ISSN: 3066-7097
Case Report
Journal of Critical Care Research and Emergency Medicine

Mycobacterium Tuberculosis Infection of the Placenta in a Patient Immunocompetent with Disseminated Tuberculosis

Roberto Villa*[1] & Maria Belen Centurion[2]

[1]*Juan a Fernández Acute General Hospital, Intensive Care Division, Cervino 3356, Buenos Aires, Argentina*
[2]*Juan a Fernández Acute General Hospital, Pathological anatomy, Cervino 3356, Buenos Aires, Argentina*

***Corresponding author:** Roberto Villa, MD, Phd, Hospital General de Agudos Juan a Fernández, Division Terapia Intensiva, Cerviño 3356, Buenos Aires, Argentina.

Submitted: 13 June 2023 **Accepted:** 19 June 2023 **Published:** 24 June 2023

https://doi.org/10.63620/MKJCCREM.2023.1005

Citation: *Villa, R., & Centurion, M. B. (2023). Mycobacterium Tuberculosis Infection of the Placenta in a Patient Immunocompetent with Disseminated Tuberculosis. J of Cri Res & Eme Med 2(2), 01-04.*

Abbreviations

- **AFLP:** Acute Fatty Liver of Pregnancy
- **GERD:** Gastroesophageal Reflux Disease
- **HELLP:** Hemolysis, Elevated Liver Enzymes, and Low Platelet Count
- **IBD:** Inflammatory Bowel Disease
- **NSAP:** Nonspecific Abdominal Pain

Introduction

We present the case of a young immunocompetent pregnant woman, with poor prenatal care, who was diagnosed with intestinal perforation due to systemic tuberculosis, without respiratory compromise.

Undiagnosed tuberculosis (Tb) has devastating consequences on maternal and fetal health with high morbidity. The greater global distribution of Tb infections is a current health problem with worldwide distribution. Early diagnosis focuses on detecting symptomatic patients as soon as possible, while screening consists of testing healthy individuals to identify those with symptoms before they appear. The greatest efforts should be directed toward early diagnosis and treatment.

We present this case due to the importance of early diagnosis, especially in pregnant women.

Clinical Case

A 22-year-old woman, 28 weeks pregnant, presented to the emergency department with a 5 days history of abdominal pain and a 3 days history of fever, vomiting, and digestive intolerance. She had no known medical history. Physical examination revelated diffuse, severe abdominal tenderness without rebound. Fetal ultrasound showed a vital term fetus. Computed tomography (CT) of the chest has normal. Abdominal CT revealed subdiaphragmatic free air, so urgent transfer to the intensive care unit was requested. On bedside ultrasound, abdominal examination confirms the presence of air. She has septic shock and multi-organ failure initially in an intensive care setting. Hemodynamic compensation is performed and antibiotic treatment is started.

She was taken to the operating room, for a surgical examination: perforation was seen in the ileum (Figure 1). Intestinal resection caecum and distal ileum resection with an ileostomy were performed. Histopathological examination showed submucosal necrotizing granulomatous inflammation, with giant cells and diffuse distribution in the parietal thickness of the appendix and colon, compromising even the serosa at the level of the cecum (Figure 2) in the histological cut of the granuloma can be seen with mucosal ulceration (Figure 3). At the time of laparotomy, fetal death was confirmed, performing an emergency cesarean section.

Figure 1: Ileal perforation. Notice enteric fluid coming out to the abdominal cavity. In the enteric wall presence of multiple tuberculous granulomas.

