CASE REPORT

Rare case of otomastoiditis due to *Coxiella burnetii* chronic infection

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SUMMARY

Q fever is a zoonotic disease caused by *Coxiella burnetii* that usually presents with non-specific or benign constitutional symptoms. Diagnosis is often challenging and, after acute Q fever, 1%–5% of patients can develop chronic disease. We present an 80-year-old male patient who was admitted due to a 3 months history of fever, productive cough, myalgia, weight loss, headache and hearing loss. Chronic Q fever was confirmed by positive antiphase I immunoglobulin G. Frequent locations of chronic infection was discarded, and ear CT revealed a right mastoid infection. He was treated with doxycycline and hydroxychloroquine for 18 months with significant improvement. This is a rare case of chronic Q fever presenting with otomastoiditis that has never been described.

BACKGROUND

Q fever is a zoonosis caused by *Coxiella burnetii*, which occurs worldwide. The most frequent sources of human infection are farm animals through the aerosol route or by ingestion. Patients presenting with acute infection are asymptomatic in 60% of the cases or present as an acute self-limiting disease, usually characterised by flu-like symptoms, pneumonia and/or hepatitis. Progression to chronicity occurs in a small number of cases (1%–5%), although it is probably being underestimated due to underdiagnosed and under-reported cases. Chronic Q fever is an infection that may lead to a complicated course over years. The mortality rate is higher than in acute disease, occurring in 1%–11% of cases.^{1,2}

Chronic Q fever is difficult to recognise since the symptoms are very unspecific, the epidemiological context is difficult to assess and diagnosis is hidden from the conventional microbiological investigation because *C. burnetii* is not seen in Gram stains or routine cultures.¹ Contact with animals, even if indirect, is important for diagnostic suspicion. Physicians should consider the diagnosis in any patient with prolonged non-specific symptoms, with no other apparent cause. We describe an unusual presentation of chronic Q fever infection.

CASE PRESENTATION

An 80-year-old male patient was admitted due to a history of fever, productive cough, myalgia, anorexia, sweating, weight loss, headache and hearing loss. He did not complain of dyspnoea,

thoracic pain, palpitations, vomiting or other gastrointestinal or urinary symptoms.

The patient's relevant medical history had started 3 months earlier, when he presented with respiratory symptoms including persistent productive cough, with rare episodes of haemoptoic sputum. He was treated with an empirical antibiotic (amoxicillin and clavulanic acid) for suspicion of respiratory infection. One month later he presented with the same symptoms, without clinical improvement, and was discharged with a different antibiotic (moxifloxacin). Despite these therapeutic approaches, he continued to worsen.

The patient had a personal history of hypertension, chronic bronchitis and benign hypertrophy of the prostate. Medications included lansoprazole (30 mg/day) and candesartan/hydrochlorothiazide (16/12.5 mg/day).

He was retired, living in a rural area with sheep and goats in the neighbourhood, but had no pets or any farm animals at home. He denied consumption of unpasteurised dairy products and only used bottled water. He did not refer high-risk sexual exposures and reported neither recent travel nor contact with apparently sick people.

At the emergency department, he was febrile (temperature of 38.3°C), blood pressure was 95/61 mm Hg, pulse 90 beats/min, room air peripheral O₂ saturation was 96%. The remaining physical examination was unremarkable, including normal pulmonary and cardiac auscultation, no peripheral oedema or skin changes.

INVESTIGATIONS

Blood workup revealed normochromic normocytic anaemia, haemoglobin 10.6 g/dL (normal range 13–17 g/dL), leucocytes 15.7 × 10⁹/L (normal range 4–10 × 10⁹/L), C-reactive protein 18.8 mg/dL (normal range <0.5 mg/dL). Renal function and hepatic enzymology were normal. The rapid urine test was not suggestive of infection and chest radiography revealed a bronchovascular enhancement.

