

Liver abscess caused by *Actinomyces odontolyticus*: a difficulty diagnostic - case report

Abcesso hepático causado por *Actinomyces odontolyticus*: um diagnóstico de dificuldade - relato de caso

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ABSTRACT

Actinomyces odontolyticus are slow-growing, facultative anaerobic, gram-positive bacilli and rarely cause liver abscesses. We present a black male, aged 47, with adynamia, jaundice, weight loss, abdominal pain and fever, which started 6 months prior, who was diagnosed with liver abscess and underwent percutaneous drainage, with delayed identification of the pathogen in culture, after three weeks with growth of *A. odontolyticus*. The literature shows low positivity (10%) in the culture due to its slow growth and technical difficulties; usually positive about two weeks. This is important to alert physicians of the diagnostic possibility and the difficulty of managing it until identification.

Keywords: *Actinomyces Odontolyticus*, Liver Abscess, Hepatic Actinomycosis.

RESUMO

Actinomyces odontolyticus são bacilos de crescimento lento, anaeróbicos facultativos, gram-positivos e raramente causam abscessos hepáticos. Apresentamos um homem negro, 47 anos de idade, com adinamia, icterícia, perda de peso, dor abdominal e febre, que começou 6 meses antes, que foi diagnosticado com abscesso hepático e passou por drenagem percutânea, com identificação tardia do patógeno em cultura, após três semanas com crescimento de *A. odontolyticus*. A literatura mostra baixa positividade (10%) na cultura devido a seu lento crescimento e dificuldades técnicas; geralmente positiva em torno de duas semanas. Isto é importante para alertar os médicos sobre a possibilidade diagnóstica e a dificuldade de administrá-la até a identificação.

Palavras-Chave: *Actinomyces Odontolyticus*, Abscesso hepático, Actinomicose hepática.

1 INTRODUCTION

Pyogenic liver abscess (PLA) is characterized by a suppurative intrahepatic collection, secondary to local inflammation in the parenchyma ⁽¹⁾. It has an incidence of 1-45 for each 100.000 habitants, is more common in men in the fourth and fifth decades of life, and can be formed by contiguous infection in nearby tissue or bile duct, penetrating

abdominal trauma, bacteraemia or intra-abdominal infections (appendicitis and acute diverticulitis), however, about half of the cases are of cryptogenic origin ^(1,6,9). It has a subacute evolution, and the main signs and symptoms are abdominal pain, fever, jaundice, weight loss and painful hepatomegaly ^(1,3,5,8). Mortality rate range from 5,6-80%, with a significant reduction due to better diagnostic methods, effective use of antibiotics and their association with interventional treatment ⁽¹⁾.

Actinomyces are gram positive bacteria, facultative anaerobic, non-spore-forming bacilli, commensal of oral cavity, digestive and urinary tract ^(2,3,5). There are about thirty subtypes, six of which can cause diseases ^(3,5). Hepatic involvement has been reported in 15% of those with abdominal infections, and represents 5% of all cases of actinomycosis, as abscess or mimicking tumors ^(3,5,6). Insidious course, nonspecific symptoms and diagnostic difficulties through culture with delayed identification of the pathogen make diagnosis a challenge ^(1,7). In this case report, we discuss a patient presenting with primary hepatic actinomycosis presenting like PLA.

In a literature review, through PubMed research, we found 17 cases in the last 10 years related to liver infections caused by Actinomyces. Among them, 2 are directly related to Actinomyces odontolyticus, most of them as case reports. In 2015, Yang et al, analyzing all cases in the literature from 1992 to 2012, described 32 cases of liver abscesses by Actinomyces ⁽⁷⁾.

2 CASE REPORT

A 47-year-old black male patient, with no previous history of dental procedures and abdominal cavity manipulation, started 6 months ago adynamia, dyspnea, jaundice, weight loss (30 kilos), fever, night sweats and abdominal pain. An initial investigation showed an increase in liver enzymes and cholestasis markers, leukocytosis, anemia, with increased of C-reactive protein (CRP) and ferritin. Abdominal ultrasound (US) was performed, showing hypoechoic liver lesion, measuring 8.3 x 7.1 x 8 cm and a volume of 253 ml, and a magnetic resonance imaging (MRI) visualizing in segment VIII, four poorly defined hypo-vascular nodular formations, with T1 hyposignal and T2 hypersignal, the largest one measuring 6.1 x 5.3 cm (Figure 1). He was admitted to a tertiary hospital after a progressive worsening of symptoms, with tachycardia, severe abdominal pain and a palpable liver in physical examination. The patient underwent a computed tomography (CT) of the abdomen, showing hepatic lesion with hypodense fluid in segment IVA measuring 16.4 x 15.3 x 14.7 cm (1920 cm³), without alteration of bile ducts (Figure 2 -