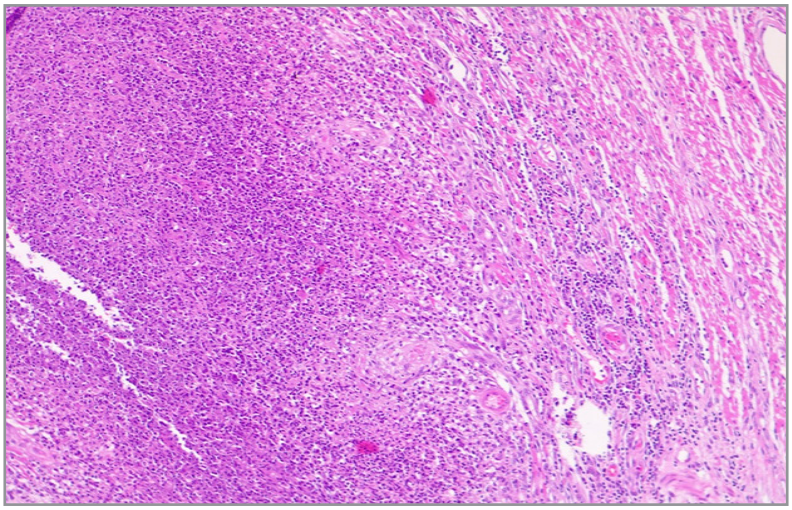

Figure 2: Granuloma 100x Tuberculous granuloma in the ilieal wall – increase 100 x

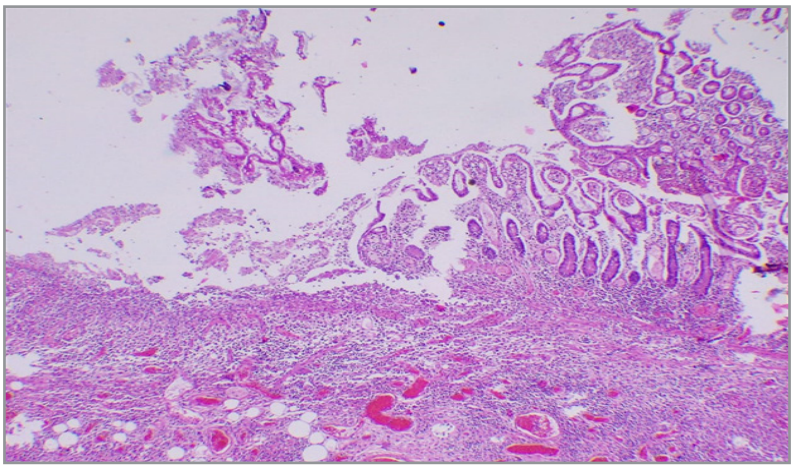

Figure 3: Ileal ulcerated mucosa.

Cultures and real-time polymerase-chain-reaction testing of peritoneal fluid and intestinal tissue revealed Mycobacterium tuberculosis (MTb). The Ziehl Neelsen technique is positive for abundant acid-fast (AF) mycobacteria. Histological examination of the placentae, third-trimester placental disc, an inflammatory process is observed that forms granulomas, focally compromising the terminal villous stroma and the surrounding intervillous space with the presence of necrosis, villitis and intervilliitis, AF mycobacteria are observed with signs of vascular malperfusion (Figure 4). Cultures and real-time polymerase-chain-reaction testing of sputum interestingly was positive for tuberculosis. Liver biopsy revealed non-caseating granulomatous hepatitis, without evidence of acid-fast bacteria on microscopic examination and no infection with MTb on culture.

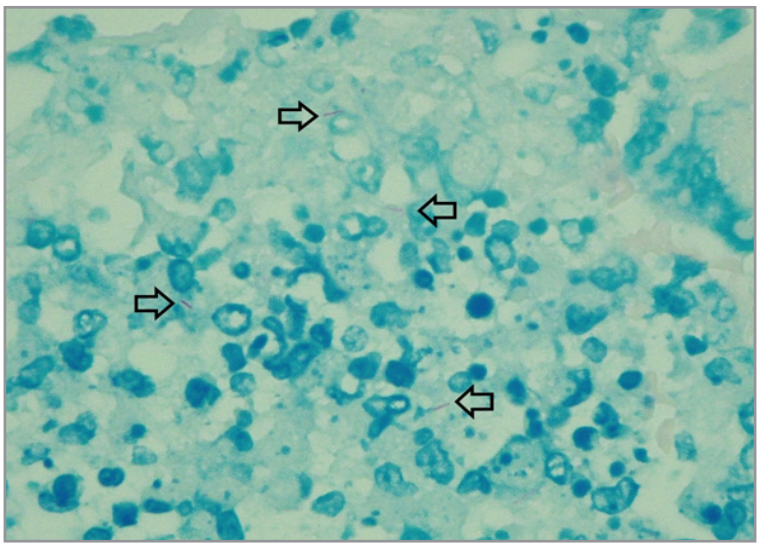

Figure 4: Placenta cut of showed multiple Mycobacterium Tuberulosis in Ziehl-Neelsen stain Magnified 1000 X. The acid-fast stains depend on the ability of mycobacteria to retain dye when treated with mineral acid or an acid-alcohol solution such as the Ziehl-Neelsen, or the Kinyoun stains that are carbolfuchsin methods specific for M. tuberculosis

