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CASE REPORT

Piogenic liver abscess by Pseudomonas aeruginosa in preschool

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Headings:
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Abstract

Pyogenic hepatic abscess is a purulent collection secondary to bacterial infection in the hepatic parenchyma. Is relatively rare in general population, around 1.1 to 2.3/100.000 inhabitant, with mortality between 5.6-80%. In this study, we report the case of a preschool, male, with fourteen days of fever, abdominal distention, pallor, *Torres-Homem* sign, periumbilical hypertimpanism and hepatomegaly. He arrived with leukocytosis/neutrophilia, high reactive-C protein, normochromic/normocitic anemia, increased liver and canalicular enzymes, in addition to alteration of coagulation tests. Ultrasonography and abdominal tomography showed heterogeneous collections of irregular contours and inaccurate limits in segments IV, V, VII and VIII. Gallbladder of thickened walls with hyperechogenic image measuring 0.8cm. The initial treatment consisted of the association of ampicillin and sulbactam associated with metronidazol and transcutaneous drainage of the abscess guided by ultrasonography. With the positive culture of the abscess material for *Pseudomonas aeruginosa*, ciprofloxacin began and the performance of weekly abdominal ultrasound. He was discharged after ultrasonography of abdomen without abscesses. The triad of pyogenic hepatic abscess encompasses abdominal pain, intermittent fever and hepatomegaly. They are usually associated with predisposing factors from immunosuppression to biliary pathway pathologies and neoplasms. Percutaneous drainage guided by CT or US is currently first-line treatment. Even though it is rare, HA should be among the differential diagnosis options of abdominal pain and intermittent fever.

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INTRODUCTION

Pyogenic liver abscess is defined as the identification of an intrahepatic purulent collection secondary to a local inflammatory cellular reaction caused by bacterial infection in the liver parenchyma[1]. The infection may spread to the liver via the biliary tree, hepatic vein, or portal vein, as an extension of an adjacent infection, or as a result of trauma. There may be only one or multiple abscesses[2].

The frequency of liver abscesses (HA) is relatively rare in the general population and is estimated to range from 2.3 to 20 cases per 100,000 inhabitants; the incidence of pyogenic abscesses ranges from 1.1 to 2.3 per 100,000 inhabitants, with mortality ranging from 5.6 to 80%[3].

In about 50% of cases of liver abscess, it is not possible to establish a causal factor. Risk factors and the course of the disease are related to different microbiological possibilities. However, in children *Staphylococcus aureus* is the etiologic agent most commonly associated with pyogenic liver abscesses, representing 20 to 55% of cases[4,5].

It is important to emphasize that in the pediatric age group, HA may be associated with some diseases, such as; disorders of innate immunity, Crohn's disease, sepsis with an abdominal infectious focus and chronic granulomatous diseases[4]. The main symptoms related to pyogenic HA are abdominal pain - more pronounced in the right hypochondrium - fever and hepatomegaly, usually evolving in a subacute way with onset of symptoms varying between 3-120 days[1].

The purpose of this article is to report a case of HA caused by *Pseudomonas aeruginosa* in a 3-year-old child.

CASE REPORT

Preschooler, 3 years old, male, was admitted to a private hospital with a 14-day evolution of fever, abdominal distention, abdominal pain and constipation for investigation.

On admission, preschooler weighing 13,600g, pale (++/4+), acyanotic, anicteric, eupneic, hydrated, without edema. Atypical facies , without cardiovascular and pulmonary alterations. Upon examination of the abdominal apparatus, he had abdominal distension, umbilical hernia, normal bowel sounds , pain on percussion, Torres-Homem sign, hypertympanic pain in the periumbilical region, flaccid, palpable liver 7 cm from the RCD and 4 cm from the xiphoid process, blunt edges, smooth surface, without signs of peritoneal irritation, with palpable lymph nodes in the right inguinal region.

The admission laboratory tests, which can be seen in table 1, showed: leukocytosis with neutrophilia, increased C-reactive protein, normocytic, normochromic anemia , increased liver enzymes, TAP/INR and APTT alterations; increase in canicular enzymes.

In addition to laboratory tests, abdominal ultrasound was performed, which showed a slightly increased liver volume, smooth contours, with heterogeneous collections of irregular contours and imprecise limits, with location and size, namely: - Segment IV measuring 2.2 x 2.3 cm; - Segment V measuring 1.7 x 1.3 cm; and Segment VII measuring 3 x 2.3 cm. Port vein with regular walls with preserved caliber. Topical, normodistended, gallbladder with thickened and delaminated walls, presenting a hyperechoic image , forming a posterior acoustic shadow, measuring 0.8 cm. No other changes in other organs.

Table 1. Laboratory evolution.

Laboratory parameter and reference value	Admission	High
Hemoglobin	8.8	8.9
hematocrit	26.6%	27.7%
VCM	78	81
Leukocyte count	20,490	9,350
Neutrophil Count	59.1%	29.6%
Lymphocyte Count	33.7%	63.4%
Platelet Count	423,000	581,000
CRP - C-Reactive Protein	126	0.9
TAP	47%	86%
TTPA	36.3s	29s
AST/ALT	105/155	37/33
Alkaline Phosphatase and Gamma GT (FA and GGT)	186/212	255/150
ALBUMIN	2.9	3.4

Source: Electronic medical record (Tasy System).

