CASE REPORT

Emergency laparotomy for primary peritonitis in a previously healthy pediatric patient: case report

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ABSTRACT

Most patients who present with sudden-onset peritonitis have some secondary cause such as acute appendicitis or intestinal perforation. Primary peritonitis is an extremely unusual pathology as a cause of acute abdomen, accounting for less than 1-2%. In pediatric patients, the clinical presentation may be similar to that of secondary peritonitis and require surgical intervention. We present the case of a pediatric patient with primary peritonitis, with signs and symptoms similar to acute appendicitis, who underwent exploratory laparotomy, which was non-therapeutic, since no secondary cause of peritonitis was found. This case discusses the usefulness of open surgery in these patients or whether there are better alternatives for preoperative management, mainly in health centers with limited resources where there are no imaging studies or instruments available for laparoscopic surgery.

Keywords: Peritonitis; Laparotomy; Pediatrics; Case Reports (Source: MeSH)

Laparotomía de urgencia por peritonitis primaria en paciente pediátrico previamente sano: reporte de caso

RESUMEN

Gran parte de los pacientes que presentan peritonitis de inicio súbito tienen alguna causa secundaria como apendicitis aguda o perforación intestinal. La peritonitis primaria es una patología extremamente inusual como causa de abdomen agudo, siendo menos del 1-2%. En pacientes pediátricos, la presentación clínica puede ser similar a un cuadro de peritonitis secundaria y requerir intervención quirúrgica. Se presenta el caso de una paciente pediátrica con peritonitis primaria con signos y síntomas semejantes a la apendicitis aguda, que fue intervenida mediante laparotomía exploratoria, la cual no fue terapéutica, ya que no se encontró causa secundaria de peritonitis. Este caso discute la utilidad de la cirugía abierta en estos pacientes o si existen mejores alternativas del manejo preoperatorio, principalmente en centros de salud con recursos limitados donde no se dispone de estudios de imagen disponibles o instrumental para cirugía laparoscópica.

Palabras clave: Peritonitis; Laparotomía; Pediatría; Estudio de Caso (Fuente: DeCS)

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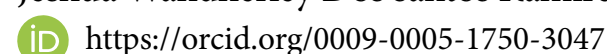
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INTRODUCTION

Peritonitis is defined as an inflammation of the peritoneum. Peritonitis can be primary, which is caused by a spontaneous infection of the ascitic fluid or the peritoneal cavity by microorganisms, without manipulation from the outside or exit of digestive tract contents as a contaminating source. On the other hand, secondary peritonitis is caused by an infection of the digestive tract, as in acute appendicitis, and tertiary peritonitis occurs in patients after surgery for secondary peritonitis who do not respond to treatment or who present sepsis (3).

Primary peritonitis is an entity associated with patients who present ascites, for example, patients with peritoneal dialysis or liver cirrhosis. This ascitic fluid serves as a culture medium for the replication of pathogenic microorganisms (5). In cases of primary peritonitis associated

with ascites, the development of primary peritonitis is explained by bacterial translocation (5).

In pediatric patients without ascites, the etiology of primary peritonitis in 90% of cases is typically associated with episodes of pharyngitis, with Streptococcus pneumoniae being detected in 60% of these cases. However, these cases represent less than 1–2% of abdominal emergencies (2,6) and are treated surgically (2). Several theories explain the pathophysiology of primary peritonitis without ascites, but the most widely accepted is hematogenous dissemination due to the presence of bacteremia (2).

The clinical picture of primary peritonitis without ascites is nonspecific, sharing most of the manifestations with secondary peritonitis, including nausea, vomiting, and diffuse abdominal pain. Additionally, signs of peritoneal irritation, leukocytosis with a left shift, and elevated acute-phase reactants may be observed.

Cases of primary peritonitis in children are a rare entity. However, the clinical presentation is similar to appendicitis and may lead to confusion of the initial diagnosis. For both situations, surgical exploration is the best therapeutic option and provides a definitive diagnosis (6).

The following is the case of a pediatric patient with primary peritonitis with a clinical presentation similar to acute appendicitis.

CLINICAL CASE

A 6-year-old female patient comes to the health center with abdominal pain of 12 hours of evolution, accompanied by fever, hyporexia and nausea. During the interview, the parents report no significant obstetric, pathological, or family history. Upon examination, the patient denies pain migration. Physical examination reveals fever, normotension, tachycardia, generalized pain, and a positive Blumberg's sign. The hemogram showed 35,000 leukocytes/mm3, and the Pediatric Appendicitis Score (PAS) was 9 points. Perforated appendicitis with atypical picture or bias in the time course of pain is suspected. Based on the findings, it was decided to take the patient to the operating room and initiate double empirical antibiotic coverage via the intravenous route with ceftriaxone at 75 mg/kg/day and metronidazole at 35 mg/kg/day.

