Liver abscesses by *Chromobacterium violaceum*: a case report of a rare disease

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**Abstract**

**Introduction**

*Chromobacterium violaceum* is a Gram-negative, facultative anaerobic, saprophytic bacillus often found in soil and water of tropical and subtropical regions. Human infection by this bacterium is rare; however, when it occurs, it is associated with high mortality rates if not diagnosed or treated correctly or early enough. Systemic clinical symptoms include sepsis and visceral abscesses in the liver. The combination of percutaneous drainage of abscesses and systemic antibiotic therapy remains the most common treatment. Currently, it is believed that diagnosis via computed tomography scan and ultrasound-guided aspiration must be done before beginning antibiotic therapy. This report discusses liver abscesses by *Chromobacterium violaceum*.

**Case report**

We report a case of *C. violaceum* infection in Brazil in a patient who had rapid evolution of signs and multiple liver abscesses. Treatment consisted of interventional radiology and ciprofloxacin without the need for surgical intervention.

**Conclusion**

Liver abscesses caused by *C. violaceum* can cause high mortality rates if not treated correctly. Early diagnosis will allow less painful drainage and antibiotics will help manage this infection effectively.

This article reports a rare case of *C. violaceum* in Brazil that caused multiple abscesses in the liver and was treated with antibiotic therapy and interventional radiology.

**Case report**

A 51-year-old man was admitted to the emergency unit of São Luiz Hospital in São Paulo, on 3 January 2010, with a fever (38°C and 40°C). He complained of intense sweating for 20 days and weight loss (10 kg) over 1 month. In addition, haemoglobin concentration decreased from 11.0 to 8.8 g/dL in 15 days for no apparent reason.

The patient reported visiting the city of Porto Trombetas, Pará, Brazil, for 1 week in November 2009; while there, he cut his foot on a wooden stick. The lesion healed after 2–3 days without any complications.

One month later, he was admitted to Hospital do Coração in a fairly general condition. He was pale, hydrated and feverish with an axillary temperature of 39.2°C. There were no changes in his cardiac or respiratory systems. A computed tomography (CT) scan of the thorax showed no changes. Tests for toxoplasmosis; cytomegalovirus and hepatitis A, B and C were negative. The results of laboratory tests showed haemoglobin 8.8 g/dL, haematocrit 27.6%, gamma-glutamyl transferase 104 U/L, alkaline phosphatase 200 U/L, and sedimentation rate 125 mm; other laboratory tests were normal.

Tomography of the abdomen and pelvis (Figure 1) performed on admission showed a liver of abnormal size with multiloculated fluid collections in the right lobe (segments VI, VII, VIII) and interventional radiology.


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VII and VIII) that measured up to 10.0 cm in wide axial diameter and a simple cyst in the left lobe (segment II) that measured about 2.0 cm.

After that, an ultrasound-guided puncture using a 16-gauge needle resulted in collection of about 80 mL of a purulent material from the lower right lobe, which was sent for analysis.

The patient was treated with ciprofloxacin and metronidazole; after 3 days when *C. violaceum* infection was diagnosed, treatment was changed to only ciprofloxacin IV 400 mg every 12 h.

The patient had good clinical improvement, and laboratory tests showed haemoglobin 7.5 g/dL, haematocrit 24.2%, gamma-glutamyl transferase 169 U/L and sedimentation rate 124 mm; other laboratory tests were normal.

After day 9, the patient was discharged, with instructions to continue ciprofloxacin 500 mg every 12 h for 6 months, to begin therapy with ferrous sulfate for 1 month to reduce anaemia and to have periodic CT scans of the abdomen.

At day 10 after discharge, the patient returned for abdominal and pelvic CT scans (Figure 2). The results showed a small pleural effusion in the right lobe similar to the one seen on the first CT scan. An ultrasound-guided puncture using an 18-gauge Chiba needle was performed; approximately 110 mL of thick purulent fluid was removed from the subphrenic region and sent for culture. An indwelling 12-French drain was placed at the site of collection.

One month later, a new CT scan (Figure 3) showed a discrete basal pleural effusion on the right with minimal subjacent passive atelectasis. The liver was of normal dimensions and density. The area around the drain in peripheral segment VII measured about 8.0 × 6.0 × 7.0 cm and had heterogeneous highlights with areas of hypodensity. A lesion similar to that in segment VII measured about 4.5 × 4.0 × 3.5 cm, and

Figure 1: Abdominal CT scan with contrast agent. Multiple fluid collections in both lobes of the liver are noted, indicating characteristics of infection.

Figure 2: Abdominal CT scan with contrast agent after percutaneous drainage of the main liver abscess.

another observed lesion was similar in its characteristics. A cystic image in the hepatic parenchyma at segment IV measured 2.2 cm and had regular and well-defined margins. Highlights were not seen after contrast injection, and the drain was removed.