Several complementary diagnostic tests were carried out during hospitalisation. Blood and urine cultures collected did not isolate any pathogen, serologies for *Borrelia* and *Brucella* were negative, gamma interferon was negative and diagnosis of chronic Q fever was confirmed by high titres of immunoglobulin (Ig)G antibodies to phase I (1:3200), with total IgG titre of 1:5120. Endocarditis, the most frequent presentation, was discarded with a transoesophageal echocardiogram.

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Figure 1 CT scan showing diffuse opacification of the entire middle ear and mastoid by material with relatively homogeneous soft tissue density ((A) axial cut and (B) sagittal cut).

Due to the persistence of otalgia in the right ear, associated with hearing loss, a CT scan of the ear was performed, which revealed otomastoiditis (figure 1). Cerebral CT scan was normal. Myringotomy was performed with purulent fluid drainage. Conventional cultures (Agar-agar) of the fluid were negative.

TREATMENT

The patient started treatment with doxycycline (100 mg orally twice daily) plus hydroxychloroquine (200 mg three times daily) with significant improvement.

OUTCOME AND FOLLOW-UP

The patient was discharged with the indication to complete therapy for at least 18 months. During follow-up no events were reported and 1 year after the end of treatment he remained asymptomatic. Total IgG antibodies reduced considerably from 1:5120 to 1:1280.

DISCUSSION

Chronic infection can develop months or years after acute Q fever, which can be asymptomatic. The most frequent manifestations of chronic Q fever are endocarditis (70%–80%) and vascular (8%–10%) in people with underlying cardiac or

vascular disease, but other rare presentations were described like osteomyelitis, representing about 2% of Q fever cases.^{1 3} The range of osseous involvement is broad, from long to short bone, single or multifocal involvement, with or without focal abscesses collection, but cases of otomastoiditis have never been described in the literature.⁴

The gold standard for the diagnosis of chronic Q fever is indirect immunofluorescence showing a rise of phase I antibodies (titre >1:800). Some authors have proposed that for bone and joint Q fever infection, a positive serological result should be confirmed by PCR or culture of the lesion. Culture is rarely performed as it is a highly infectious organism that can place laboratory personnel at risk of infection.¹ Unfortunately, in this case, the fluid drained at the myringotomy was only used for conventional culture, which turned out to be negative, and PCR for *Coxiella* was not performed due to lack of product.

According to the proposed criteria for the definition of *C. burnetii* osteoarticular infection without prosthesis, this case presents at least two major criteria (positive serology with IgG I antibodies >800 and clinical osteitis confirmed on CT scan).⁵

The recommended treatment of endocarditis is well established, consisting of doxycycline plus hydroxychloroquine for at least 18 months. Alternatives are trimethoprim-sulfamethoxazole, ciprofloxacin, rifampin and clarithromycin, but their efficacy is not proven. Given his high bone penetration and fewer side effects, ciprofloxacin plus rifampin has been used and showed to be effective in some cases, but further reports are needed.^{6 7}

Duration of treatment and follow-up should be guided by clinical and serological responses and may need to be maintained for long periods. A phase I IgG <800 is the most commonly accepted criterion to discontinue therapy; however, because of the highly variable clinical nature of chronic Q fever, clinical judgement remains the most crucial factor in the treatment management.¹

Learning points

- ▶ Q fever is a worldwide zoonosis caused by *Coxiella burnetii*, which is often asymptomatic or present as an acute self-limiting disease.
- ▶ Progression to chronicity occurs in a small number of cases (1%–5%) and includes endocarditis, chronic vascular infections and, more rarely, osteoarticular infection.
- ▶ Diagnosis should be considered in any patient with prolonged non-specific symptoms.
- ▶ Elevated immunofluorescence assay antibody titres against *C. burnetii* phase I is diagnostic of chronic infection.
- ▶ Treatment of *C. burnetii* osteomyelitis is extrapolated from endocarditis treatment recommendations and consists of doxycycline in combination with hydroxychloroquine for at least 18 months, but further research is needed.

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