Surgical findings are shown in Figure 1. Inflammatory changes and fibrin of the terminal ileum are evident. There is no evidence of intestinal perforation. The appendix shows a normal appearance. The presence of mesenteric adenitis is observed. The Meckel's diverticulum displays a normal appearance, with no signs of perforation or bleeding, accompanied by 150 mL of purulent fluid containing traces of fibrin. During the procedure, fluid was collected and drained, and the cavity was irrigated with prophylactic antibiotics for bacterial culture, followed by wedge diverticulectomy. In the immediate postoperative period, a peripheral blood culture was performed.

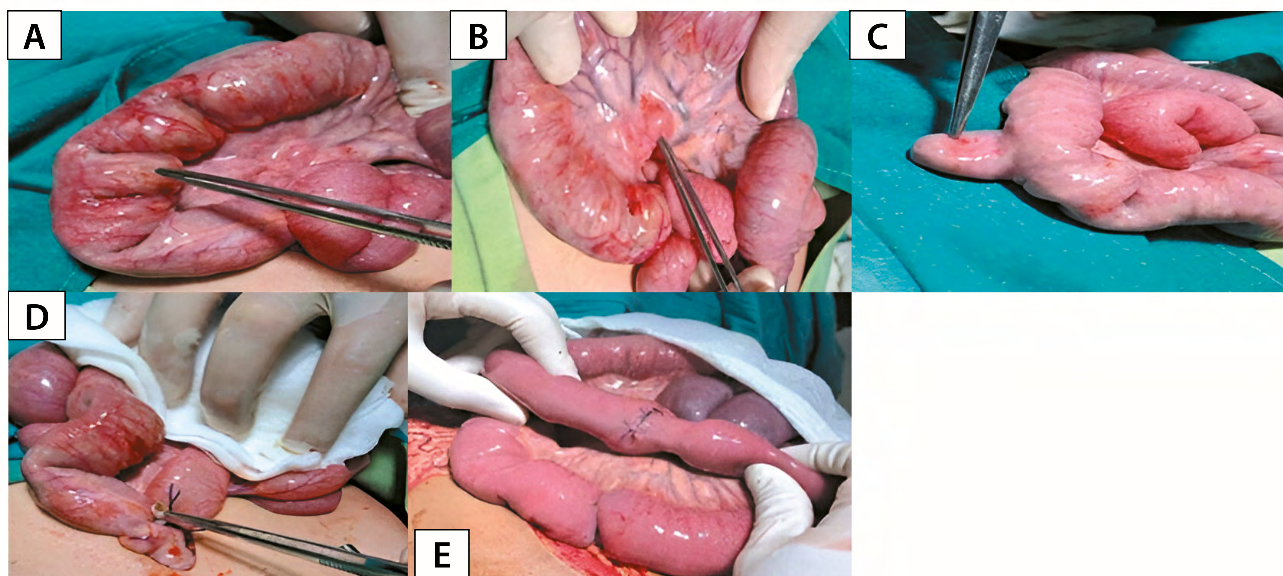

Figure 1. Exploratory laparotomy findings
A) Terminal ileum with inflammatory changes. B) Mesenteric adenitis. C) Meckel's diverticulum at 80 cm from the ileocecal valve. D) Appendicular stump after appendectomy. E) Wedge diverticulectomy.

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After the procedure, the patient continues to be febrile, and an oral diet is started with partial tolerance. On the fifth day, the hemogram was repeated, and leukocytosis was observed. Based on this finding, it was decided to perform an ultrasound of collections, which showed a negative result for intra-abdominal collections. On the seventh day, the results of the cultures collected during the procedure were obtained, showing the presence of S. pneumoniae in the secretion culture. This strain was resistant to ceftriaxone and cephalothin but sensitive to ciprofloxacin, levofloxacin, gentamicin, amikacin, and ampicillin.

Blood culture was positive for the same microorganism. Based on these findings, ciprofloxacin was administered intravenously at a dose of 20 mg/kg/day, divided into two doses. At 72 hours, the patient presented with clinical improvement, demonstrating adequate oral tolerance, a regular bowel habit, a non-painful abdomen, and resolved leukocytosis. After observing the improvement, the therapy was modified to oral therapy with ciprofloxacin at 30 mg/kg/day, and the patient was discharged from the hospital on the tenth day. Informed consent was requested from the patient's caregiver prior to discharge.

At the one-week follow-up post-discharge, the patient demonstrated significant progress. A subsequent appointment was scheduled for one month later; however, she did not attend. It is important to note that the patient resided in a remote rural area with limited resources and no transportation options. She was initially brought to the consultation by the volunteer fire department via ambulance, which hindered the possibility of additional follow-up assessments.

