBO with possible pneumatosis on computed tomography and hyperthyroidism. At this time, it was decided that clinically there was no SBO and that no acute surgical intervention was needed. Five days later he was discharged.

Two weeks after that admission, the patient returned to the emergency room for decreased appetite, diarrhea for two days, associated with tachycardia (measured from an at-home monitor). The history was obtained from the mother. She stated that the patient has had continued persistent diarrhea, and non-bloody, non-bilious vomiting, with the patient having about three episodes a day of both vomiting and diarrhea. The mother brought him to the hospital due to a tachycardia and rapid breathing. She added that the patient has had multiple outpatient evaluations for diaphoresis, tachycardia, and tachypnea. The most recent visit was 2 weeks ago, where he was found to have hyperthyroidism and started on methimazole and propranolol. The patient was tachycardic and mildly hypotensive. The patient was admitted to the ICU for severe sepsis, hyperthyroidism, and to rule out thyroid storm. For twenty minutes, the patient became unresponsive and went into PEA. A code blue was called and return of spontaneous circulation (ROSC) was achieved after 4 rounds of CPR. The patient was then sedated, intubated, and ventilated. The patient's abdomen was distended with involuntary guarding and tympany. Computed tomography of the chest, abdomen, and pelvis revealed bilateral lower lobe infiltrates with trace left pleural effusion and pneumopericardium. Additionally, the findings revealed a pneumoperitoneum and a large amount of fluid in the abdomen and pelvis with distended loops of the small bowel although there is contrast noted in the large bowel. Subsequently he was taken for an emergent exploratory laparotomy.

In the operating room, severely dilated small bowel, dense omental adhesions to the small bowel, dense interloop adhesions, and a large jejunal perforation at the junction of the D4 and the proximal jejunum with patchy areas of necrosis of the proximal jejunum were found. This area of the proximal jejunum was resected.

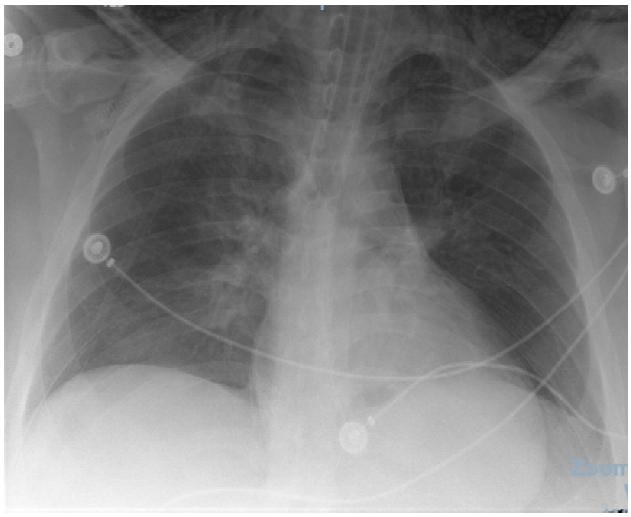
All four quadrants of the abdominal peritoneal cavity were irrigated with warm saline washed out and suctioned. Upon elevation of the thickened greater omentum, and at the site of the prior jejunal resection, bile and small bowel enteric contents were noted, which were washed out and aspirated. Imaging noted was a defect at the staple line at the prior resected jejunum. This was repaired primarily using 2-0 Vicryl suture in a running fashion. The proximal Malecot drain was removed. The stomach was examined and it appeared to be healthy. Decision was made to place a gastrojejunal feeding tube with the distal limb to be positioned in the proximal duodenum for proximal drainage of the hepatobiliary pancreatic limb. Two rows of 2-0 silk pursestrings were applied and the gastric body, and the stomach was accessed using electrocautery and the gastrojejunostomy tube was placed and manually advanced through the pylorus and the duodenum. The tube was exteriorized through the left upper part of the abdominal wall. The balloon was inflated and the stomach was pexied to the abdominal wall using 2-0 silk after the pursestring sutures were tightened. The gastrojejunostomy tube was fixed to the abdominal wall using 2-0 nylon.

The proximal duodenum open lumen was identified and was closed in a running fashion using 2-0 silk, so as to completely isolate the stomach and the duodenum. Attempts were made to pass a red rubber catheter through the distal limb of the duodenum so as to be used as a feeding tube. However, this was likely being passed through a blind loop of bowel. Therefore this attempt was aborted and a Malecot drain was placed in the open end of the distal duodenum/proximal jejunum and exteriorized abdominal wall for drainage purposes. The tube was fixed abdominal wall using 2-0 nylon. A Davol sump drain was laid across the duodenal repair and the posterior abdominal wall and exteriorized to the left upper quadrant and fixed to the skin using 2-0 nylon. The prior placed left lower quadrant Blake drain was left in place, which was draining the left paracolic gutter, the pelvis, as well as the right paracolic gutter. The surgical pathology specimens included small bowel nodules, peritoneal biopsy, proximal jejunal and jejunal resection. In the small bowel nodules enlarged lymph nodes with lymphoid hyperplasia were appreciated. There was also fat necrosis and scattered chronic inflammation. There were multiple necrotizing granulomas appreciated in the peritoneal biopsy. The jejunal segment resections showed extensive ulcerations, transmural gangrenous necrosis, perforations, and necrotizing granulomas.

