

PYOGENIC LIVER ABSCESS IN CHILDREN: TWO CASES REPORT AND LITERATURE REVIEW

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ABSTRACT

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Description of two cases of pyogenic liver abscess. The first case: a 3-years-old immunocompetent girl with fever, abdominal pain, vomiting, and diarrhea. Abdominal ultrasound: multiloculated heterogeneous collection in the right hepatic lobe (figure 1A). The second case, a 1-year-old girl with congenital neutropenia, showed fever, malaise, anorexia, sweating and pallor. Abdominal computed tomography showed hypodense lesion with heterogeneous impregnation by contrast in the left hepatic lobe (figure 1B). Different clinical presentations, images and treatment are of special interest in pediatrics and are reviewed in this text.

Keywords: *Pyogenic liver abscess; fever; granulomatous disease*

Pyogenic liver abscess (PLA) is a severe infectious disease, with high incidence in developing countries. The most prevalent bacteria associated with this condition are *Staphylococcus aureus*. Other species that cause PLA are *E.coli*, *Klebsiella*, *Enterobacter* and anaerobes. The most frequent location is in the right hepatic lobe. Infection can occur by contiguous or hematogenous spread. The diagnosis relies on clinical data such as abdominal pain and fever, and laboratory tests. There is an increase in the inflammatory markers, such as C-reactive protein (CRP) and erythrocyte sedimentation rate; leukocytosis and liver function markers can be above normal. Imaging studies (ultrasound [US] and computed tomography [CT]) are useful tools for diagnosis. There are different treatments for pyogenic hepatic abscess. The ones with most evidence include antibiotics and percutaneous drainage.

We present two cases of PLA in children with different

immunological status: one is immunocompetent and the other has an immunologic disease – congenital neutropenia. Moreover, a literature review was conducted.

CASE REPORT

Case 1

A 3-year-6-month-old girl, multiracial, with low socioeconomic level, was brought to the emergency room in December 2011 with fever, abdominal pain, vomiting and diarrhea. On physical examination she was prostrate, dehydrated, febrile, and had abdominal distension with diffuse tenderness on palpation, without defense. Abdominal US showed multilocular, heterogeneous collection occupying most of the right hepatic lobe, measuring 7.2 x 6.5 x 6.2 cm (figure 1A). There was a moderate amount of free liquid in the abdominal cavity, with septa and echoes in suspension. Hemoglobin was 8.6 g/dL, hematocrit 25%, white blood cells 13.920, band forms 5%, segmented 72%, eosinophils 1%, monocytes 4%, lymphocytes 16%,

metamyelocytes 1%, myelocytes 1%, platelets 853.000. Urea, creatinine, sodium and potassium were normal.

Antibiotic therapy with ampicillin, gentamicin and metronidazole was initiated. An US-guided puncture was performed with insertion of a drainage tube in the abscess cavity. On abscess culture, *Staphylococcus aureus* sensitive to gentamicin and resistant to oxacillin have grown. Subsequently ampicillin was changed to vancomycin. Control US showed a reduction of the abscess and the drain was removed 48 hours after the drainage had stopped. The patient evolved with reduction of the abdominal pain, decrease of inflammatory markers (CRP from 30.7 to 7.2 mg/dL), as well as hemogram improvement after one month of treatment.

Case 2

A 1-year-8-month-old female patient, caucasian, carrier of congenital neutropenia (Kostmann Syndrome). Patient with previous medical history of multiple cutaneous abscesses and, in March 2011, an episode of pulmonary tuberculosis, treated with Rifampicin, Isoniazid and pyrazinamide for six months. The patient was brought to the emergency room in January 2012 to investigate fever, associated to prostration, loss of appetite, sweating and pallor. On physical examination, she presented regular clinical condition, tachycardia (138 bpm) and pale mucosa. She was irritable, tearful and febrile (39°C). The hematocrit was

19.2%, hemoglobin 6.3 g/dL, leukocytes 7.000, segmented 3%, lymphocytes 75%, and CRP 217 mg/dL. Chest radiographic showed a widened mediastinum and consolidation in the right lower lobe. Cefuroxime was started empirically. She was treated simultaneously with filgrastim.