In the CT scans performed in March, April and June of 2010, absorption of right pleural effusion and regression of atelectasis in the lung were observed. The liver was normal, and the abscesses had decreased in size.

The last CT scan of the upper abdomen, performed in September 2010 (Figure 4), showed a subdiaphragmatic abscess in segment VII, a hypodensity measuring $2.1 \times 2.5$ cm with progressive highlights in the central portion in late phases. Another image of the subcapsular aspect on the border of segment VII was similar, with a cuneiform appearance, which is associated with discrete parenchymal retraction. Compared with the studies of April and June, no defined signs were seen in capsule highlights.

The liver was normal, and the hepatic parenchyma displayed a heterogeneous attenuation. In that same period, no changes were found on new laboratory tests.

After 6 months of antibiotic therapy and 9 months of follow-up with laboratory tests and CT scans, the patient showed good clinical improvement and was discharged.

**Discussion**

Many regions with tropical and subtropical climate in Brazil provide an adequate environment for *Chromobacterium*. This microorganism rarely infects humans, and a limited number of cases are described in the southern United States, South America, Africa, India, Southeast Asia and Australia\(^1\).\(^,\)\(^7\) Sirinavin et al.\(^8\) studied 24 cases of *C. violaceum* infection between 1971 and 2005; 16 were in the United States, 3 in Australia and 1 in each

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**Figure 3:** Abdominal CT scan with contrast agent after removal of percutaneous drain; right lobe abscess demonstrates significant regression, indicating improvement.

**Figure 4:** Abdominal CT scan with contrast agent performed 7 months after percutaneous drainage shows continued improvement of the right lobe abscess. Simple cyst in left lobe is noted.
of Brazil, India, Singapore, Taiwan and Thailand. Infection occurred via a skin lesion in 60% of the cases, the ocular conjunctivae in 8%, the gastrointestinal tract in 8% and unknown route in 24%.

Human infection is associated with high mortality in 60–80% of cases, but when diagnosed early, the chances of recovery increase with specific antibiotic treatment. Appearance of sepsis is one of most common signs, followed by skin lesion, lymphadenitis and liver abscess9.

The rapid course of infection, formation of multiple abscess and high mortality rate are characteristic of C. violaceum infection. Often septicemia is followed by multiple-organ failure. These complications are consequences of lipopolysaccharides and other toxins that are produced by high number of bacilli that infect tissues1.

Management of this disease based on antibiotic therapy associated with surgical draining has been less invasive. Nowadays diagnosis is made by ultrasound-guided aspiration and CT scan, which is performed before antibiotic therapy. When a sample of the aspirated material is available, culture and sensitivity can be done to select an effective antibiotic. However, because culture takes several days, empiric treatment is advised.

Intravenous antibiotic treatment should continue from 10 to 14 days, followed by oral treatment from 6 or more weeks. The duration of treatment might be guided by imaging10,11. Drainage is successful in 80–90% of cases. Susception of multiloculated or multiple abscesses does not contraindicate percutaneous drainage, which can be guided by ultrasound; more than one drain can be placed12.

Combined percutaneous drainage and antibiotic therapy remains the best treatment of liver abscesses because of it efficacy, low rate of complications and opportunity to collect material for cell culture and histology11.

This case was managed, according to the literature, with empiric antibiotic therapy with ciprofloxacin and metronidazole and after ultrasound-guided puncture.

Cell culture identified C. violaceum, so treatment was changed to intravenous ciprofloxacin for an additional 7 days, followed by discharge and continued oral antibiotic treatment for 6 months. As in the majority of cases described in the literature, treatment with antibiotic therapy and interventional radiology without the need for open surgical drainage was efficacious for the patient in this report.

C. violaceum is resistant to betalactam antibiotics and to other mechanisms that pump cytotoxic drugs out of the extracellular environment, a likely explanation for the high mortality rate9. Culture to isolate the pathogenic agent and sensitivity using disk diffusion to determine antibiotic efficacy showed resistance to ampicillin and cephalosporins and sensitivity to gentamicin, meropenem, ciprofloxacin and sulfamethoxazole–trimethoprim9.

Prognosis of this infection is worse in patients with sepsis or bacteremia or who do not receive prompt antimicrobial treatment9.

Comparative study of genes involving different aspects of antibiotic resistance may lead to new strategies to treat more resistant infections, including opportunistic infections with C. violaceum that can result in death. When any phase of intracellular infection is interrupted, the ability of the pathogenic organism to escape the action of more efficient drugs is decreased10.

Conclusion
Liver abscesses caused by C. violaceum are associated with high mortality (60–80% of cases) if not adequately treated. Therefore, early diagnosis to isolate the agent through adequate drainage by minimally invasive methods, followed by appropriate antibiotic therapy, seems to be the best initial management against this rare infection. This study showed an approach of diagnostic interventional radiology coupled with long-term antibiotic therapy for efficacious management of liver abscesses caused by C. violaceum.

Consent
Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

References