Computed tomography of the abdomen was also performed, with and without contrast, confirming the enlargement of the liver, which had cystic images with irregular contours and post-contrast parietal enhancement located in segments VIII, V, IV and VII, measuring up to 3 cm, the largest in segment VIII. Gallbladder with calculus inside measuring about 7mm. Dilation of the bile ducts is not observed. Abundant fecal waste in the colon and rectal ampulla. Other organs without alterations. Images suggestive of amoebic and/or bacterial liver abscesses.

In view of the diagnosis, antibiotic therapy was started with ampicillin and sulbactam at a dose of 300mg/kg/day associated with metronidazole 40mg/kg/day. In addition, it was decided to perform transcutaneous drainage of the abscesses, guided by ultrasound, with the output of 10 ml of material with a bilious appearance (dark) and a small amount of bloody material. After three days of empirical antibiotic therapy, due to the persistence of fever and abdominal symptoms, it was decided to change ampicillin with sulbactam to ceftriaxone at a dose of 100mg/kg/day, and to maintain metronidazole for a total of seven days.

On the 3rd day of treatment with ceftriaxone , the culture of the three samples of secretion drained from the liver abscess was positive for *Pseudomonas aeruginosa* , and based on the sensitivity of the antibiogram, it was decided to change the cephalosporin to ciprofloxacin , at a dose of 30mg/kg/day, and to maintain metronidazole for up to seven days of treatment, in agreement with the infectologist.

The preschooler was hospitalized for 18 days, performing weekly control abdominal ultrasound. The patient evolved with gradual improvement, with cessation of fever and regression of hepatomegaly. On the day of discharge, the abdominal ultrasound no longer showed abscesses and the gallbladder was topical, normodistended , with thin walls, presenting only the hyperechoic image, forming a posterior acoustic shadow, measuring 0.7 cm (gallstone).

He was discharged from the hospital on the tenth day of ciprofloxacin with a prescription to continue the antimicrobial treatment for another seven days, being referred to the Pediatrics, Infectious Diseases, Immunology and Pediatric Surgery outpatient clinics for follow-up.

Currently, the minor is 5 months after discharge, was discharged from the infectology outpatient clinic without any clinical or imaging changes, in addition to those already evidenced on the day of hospital discharge.

DISCUSSION

The case refers to a pathology considered rare and extremely important due to its high morbidity and mortality in childhood. In a study carried out in Brazil (1997) with a child population, 65 cases of liver abscess were identified over a 3-year period, with an association with skin infections in 35% of cases[6].

HAs are usually associated with predisposing factors that include immunosuppression, chronic granulomatous disease or leukemia, surgery, travel to endemic areas, exposure to animals, trauma, bile duct pathologies and neoplasms[7]. Although the etiology has changed in recent years, the main routes of infection remain the same: biliary, portal, hepatic artery, contiguity, traumatic and idiopathic. Infection in the biliary tract is the most frequent cause of pyogenic HA. This may result from biliary obstruction and cholangitis, whether due to calculi, malignant tumors, biliary strictures or congenital anomalies such as Caroli's disease[8]. The preschooler in question, during hospitalization, was diagnosed with cholelithiasis with an ultrasound sign of cholecystitis . A study revealed that 12.5% of abscesses were multiple and that 68.7% had underlying pathology, 37% of which resulted from the bile ducts[15].

Regarding the symptoms, the patient presented the triad of liver abscess, abdominal pain, intermittent fever and hepatomegaly. In the literature, the most frequent symptoms are abdominal pain (90%), jaundice (70%), fever (40%), reinforcing that the diagnosis of liver abscess is based on clinical suspicion, given the low prevalence and nonspecific symptoms[1,4].

Among the laboratory findings, abnormalities in liver biochemistry should be expected, especially the elevation of alkaline phosphatase, bilirubins and aminotransferases, in addition to leukocytosis with left shift[9]. In the case in question, leukocytosis with neutrophilia, altered liver function tests and increased hepatic and canalicular enzymes were observed.

Radiological imaging exams, such as ultrasound (US) and computed tomography (CT), have significantly increased the ability to establish the diagnosis, and US is preferable for the initial approach, as it is more accessible and has a lower cost. cost. However, CT is more accurate than US in diagnosing these lesions (95 to 100% sensitivity), while US rates are lower (85 to 95%)[10]. The case in question had the same sequential approach and the findings that led to the diagnosis can be seen in figures 1 and 2.

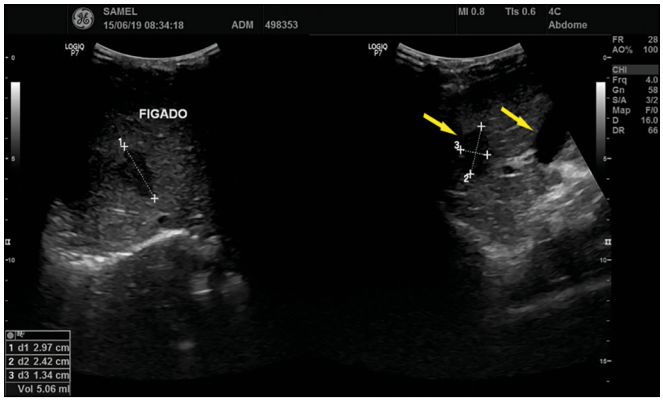


Figure 1. Total abdomen US showing hepatomegaly and hepatic collection Source: Hospital Imaging Service.