A). Empirically, was decided to start treatment with Ciprofloxacin and Metronidazole, associated with percutaneous drainage (initial aspiration with 1000 ml purulent discharge). Pigtail drain maintained, draining over 700 ml in 24 hours. The patient had significant clinical improvement, including the signs of sepsis, resolution of abdominal pain and the fever. The initial antimicrobial regimen was maintained due to the difficulty in identifying the possible agent in GRAM and secretion culture. After three weeks, we got the identification of *Actinomyces odontolyticus* in liver aspirate culture, identified by the Vitek 2C equipment with the ANC card (Anaerobes and Corynebacterias), best developed in anaerobic atmosphere. After that, the patient started receiving Crystalline Penicillin. An abdominal control ultrasonography was performed, with evidence of recovering abscess area with local hepatization. He was discharged after 21 days of crystalline penicillin to continue oral amoxicillin for 3 months, with ambulatory and image control. Two months later, patient was asymptomatic, and a CT of the abdomen had significant improvement of the abscess, in a resolution process, measuring 4.1 x 3.0 x 2.5 cm and 16.1 cm³ (Figure 2 - B), so, was decided to complete the three months of antibiotic oral therapy proposed and proceed with clinical follow-up.

3 DISCUSSION

The *Actinomyces* bacteria species are gram-positive, facultative anaerobic, filamentous, non-spore-forming, slow-growing bacilli, commensals of oral cavity, gastrointestinal and urinary tract (50, 30 and 20%, respectively), that acquire pathogenicity through tissue invasion, usually by breaking down the mucosal or skin barrier^(2,3,4,5,6,8,9). They can cause disease in patients the fourth and fifth decades of life, and are two times more likely to affect men^(2,3,8). There are 13 subtypes, out of which 6 can cause diseases: the most common of them, *A. israeli* is related to chronic suppurative infections. *A. odontolyticus*, usually found in the oral cavity, may be the cause of bacteremia and multiple organ abscesses, as presented in our clinical case^(2,3,4,5,9). The biggest involvement is ileocecal, with hepatic involvement described in 15% of cases, most of them due to intrahepatic or intra-abdominal translocation, but the cause is unknown in 80% of cases^(3,4,5,6,9). Primary liver involvement occurs in 5% of cases and is called isolated hepatic actinomycosis^(3,5,6,9). The prevalence of endogenous infection is not well established due to a paucity of data but has been quoted between 1:300,000 and 1:1,000,000⁽⁹⁾. Actinomycosis includes chronic manifestations and abscess formation, often mistaken as a primary or metastatic tumor^(2,5,9). Radiologic imaging can

be of limited value, sometimes confused with malignant tumors, so, the diagnosis is based on cultures of secretions, blood, microscopy, and macroscopy. The specific histological finding of actinomycosis, however not always present, is the presence of hardened sulfur granules, which stained by GRAM reveal basophilic filaments, surrounded by inflammatory cells ^(4,5,7,8,9). The failure rate of the culture is high, only 10-15% are positive, often due to recent antibiotic therapy, inadequate culture conditions or inadequate incubation time - an intrinsic characteristic of the pathogen is its slow growth, usually positive after about two weeks, however, there is increased sensitivity if there is direct inoculation in the anaerobic and aerobic culture bottles ^(2,3,4,5,8). The emergence of molecular techniques like 16s rRNA sequencing has proven effective in this regard and is also superior in distinguishing among the various *Actinomyces* species ⁽⁹⁾. The course is more indolent when related to this group of bacteria, with a mortality rate of approximately 7.6% ^(3,4).

The symptoms are nonspecific, such as: abdominal pain (74%), fever (83%), weight loss (51%) and jaundice (20%) ^(1,3,5). The most common sign is the defense of palpation and percussion of the right hypochondrium, followed by hepatomegaly (16 and 52%) ⁽³⁾. The presentation is subacute, the symptoms vary between 3 to 120 days, with an average delay of 8 days for diagnosis ^(1,3,5).

Laboratory analysis shows leukocytosis (89%), a significant increase in C-reactive protein (CRP), associated with hypoalbuminemia in 80% of patients ^(1,3). Elevations in liver (AST, ALT), canalicular (GGT, FAL) and bilirubin enzymes are frequently found ^(1,3,5,8).

Through imaging studies, the diagnosis of abscess is made in 90% of cases, mainly with US, CT or abdominal RMI, showing a typically hypoechoic lesion (sensitivity of 40, 96- 100%, respectively) ^(1,3,5). MRI is characterized by low-signal intensity on T1 and high-signal intensity on T2 weighted images ^(1,3,5). The right hepatic lobe is the most affected, being solid in 58% of cases, 75% are unique and 31% of them present extension to other tissues ⁽³⁾.

