CASE REPORT

Bacteraemia and liver abscess due to *Fusobacterium necrophorum*

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SUMMARY

Fusobacterium necrophorum is the oropharyngeal pathogen usually associated with Lemierre's syndrome, a pharyngeal infection which evolves to sepsis, septic emboli and thrombophlebitis of the adjacent neck vessels. It is an uncommon causative bacteria of a liver abscess, and an extensive workup should, therefore, be performed in order to rule out potential sources of the infection. This case report describes the workup that led to the diagnosis of a colorectal carcinoma, which was deemed to be the source of the *Fusobacterium* bacteraemia.

BACKGROUND

Fusobacterium necrophorum is an anaerobic Gram-negative bacterium which is often involved in the development of Lemierre's syndrome, although other bacteria, such as other fusobacteria and *Streptococcus*, can also be related to this syndrome. *F. necrophorum* is usually found as part of the normal oral, gastrointestinal and genital flora but may induce septic thrombophlebitis in the neighbouring neck vessels when the infection is associated with an oropharyngeal abscess. Although the liver is the most common site of metastatic visceral abscesses, the presence of septic emboli involving this organ is uncommon. With no evidence of pharyngeal infection, it is less common to diagnose a liver abscess in an immunocompetent patient, and therefore, a workup should be performed in order to identify the primary focus of the infection.

CASE PRESENTATION

A 56-year-old man was admitted to our hospital presenting with abdominal pain, fever, chills, nausea, vomiting and malaise over the past week. The patient had hypertension and was on enalapril 10 mg twice a day and amlodipine 10 mg daily. The social history did not yield further data because the patient had not recently travelled abroad. He worked as a bus driver and no exposure to environmental pathogens through recreational activities or pets could be identified.

On examination, he had a high temperature (38.3°C), heart rate of 100 bpm, respiratory rate of 20 breaths/min, blood pressure of 130/84 mm Hg and oxygen saturation of 93% on room air. On auscultation, heart and lungs were normal. The abdomen was not distended, but the patient had mild abdominal pain in the right upper quadrant.

Oropharyngeal examination was normal, and we could rule out periodontal disease.

Blood tests revealed a white cell count of 15,430/ μ L, with 83% neutrophils, haemoglobin level of 13.3 g/dL and platelet count of 185,000/ μ L. C-reactive protein was 383 mg/dL (normal range: <5 mg/dL) and gamma-glutamyl transpeptidase was 178 U/L (normal range: 5–45 U/L). Alanine transaminase, aspartate transaminase, lactate dehydrogenase and bilirubin were normal.

An ultrasound showed a parenchymal mass of 6×3 cm in size, and a CT scan revealed that this mass was 6.5×3.2×4.3 cm in diameter, hypodense and heterogeneous, with phlegmonous areas and small abscesses, which were 1 cm in diameter (figure 1).

To rule out primary and secondary metastatic malignancies, AFP, CEA and CA19-9 were performed, but they were within the normal range.

Empirical antibiotic treatment with ceftriaxone and metronidazole was initiated. On the third day of hospitalisation, blood cultures drawn at the time of admission revealed *Fusobacterium necrophorum*, sensitive to piperacillin/tazobactam and metronidazole.

Species-level identification was performed from positive cultures by manual methods, and by means of the commercial system of multisubstrate analytical profile index, API 20A determines the phenotypical characteristics for anaerobic bacteria identification, both Gram-negative and Gram-positive.

We, therefore, decided to start piperacillin/tazobactam. The patient's symptoms improved over the days that followed.

He was scheduled for an abdominal CT scan 19 days after the first CT, which revealed the complete resolution of the liver abscess.

DIFFERENTIAL DIAGNOSIS

Fusobacterium is a rare causative pathogen of liver abscesses.¹ The ensuing workup should focus on assessing the possible aetiology of the infection and try to identify underlying risk factors. Oral infectious diseases, such as periodontitis, must be ruled out as a potential focus of the infection. Infective endocarditis can be the source of the dissemination, and an echocardiogram should, therefore, be performed. Diverticulitis and colorectal neoplasia can be risk factors for a liver abscess, and a colonoscopy should, therefore, be carried out as part of the

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Figure 1 The CT slide shows the heterogeneous hepatic lesion (arrow), with poorly defined borders and small hypodense areas within, with mixed phlegmonous and small abscessation areas.

workup. Other risk factors include pancreatic disease, diabetes mellitus and immunosuppressive status.¹

Liver abscesses are uncommon conditions that present diagnostic challenges to clinicians. They can occur via the bile ducts, the vessels or by contiguity. Infection is usually bacterial (80%), amoebic (10%) or fungal (10%). Lithiasic biliary disease, intra-abdominal infections (appendicitis and sigmoid diverticulitis), Crohn's disease, liver transplantation, interventional techniques or a bacteraemia should be excluded in the workup.²

We performed a complete oropharyngeal examination and an echocardiogram, which were normal. However, the colonoscopy revealed a rectal mass situated 12 cm above the dental line (figure 2). This tumour had an uneven, haemorrhagic surface and was causing partial obstruction of the lumen (70%). Biopsies were taken and the pathological examination revealed a differentiated colorectal adenocarcinoma.