Table 1: Causes of Acute Abdominal Pain in Obstetrics Patients

Obstetric Causes	**Early pregnancy** Miscarriage Ectopic pregnancy Molar pregnancy Ovarian cyst (torsion, hemorrhage, rupture) Degeneration of uterine fibroids Round ligament pain	**Late pregnancy** Placental abruption AFLPa Abdominal pregnancy HELLP syndrome Rupture uterus Fibroid degeneration Fallopian tube torsion Uterine torsion Rupture rectus muscle Polyhydramnios Symphysis diastasis Intraperitoneal bleed
Non-Obstetrics Causes	**Surgical** Appendicitis Cholecystitis Biliary colic Acute pancreatitis Peptic ulcer Urolithiasis Intestinal obstruction Instestinal perforation Gastric perforation IBD Rupture aneurysm Trauma	**Medical** Gastroenteritis Porphyria Sickle cell crisis Deep vein thrombosis
Extra abdominal etiology	Cardiac pain NSAP Pleuritic pain Psychological drug abuse or withdrawal Herpes zoster infection	
Exacerbates by pregnancy	GERD Gallbladder disease Acute cystitis Acute pyelonephritis Musculoskeletal pain	

Immunohistochemical studies on placenta were conducted to identify histiocytes (CD68), neutrophils (Myeloperoxidase), T and B lymphocytes (CD3 and CD20), interdigitating reticulum cells (CD21), and natural killer cells (CD56), were performed using standard methods.

A diagnosis of disseminated tuberculosis with intestinal tuberculosis and placental compromise was made. Testing for human immunodeficiency virus was negative. The patient completed one year of antituberculous therapy. At nine months, the ileostomy was closed without complications. At a follow-up visit 12 months after her initial presentation, she had fully recovered.

Discussion

Tuberculosis is one of the most globally prevalent diseases, with some 2 billion patients affected worldwide and with 9 million new cases reported in 2005 [1]. However, it appears that only about 400 cases of congenital or perinatal TB have been reported throughout the last century, and very few of these have involved adequate placental evaluations [2].

Gastrointestinal (GI) TB, as an extrapulmonary form, accounts for 1% to 3% of all TB cases worldwide. GI TB can occur as part of active pulmonary disease or as a primary infection without pulmonary involvement. The abdominal presentation may involve different structures such as the gastrointestinal tract, genitourinary tract, solid organs (liver, spleen, pancreas), gallbladder, aorta and its branches, peritoneum, and lymph nodes, frequently with concomitant involvement of those organs [3].

In intestinal tuberculosis, the ileocecal area is the most commonly involved region, and infection there may initially be misdiagnosed as appendicitis or inflammatory bowel disease. Despite the fact of being defined only by means of biopsy, the diagnosis of intestinal tuberculosis requires a high degree of clinical suspicion [4]. More even is an entity not very well known by clinicians [5].

Peritoneal tuberculosis is the most common presentation of abdominal tuberculosis and includes the involvement of the peritoneal cavity, mesenterium, and omentum. It is believed that its origin is hematogenous, but it may be secondary to lymph node rupture, gastrointestinal dissemination, or tubal involvement [6]. However, TB may involve any gastrointestinal tract segment,

but there is a preponderance in the ileocecal valve, terminal ileum, and cecum, which occurs in up to 90% of intestinal tuberculosis cases [7]. Main imaging findings of intestinal tuberculosis include symmetrical or asymmetrical parietal thickening, and extrinsic compression by enlarged lymph nodes which, on their turn may represent heterogeneous masses as associated with adherent loops and mesenteric thickening, perforation, and fistulas are the most frequent gastrointestinal complications of tuberculosis [8].

Tuberculous infection of the female genital system may cause menstrual disorders, gestational complications, neonatal tuberculosis, antituberculosis drugs side effects during pregnancy, increased drug resistance, and infertility. As seen with other transplacental infections, acute or chronic villitis, often accompanied by intervillitis, is the hallmark lesion [9].