DISCUSSION

Secondary peritonitis, primarily due to acute appendicitis, is the leading cause of acute surgical abdomen in the pediatric population. In the United States, more than 70,000 children are diagnosed annually, or approximately 1 per 1,000 children per year (6). Because of this, the remaining causes, such as primary or spontaneous peritonitis, an inflammatory bowel process with no apparent infectious focus, are complex to suspect. Although primary peritonitis is linked to patients with pre-existing chronic pathologies such as immunosuppression, hypoalbuminemia, nephrotic syndrome, hepatopathy, or other pathologies that cause ascites in a previously healthy patient, suspicion requires great expertise since its incidence is less than 1–2% of the causes of acute abdomen (6). To date, the mechanisms underlying the development of primary peritonitis remain unknown, although several theories have been proposed. Similar case reports suggest that the pathology may occur due to the dissemination of S. pyogenes in patients with oropharyngeal infections; second, to contiguous dissemination of an infection localized in the abdominal lymph nodes, secondary to infection of any intra-abdominal organ; and third, to transmural dissemination of bacteria contained in the intestine. However, it is likely that peritonitis results from a combination of the aforementioned mechanisms (2). Ninety percent of infections in cases of primary peritonitis are monomicrobial. Currently, the most prevalent germ in children is S. pneumoniae (2). Primary peritonitis caused by S. pneumoniae lacks pathognomonic signs; the disease shares clinical and laboratory test findings with other pathologies, with the primary differential diagnosis being acute appendicitis (4). In this case, the only difference found with appendicitis was the abrupt onset of symptoms in less than 24 hours, accompanied by marked leukocytosis, disproportionate to the time of evolution (5).

Imaging studies are fundamental in suspecting the condition, particularly when evidencing an increase in peritoneal fluid without evidence of perforation or a specific infectious focus (2). However, in the absence of imaging studies, the literature indicates surgical treatment (1–3,6). The initial treatment is based on the use of antibiotics administered empirically and then directed, according to the antibiogram (3). However, in a patient with clear signs of acute abdomen and a clinical picture indistinguishable from acute appendicitis, surgical intervention becomes mandatory (1–3,6). Surgery consists of prophylactic appendectomy (6), with drainage of fluid and collection of lavage samples from the abdominal cavity for culture (2,6). Although diagnostic laparoscopy is suggested in these cases (3), it is not available in many low-income centers, so exploratory laparotomy is chosen (2,6).

In addition, antibiotic therapy is often superimposed as the best option after open surgical exploration. A case report in a 6-year-old girl mentions that antibiotic therapy is very effective, with no subsequent complications at the end of treatment. The definitive diagnosis is confirmed by isolating the pathogen, which is often a gram-positive microorganism (3). Regarding the management of asymptomatic diverticulum as incidental findings during laparotomy, there are controversies (7,8). Older studies, such as that of Soltero and Bill in 1976, did not justify diverticulectomy, as they estimated that the long-term risk of complications from Meckel's diverticulum was 4.2% and that this decreased with age. However, other authors estimated that the long-term risk of diverticulum complications was 3.7% at 16 years of age and decreased to 0% at 76 years of age. Olmsted County, Minnesota, and the Mayo Clinic Rochester supported incidental diverticulectomy based on the follow-up of 145 operated patients, where the risk of developing long-term complications (20 years) was 2% (adhesions). In contrast, patients operated on for complications of Meckel's diverticulum had a morbidity rate of 7%.

However, in another study also from the Mayo Clinic, age younger than 50 years, male sex, diverticular length greater than 2 cm, and diverticulum containing ectopic or abnormal tissue were found to be factors related to symptoms. In contrast, the diameter and length-to-diameter ratio of the diverticulum were considered irrelevant factors. They recommend resection in the presence of one of these four factors. In the presence of one criterion, the rate of symptom occurrence is 17.2%; with two criteria, 25.3%; with three criteria, 42%; and with four criteria, 70%. In our case, the patient met two criteria (being younger than 50 years and having a diverticulum larger than 2 cm), so diverticulectomy was considered. The limitations of this clinical case included the unavailability of imaging studies, such as computed tomography (CT), the lack of necessary equipment and instruments for laparoscopy, and the absence of follow-up care for the patient after discharge.

CONCLUSIONS

There are no clinical or laboratory signs that differentiate primary peritonitis from secondary peritonitis; therefore, the diagnosis requires imaging studies or, in the absence of these, surgical intervention. The surgical intervention of choice is laparoscopic, but in the absence of instruments required for this, laparotomy is performed. The procedure consists of 1) culture collection, 2) drainage of fluid or collections, 3) prophylactic appendectomy, and 4) abdominal cavity lavage. Once the diagnosis has been made, treatment consists of antibiotics administered in a targeted manner to the microorganism isolated in the cultures, according to the antibiogram.

Author contribution

The author confirms his responsibility for the conceptualization and design, data collection, analysis, interpretation and preparation of the final manuscript.

Conflicts of interest

The author has no conflicts of interest associated with the material presented in the manuscript.

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Ethical aspects

Informed consent was obtained from the patient's caregiver.

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