OUTCOME AND FOLLOW-UP

Intravenous antibiotic therapy was administered for 4 weeks, and the patient was scheduled for a CT scan, which showed the complete resolution of the liver abscess.

While the patient was on antibiotic therapy, and despite the prophylactic treatment with low-molecular-weight heparin, he developed deep vein thrombosis of the right lower limb, which was deemed to be cancer associated. Anticoagulation treatment with low-molecular-weight heparin was initiated. Given the

Figure 2 The lumen of the rectum was partially obstructed by an ulcerating rectal mass situated 12 cm above the dental line, and its surface was haemorrhagic and uneven.

diagnosis of colorectal cancer, the patient was referred to our Oncology Department. The workup showed negative lymph nodes and no distant metastases (stage T3cN0M0). Oncologists decided that the patient should undergo radiation therapy and chemotherapy prior to surgical management.

DISCUSSION

Fusobacterium necrophorum is an anaerobic pathogen usually involved in the development of Lemierre's syndrome, although other bacteria may also cause this complication of pharyngitis. Typical manifestations of Lemierre's syndrome include the development of a pyogenic thrombosis of the internal jugular vein and septic emboli to the lungs, brain and liver. Pyogenic liver abscesses are often polymicrobial, and very few cases of *Fusobacterium* as a causative pathogen have been reported. With regard to Lemierre's syndrome, about 2%–4% of cases develop liver abscesses when metastatic emboli occur.¹

The liver is the most common visceral organ in which abscesses can be found. These are usually polymicrobial, due to a complication of peritonitis, spreading via a biliary infection or haematogenous spread in the setting of a systemic infection.² Other risk factors for a liver abscess include underlying gastrointestinal neoplasm, such as colorectal or hepatobiliary carcinoma, pancreatic abscesses, diabetes and a certain degree of immunosuppression.³

Fusobacterium is a rare causative pathogen in a liver abscess, and its infections mostly occur because of disruption of mucosal barriers. As such, traumas, neighbouring abscesses and tumours may be the source of the spreading to lung, liver or neck vessels. Solitary liver abscesses related to Lemierre's syndrome are uncommon.^{1,4} However, some publications have reported liver abscessation related to periodontal disease⁵ without Lemierre's syndrome, or after a dental procedure⁶ (dental cleaning in an otherwise healthy patient). Colorectal tumours, diverticular disease and even a recent colonoscopy⁷ may be the potential source of *Fusobacterium* infection. A recent publication reported a liver abscess in an immunocompetent patient with no recognisable risk factors for *Fusobacterium* infection.⁸

As previously mentioned, liver abscesses are polymicrobial, which may lead to the suspicion of the source of the infection. Gram-negative and anaerobic bacteria are the most common pathogens, and until blood cultures can yield any definitive results, empirical treatment with broad-spectrum antibiotics, such as ceftriaxone and metronidazole, should be initiated. This treatment should be corrected according to the sensitivities and drug resistances, and this was why our patient started on broad-spectrum antibiotic therapy.

The elective treatment for a liver abscess is usually percutaneous drainage. However, our patient did not undergo drainage of the liver abscess due to its accessibility, size and heterogeneous content, that is, patchy areas of phlegmons and small abscesses within (figure 1). In this case, the abscess resolved with no surgical or percutaneous drainage. Systemic antibiotics and medical management were enough to achieve the complete resolution of the abscess.

Contributors RGC wrote the first draft; ML-L and OV-G made interesting suggestions and BR-M helped in translating the draft into English.

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Learning points

- ▶ Liver abscesses should be promptly treated, either with drainage or, where appropriate, with aggressive, broad-spectrum antibiotic therapy.
- ▶ When bacteraemia due to *Fusobacterium* is detected, but the source of infection is unknown, an extensive diagnostic workup should always be considered in order to rule out occult underlying conditions, such as neoplasia or unnoticed abscesses.
- ▶ Clinicians should consider oral infections, diverticulitis, infective endocarditis and colorectal neoplasms as the primary source of the *Fusobacterium* bacteraemia.

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