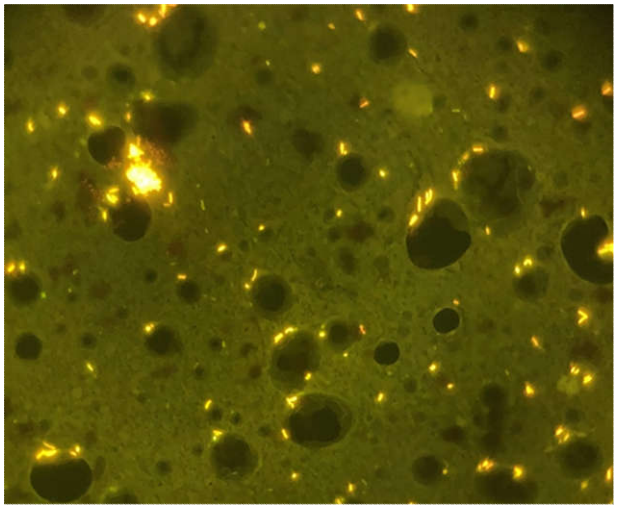
The patient presented with perforated proximal jejunum due to miliary TB throughout the abdomen. Due to the inflammatory nature of this infection, the operating surgeons were not able to re-establish continuity of his GI tract. He was left with drains inside the duodenum and adjacent to the jejunum to drain the intestinal contents. His hospital course was complicated by an anoxic brain injury sustained during cardiac arrest. He also had problems with clenching his jaw and the family was offered several therapeutic options ranging from Botox injections to teeth extraction. His hospital course was complicated by acute renal failure and respiratory failure. Because of an inability to use his gut, TPN was initiated. He would require long-term antibiotics for treatment of his TB infection. It was determined that there is no possibility of any surgical intervention within the next 6 months due to his extensive TB infection and inflammation in his abdomen. Also noted was that surgical intervention would be of very high risk, including any attempts

at reconnecting the GI tract. At this time the patient was deemed appropriate for transfer to LTAC, upon approval.

CT Chest Abdomen withcontrast: Arrow showing bowel loop thickening (yellow) and pneumatosis (blue)



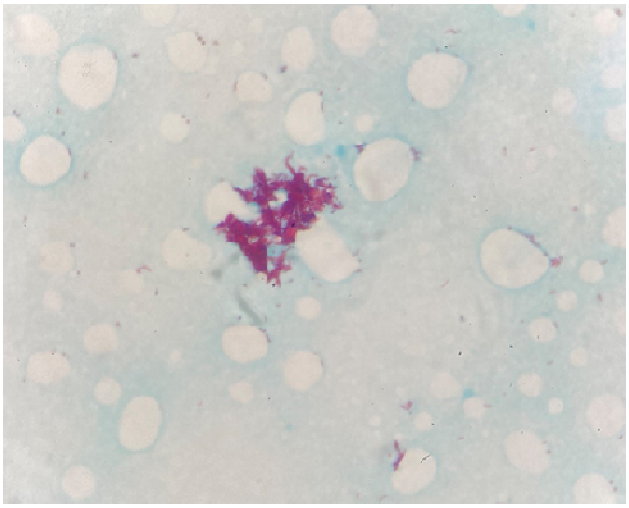
Chest X-ray: showing free air under the diaphragm



Floresence mircoscopy of Mycobaeterium tuberculosis

DISCUSSION

As noted with this case report, the presentation of GI tuberculosis was very non-specific and was only uncovered from further imaging and after surgical intervention.



Acid-fast stain of Mycobacteriumtuberculosis

On intervention, in this case, after pneumoperitoneum followed by an exploratory laparotomy, adhesions were appreciated, and histopathology similar to prior case reports confirmed the diagnosis. In this patient, the histopathology showed nodes with lymphoid tissue, fat wrapping, and necrosis had taken place with chronic inflammation (1). There were also numerous granulomas appreciated in the surgical pathology report as well. Usually, the site of disease manifestations includes the ileocecal junction, ascending colon, jejunum, appendix, duodenum, stomach, and lastly, the esophagus (5). As was appreciated in our patient with ileocecal junction and ascending colon were involved (1). Although all of the recommended diagnostics were ordered and completed in our patient, numerous labs did not point to a disseminated tuberculosis scenario even though the clinical manifestations of weight loss and leukocytosis with complications of bowel perforation, and pathological confirmations were present. This adds to the point of discussion that disseminated miliary TB, especially in the GI tract, can be hard to detect.

CONCLUSION

Although tuberculosis is primarily a pulmonary infection, it can have several extrapulmonary manifestations. Common locations include the GI tract, kidneys, spine, bones, and lymph nodes (2). We shared the complex, nonspecific, and generalized symptoms of gastrointestinal tuberculosis in this case report. Even with all the recommended diagnostics of both imaging and laboratory testing in this patient, it still did not confirm TB until surgical intervention was done. The surgery showed adhesions and necrosis in the ileocecal and ascending colon. Plus, the histopathological findings also confirmed the diagnosis. Because of the high degree of clinical suspicion, all the workup that was done on our patient should also be completed included in any patient suspected of extrapulmonary tuberculosis. Even though TB can be medically managed, it is essential to consider the patient's status, risk factors, and presentation to manage early and accordingly (3). This patient presented with insidious latent TB, ultimately leading to a complication and an insidious hospital course that was complicated by interventions and underlying infection.

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Informed Consent: Informed consent was not obtained from the patient for this case report. This report does not contain any personal information that could lead to the identification of the patient.

Author contributions: All authors contributed to the revision and approval of the manuscript.

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