After 12 days of admission, the patient still had fever despite the therapy. Hence, chest and up abdominal CT scans were performed: Hypodense lesion with heterogeneous impregnation by the contrast, measuring 6.0 x 4.5 cm, occupying most of the liver's left lobe, compressing the left branch of the portal vein. Hypodensities, linear branched images were identified alongside the lesion, which may correspond to distal portal branches thrombosis. An increased blood flow surrounding the lesion was also observed, as well as retroperitoneal and celiac trunk lymphadenopathies (figure 1B).

Therapy was changed to vancomycin, metronidazole and gentamicin. It was not possible to perform percutaneous drainage guided by ultrasound because the center of the lesion was not liquefied. After that, the patient showed an improvement in general condition and remained afebrile throughout the hospitalization. There was a decrease in CRP (from 217 mg/dL on arrival to 14.4 mg/dL after one month). The control US showed a reduction on the size of the lesion. The antibiotic therapy was maintained for 4 weeks. The patient was discharged in late February 2012 in good general health, active, afebrile and without abdominal symptoms.

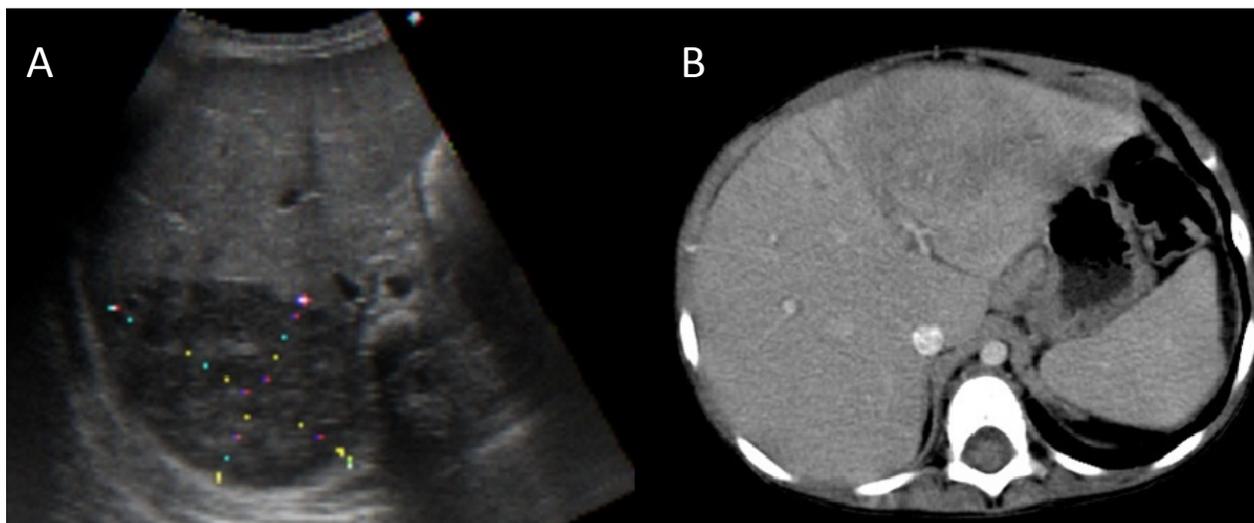


Figure 1: A - Abdominal ultrasound with multilocular, heterogeneous collection occupying most of the right hepatic lobe, measuring 7.2 x 6.5 x 6.2 cm (case 1). B - CT scan showing hypodense lesion with heterogeneous impregnation by the contrast, measuring 6,0 x 4.5 cm, occupying most of the liver's left lobe (case 2).

DISCUSSION

PLA in children is a serious infectious disease, with higher incidence in developing countries, especially those living in tropical or subtropical areas (1). The overall incidence of PLA ranges from 11/100.000 in Denmark up to 79/100.000 in India (1). Brazil, like other developing countries, shows areas of poor social-economic conditions. Therefore, the PLA should be thought as a differential diagnosis when attending a child with fever.