The therapeutic options for PLA are: antibiotic therapy, surgical resection or percutaneous drainage, in combination or alone ^(3,4,6). Being a disease of gram-positive microorganism, the choice of antibiotic is for penicillin such as Crystalline Penicillin G for 2 to 4 weeks, followed by oral options for 3 to 12 months ^(2,3,4,6). Other antibiotic options include cephalosporins, tetracyclines and clindamycin ^(2,4,5). Resistance to Metronidazole is demonstrated but resistance to penicillin is rare ⁽²⁾. The prolonged

treatment is recommended due to the high incidence of recurrence and the duration depends on response to treatment: resolution of fever, improvement of leukocytosis and imaging tests ^(1,2,4,5). Small abscesses (3–5cm) can be managed with isolated antibiotic therapy, with up to 82% success ^(1,5). Surgical approach is indicated as initial treatment when rupture, peritonitis, abscesses > 5 cm and multiloculated occurs, being possible percutaneous drainage with aspiration or placement of drainage catheter guided by US or CT, the latter being the most effective ⁽⁴⁾. Studies reports no significant difference in mortality between those that received antibiotics alone and those that had surgical intervention in addition to antibiotics ^(4,3,5). The emergence of more effective antibiotics and minimally invasive procedures were responsible for reducing mortality rates ^(1,2,3,5). *A. odontolyticus* liver abscess is rare, and in consequence, the literature description is important to alert physicians of the diagnostic possibility and difficulty of clinical management until its identification.

Figure 1: Abdominal MRI showing formations hypo-vascular in segment VIII.

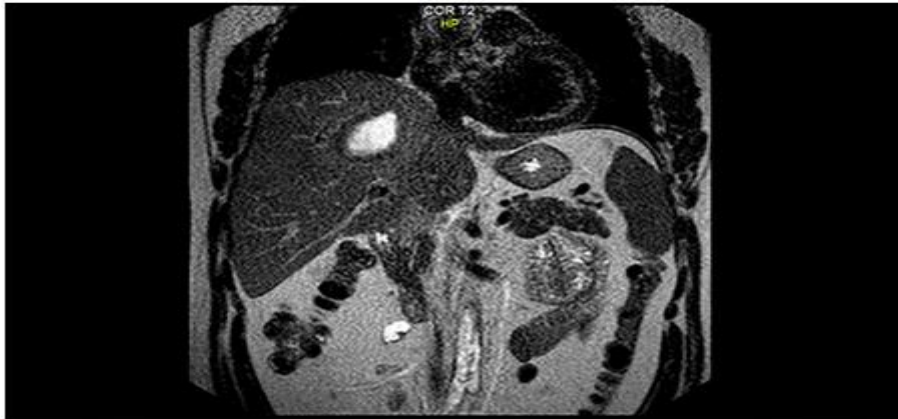
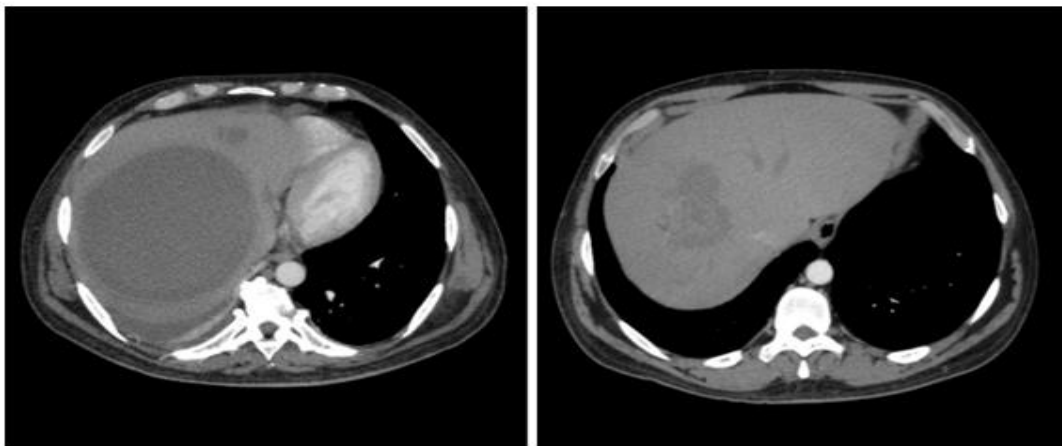


Figure 2-A: CT with hepatic hypodense lesion in segment IVa.

Figure 2-B: 2 months later, abscess in resolution process, after drainage and antibiotic therapy.



(A)

(B)

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