A fetus-newborn may be infected with TB by 1 of 4 routes: (1) transplacental or hematogenous transmission, the hallmark of which is hepatic lesions derived from mycobacteria in umbilical vein blood; (2) inhalation of infected amniotic fluid, usually manifested by pulmonary infiltrates; (3) infection from the maternal genital tract at delivery; and (4) postnatal infection from contact with the mother, other relatives, or health care providers [10].
Macroscopically it appears as a normal placenta. Histological placental findings include chronic necrotizing granulomas in the decidua. Immunostains showed intense and diffuse staining of inflammatory cells with CD68 and Myeloperoxidase. Adjacent villi to these inflamed areas showed apparent proliferation of Hoffbauer cells in the CD68-stained slides. Too some CD3-positive cells in the mixed cellular reaction and apparent activation of CD3 cells in adjacent villi. None of the specimens showed CD20-, CD21-, or CD56-positive cells.

Macroscopic analysis of the fetus shows normal development in a term fetus. Cultures and real-time polymerase-chain-reaction testing of all fetus fluids was positive for tuberculosis.

Our case reflects reports in which the mother was apparently healthy or recently ill, with no family history of tuberculosis or other infectious problems. In fact, it was the acute onset of the mother's prenatal fever, abdominal pain, subsequent lung disease, and subsequent diagnosis of tuberculosis.

Infection of the fetus or newborn is even less frequent if the mother is known to have chronic TB and especially if she has received treatment. However, without treatment during pregnancy, it can have catastrophic consequences.

References

1. Lawn, S. D., & Zumla, A. I. (2011). Tuberculosis. The Lancet, 378(9785), 57–72. https://doi.org/10.1016/S0140-6736(10)62173-3
2. Whittaker, E., & Kampmann, B. (2008). Perinatal tuberculosis: New challenges in the diagnosis and treatment of tuberculosis in infants and the newborn. Early Human Development, 84(12), 795–799. https://doi.org/10.1016/j.earlhumdev.2008.09.007
3. Eraksoy, H. (2021). Gastrointestinal and abdominal tuberculosis. Gastroenterology Clinics of North America, 50(2), 341–360. https://doi.org/10.1016/j.gtc.2021.02.008
4. Osoba, A. O., & Ibrahim, M. (1990). Abdominal tuberculosis. British Journal of Clinical Practice, 44(2), 58–61.
5. Calin, R., Belkacem, A., Caraux-Paz, P., Wagner, M., Guillot, H., et al. (2021). Abdominal tuberculosis: Experience from two tertiary-care hospitals in the Paris region. American Journal of Tropical Medicine and Hygiene, 104(1), 223–228. https://doi.org/10.4269/ajtmh.20-0380
6. Sinan, T., Sheikh, M., Ramadan, S., Sahwney, S., Behbehani, A., et al. (2002). CT features in abdominal tuberculosis: 20 years' experience. BMC Medical Imaging, 2, 3. https://doi.org/10.1186/1471-2342-2-3
7. Pereira, J. M., Madureira, A. J., Vieira, A., & Ramos, I. (2005). Abdominal tuberculosis: Imaging features. European Journal of Radiology, 55(2), 173–180. https://doi.org/10.1016/j.ejrad.2004.11.031
8. Lima da Rocha, E., Pedrassa, B. C., Bormann, R. L., Kierszenbaum, M. L., & Torres, L. R. (2015). Abdominal tuberculosis: A radiological review with emphasis on computed tomography and magnetic resonance imaging findings. Radiologia Brasileira, 48(3), 181–191. https://doi.org/10.1590/0100-3984.2013.1764
9. Ghosh, K., Ghosh, K., & Chowdhury, J. R. (2011). Tuberculosis and female reproductive health. Journal of Postgraduate Medicine, 57(4), 307–313. https://doi.org/10.4103/0022-3859.90079
10. Abramowsky, C. R., Gutman, J., & Hilinski, J. A. (2012). Mycobacterium tuberculosis infection of the placenta: A study of the early (innate) inflammatory response in two cases. Pediatric and Developmental Pathology, 15(2), 132–136. https://doi.org/10.2350/11-06-1071-CR.1