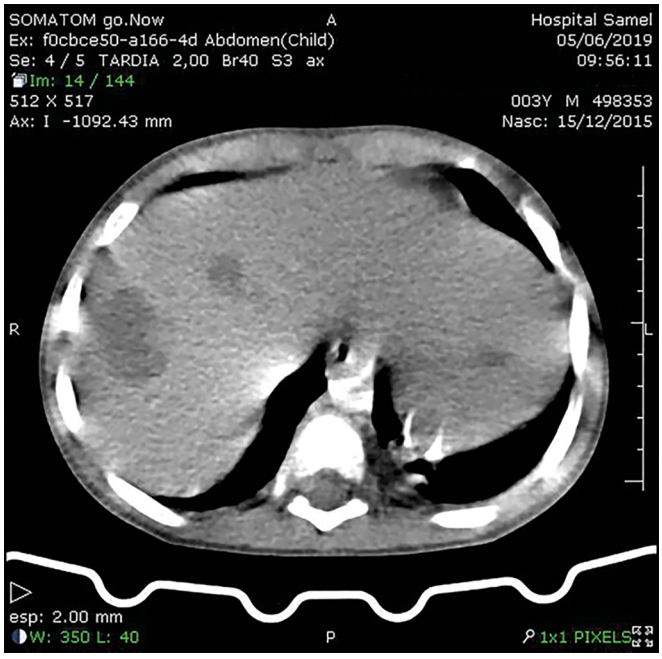


Figure 2. Computed tomography of the abdomen with contrast showing the liver abscess. Source: Hospital Imaging Service.

Regarding treatment, CT or US-guided percutaneous drainage is currently the first-line treatment. It is minimally invasive, easy to perform, has few complications and should be performed as soon as the diagnostic hypothesis is made. In addition, it also allows the identification of the causative

organism, whose antibiogram guides the appropriate antibiotic therapy, since isolated blood culture does not accurately reflect the microbiology of hepatic processes[11].

Regarding the etiological confirmation of abscesses, blood culture (two samples) should be routinely included, sown in selective aerobic and anaerobic media. Blood cultures are positive in 30%-60% of patients, thus confirming bacterial or mixed etiology. Positive blood culture is rarely observed in hepatic amebiasis[12]. In the case presented, both blood culture samples were negative.

The *Escherichia bacterium coli* has been the most commonly isolated pathogen in pyogenic HA, accounting for 35-45% of reported cases worldwide. However, the cause may vary depending on the region and cases of *Staphylococcus can be found aureus* , *Streptococcus* , *Klebsiella pneumoniae*[13].

In another study showed that *K. pneumoniae* and *Streptococcus spp.* were the most frequent etiologic agents in Taiwan. In the report described, the culture of the aspirated liver abscess was positive for *Pseudomonas aeruginosa* , an uncommon agent worldwide. A study published in 2011 showed that only 1% of cases had *P. aeruginosa as the etiology*. In the case in question, it is noteworthy that the child had not undergone previous surgical procedures, having been previously submitted to intestinal lavage due to chronic intestinal constipation, which was the only factor identified in her history. There was no record of hospitalization and/or previous surgical intervention[4,14].

As a therapeutic approach in the case, image-guided percutaneous drainage was chosen, associated with empirical antibiotic therapy and weekly abdominal US. After the introduction of ciprofloxacin, in accordance with the culture of the abscess aspirate and sensitivity profile, the child evolved with an improvement in the clinical, laboratory and imaging conditions, being discharged from the hospital, with the end of antibiotic treatment.

Cure criteria are clinical improvement and reduction of abscess volume on ultrasound, which should be repeated weekly until all abscesses have disappeared[12].

CONCLUSION

Even though it is rare, liver abscess should be among the diagnostic hypotheses of cases with abdominal pain and intermittent fever. The HA are mostly of biliary origin, in the case in question, we were able to identify gallstones causing cholecystitis that, by contiguity, led to the formation of multiple liver abscesses. However, what was essential for the favorable outcome of the case was the culture of the drained material, since the bacterial sensitivity profile did not follow the epidemiology of the etiological agents typical of these cases and referenced in the literature, and in addition, a child who there was no history of previous surgical manipulations or even previous hospitalizations, with the exception of intestinal lavage performed, there was growth of *P. aeruginosa ,* a typical agent of surgical manipulations. The culture of the abscess material was essential to guide the treatment, since it evolved with improvement of the condition after the introduction of appropriate antibiotic therapy, and since the isolated blood culture does not accurately reflect the microbiology of the hepatic processes.

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The study received no funding.

CONFLICT OF INTERESTS

The authors declare no conflict of interest.

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