

Neonatal acute Appendicitis: A Diagnostic Challenge

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ABSTRACT

Background: Neonatal acute appendicitis in the newborn is an extremely rare surgical entity, its incidence is 0.04% to 0.2%, and it represents a diagnostic challenge in this group of patients. For this reason, it is not usual to suspect this pathology when we are facing an acute neonatal abdomen; mostly there is a delay in diagnosis and management. And although the literature shows a decrease in mortality, it is still around 28% in some reviews.

Case report: We report a female neonate with complicated acute appendicitis, who at the beginning did not present evident symptoms and did not respond to medical management. On the sixth day, due to poor evolution, he was admitted to surgery with findings: free meconium in the abdominal cavity with a 1-cm-diameter punch-type perforation in the distal ileum (4 cm from the ileus-caecal valve), which was crushed with phlegmonous cecal appendix; Cecum and omentum with abundant fibrin around.

Conclusion: The timely diagnosis of acute appendicitis in neonates continues to represent a challenge for neonatologists. Due to its low frequency but high lethality, it should be considered as a diagnostic option against a baby with an acute abdomen that does not show clinical findings of frequent pathologies in addition to an unusual clinical course.

Keywords: Neonatal appendicitis, Necrotizing enterocolitis, Peritonitis

Introduction

Acute appendicitis is an extremely rare surgical entity and represents a diagnostic challenge during the neonatal period, its incidence rate has been estimated low at a range of 0.04-0.2%, and it is not usual to be posed in front of an acute abdomen (1).

That is why most of the time there is a delay in its diagnosis, and consequently, a late intervention. Although the literature shows a decrease in the mortality of the condition, it still stands at around 28% in some reviews; as a result, its review is relevant (2).

Case report

A 2-day-old female term newborn was referred from the city of Cerro de Pasco (4330 masl), Peru. She was born vaginally, weighing 3,920 g, without Apgar Score assessment, for which asphyxia markers were requested upon admission, which

did not show a significant elevation.

Since birth, she had hematochezia, in addition to vomiting and abdominal distension. A simple abdominal X-ray was performed, in which loops distension and slight edema of the intestinal wall were observed. The results of the abdominal ultrasound showed hepatomegaly and free fluid in a small cavity (not quantified).

During her hospitalization, she persisted with hematochezia and abdominal distention until the sixth day of life without response to medical management and with evident clinical deterioration. Exploratory laparotomy was scheduled for acute surgical abdomen, with the following operative findings: free meconium in the abdominal cavity with punch-type perforation 1 cm in diameter in the distal ileum (4 cm from the ileus cecal valve), which was crushed with a phlegmonous cecal appendix; cecum and omentum with abundant fibrin around it

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(Figure 1).

In addition, jejunum and ileum segments with ecchymotic areas were observed, and fibrin firmly adhered to the serosae. The perforated distal ileum segment and the cecal appendix were resected, which were evaluated under microscopy confirming the diagnosis of acute phlegmonous appendicitis, showing a regular amount of polymorphonuclear cells in the mucosa, submucosa, and appendicular muscle layer, as well as wall edema and hemorrhagic areas (Figure 2a). Regarding the perforated ileal segment, it presented erosion of the mucosa in patches that involved the entire serosa with areas of hemorrhage and vascular congestion, in addition to microabscesses without intestinal pneumatosis and tissue necrosis (Figure 2b).



Figure 1. Punch-type perforation in the distal ileum (4 cm from the ileus cecal valve) being crushed with a phlegmonous cecal appendix; cecum and omentum with abundant fibrin around it

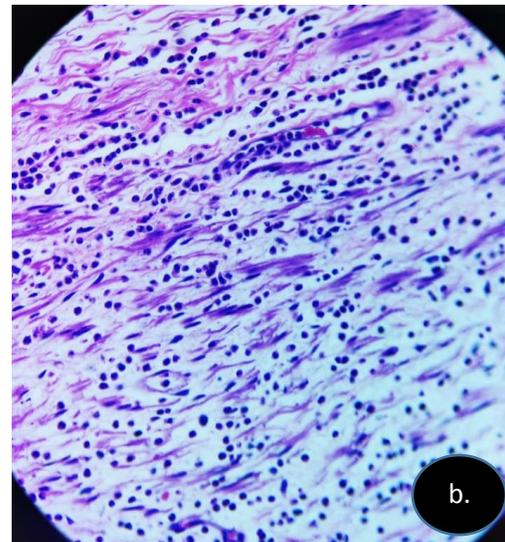
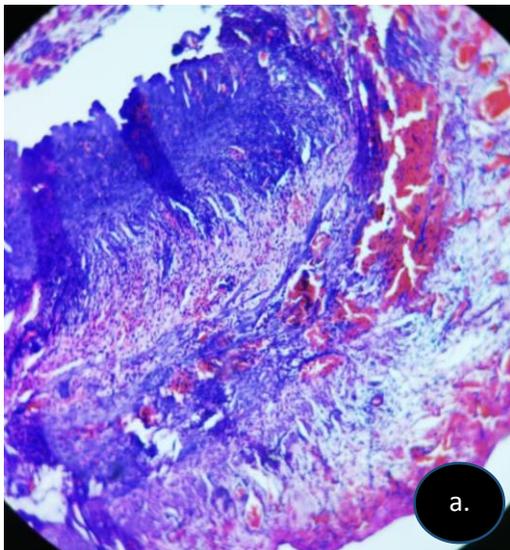


Figure 2. Cecal appendix; (a) Image in 10x, the black arrow shows the appendicular lumen, and in brackets are the muscular layer with cellularity between its smooth muscle fibers, as well as the areas of hemorrhage and edema of its wall; (b) Image in 40x, the black arrows show the presence of abundant neutrophils dissecting the smooth muscle fibers.

Discussion

In relation to the causes of the infrequency of this pathology, it can be due to four factors inherent to the neonate, including a funnel appendix added to a reclined posture that protects it from appendicular blockage, the recumbent disposition that protects it from appendiceal blockage, an exclusive feeding with milk that prevents the formation of fecaliths, and infrequency of gastrointestinal and respiratory tract infections, such as adenovirus, that lead to lymphoid hyperplasia (3).

It should be noted that in previous reports, 50% of cases were associated with prematurity, which rises the theory that it was a limited form

of necrotizing enterocolitis; however, the pattern of the disease has changed over time, affecting more term infants than preterm infants (48% vs 37%), which makes the theory loses its force (4, 5).

Despite its rarity and diagnostic difficulty, it shows a high mortality rate estimated at 34%. Therefore, it is imperative to try to associate various clinical signs to confirm its diagnosis early, and thus reduce its mortality. A study compiled some reported cases found in the physical examination, including abdominal distension (89%), vomiting (54%), abdominal tenderness (48%), restlessness or lethargy (36%), and fever (31%) as the most common symptoms; however, they are still nonspecific for the disease (5).

Considering conventional laboratory tests, they have little utility compared to other age groups, even in pediatric patients. That is why other potential diagnostic aid methods arise, such as the study of biomarkers based on inflammatory mediators and metabolomics and the detection of a biopattern composed of 9 metabolites and 7 inflammatory compounds that strongly distinguish children with appendicitis from those without it (6). This study would be of utmost importance when replicated in neonates, given its diagnostic complexity with the current tools.

Regarding imaging tests, ultrasound provides more data compared to radiography, such as the presence of intra-abdominal fluid and intestinal wall thickness and its perfusion; nevertheless, the established ultrasound criteria are established for cases over 5 years of age (7).

Acknowledgments

None.

Conflicts of interest

The authors declare that there is no conflict of

interest.

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