PLA typically presents as a solitary lesion, most often in the right hepatic lobe. The preference for this lobe can be attributed to the volume of the right portal vein and the fact that this vessel continues toward the common portal vein, while the left portal vein takes a horizontal direction. The pathogens involved in this condition include *Staphylococcus aureus* (most cases), *Streptococcus*., *E. coli*, *Klebsiella* and anaerobic organisms.

PLA can arise from a direct extension of a contiguous focus of infection (2) or hematogenous seeding from the systemic circulation. The biliary tract is a major source due to the direct propagation or because of septic emboli formation in portal circulation, which are imprisoned by sinusoids. Penetrating liver trauma can inoculate organisms directly into the parenchyma. Non-penetrating trauma can have similar results, causing localized liver necrosis, hemorrhage and intrahepatic biliary fistula, providing a good environment for bacterial growth. We suspect that non-penetrating trauma may have been the source of PLA in case 1, since the child lived in a risky family situation, and she is monitored by the child protection service.

Granulomatous disease (case 2) is a rare primary immunodeficiency, associated with cellulite, ear infections, respiratory infections and pyogenic abscesses, and the liver is one of the possible sites of involvement. The germ most frequently involved is *Staphylococcus aureus* and fungi. In this syndrome, the phagocytes cannot destroy catalase-positive bacteria or fungi, resulting in granuloma formation with clinical symptoms of abscess and granulomatous reaction surrounded by granulation tissue. For this reason, there is no liquefied material in the center of these abscesses, which is why the percutaneous drainage is impaired.

Laboratory tests often show elevated CRP (level mean of 200.5 g/dL, range 25-309 g/dL (3)), slightly increased bilirubin levels, transaminases and alkaline phosphatase. There is also increased

erythrocyte sedimentation rate, leukocytosis and reduced hemoglobin (below 10 mg%). Studies differ on laboratory and images findings. Halvorsen et al (4) found that the contrast-enhanced CT detected 97% of liver abscesses because 2 patients were false-positives. According to AA Malik et al (5), US and CT scans have a sensitivity of 96% and 100% respectively. The high-resolution ultrasound has a sensitivity varying from 80% to 95% and is recommended for diagnosis and monitoring the lesion.

There are no clinical trials to define the optimal management in cases of liver abscess, especially in pediatrics. However, studies on this subject agree that the treatment should include abscess drainage and culture, followed by specific antibiotic therapy, when possible. Surgical drainage was the gold standard treatment for a long time. Today, percutaneous drainage or aspiration are preferred, both guided by ultrasound or CT scans.

In liver abscess smaller than 5 cm, it is acceptable to choose either needle aspiration or percutaneous drainage catheter (6); in abscesses bigger than 5 cm, percutaneous drainage catheter is kept in the abscess until the drainage liquid is minimal (approximately 7 days). This should be the first line of treatment, because it has great efficacy (7). The open surgical drainage is reserved for patients with abscess rupture, multifocal, multiple, left lobe abscess or for those that the percutaneous drainage failed or had another intra-abdominal pathology requiring surgical correction.

Studies are even scarcer about antibiotic therapy. The consensus is that initial therapy should be broad-spectrum intravenous antibiotic coverage for the most common agents (*S. aureus*, gram negative bacteria and anaerobes). The therapy should be guided by the culture results as soon as possible (3). However, often bacterial flora is mixed and anaerobic coverage is recommended even if they do not grow in the culture (5).

There is no consensus on the duration of antibiotic therapy and it should be determined by extension of the disease, the quality of the abscess drainage, the patient's clinical response, body temperature, leukocytes' count and CRP (this last one is a very good indicator of therapy response (3)). Antibiotic therapy should be maintained for four to six weeks. If the drainage and clinical response is satisfactory, intravenous antibiotic therapy may be continued for two to four weeks, being replaced by oral antibiotic therapy directed by culture (7,8).

CONCLUSION

PLA is a fatal disease if not treated early. In the 1980s, the mortality rate was 40%. However, with the introduction of antibiotic therapy, the advancement of imaging studies and the drainage

success, mortality rates have decreased and the current mortality range is between zero and 15% (3,9). Since there are no studies that define the optimal management in cases of PLA, it is mandatory that each case should be evaluated individually, as well as the immunological status.

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