**Case Report**

**Helicobacter cinaedi**: a challenging case in a rural clinic

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**Introduction:** Several cases of *Helicobacter cinaedi* infections have been reported in immunocompromised patients since the 1980s and, more recently, in immunocompetent patients with certain risk factors. In spite of reports from Japan, Europe and the USA, there are currently no guidelines for identification, susceptibility testing or treatment of these infections. This is particularly challenging for rural clinics, which are already limited by available diagnostic modalities and therapeutic approaches. We present a case of *H. cinaedi* infection in a rural clinic that exposes these challenges and provides an argument for the establishment of guidelines.

**Case presentation:** A 64-year-old immunocompetent bisexual male with a history of recent orthopaedic surgery presented to our rural clinic with left lower leg cellulitis, bacteraemia, fever and chills. The causative organism could not be definitively identified in the clinic. Cultures were sent to the state laboratory for identification. Empiric treatment with cephalexin and ceftriaxone showed no improvement in cellulitis. The patient was transferred to a tertiary-care facility where vancomycin and ciproflxacin were moderately successful. Several days later, cultures identified *H. cinaedi* and the patient was treated with carbapenem and doxycycline to complete resolution of symptoms.

**Conclusion:** Although infections by *H. cinaedi* are rare, they are not uncommon. Identification by culture may not always be definitive, so a high degree of suspicion and access to other diagnostic modalities is essential. Empiric treatment with certain antibiotics is usually successful and may be an acceptable therapeutic approach considering the lack of guidelines.

**Keywords:** bacteraemia; *Helicobacter cinaedi*; cellulitis; cephalosporin; carbapenem; doxycycline; vancomycin.

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**Introduction**

*Helicobacter cinaedi* is a Gram-negative spiral bacterium usually found in the intestinal tract of mammals (Uçkay et al., 2006). Since 1984, several cases of *H. cinaedi* infection have been reported in the immunocompromised, particularly in homosexual men (Minauchi et al., 2010). Recently, a few cases have also been reported in immunocompetent patients with the risk factors of homosexuality, bisexuality, cancer, alcoholism or pregnancy (Lasry et al., 2000). *H. cinaedi* has been implicated in multiple disease conditions, including cellulitis, gastroenteritis, proctitis, arthritis and, more recently, meningitis (Sugiyama et al., 2014) and atherosclerosis (Kawamura et al., 2014).

Many natural reservoirs have been reported for *H. cinaedi*, including rodents, foxes and wild animals such as deer (Uçkay et al., 2006), which are rampant in the vicinity of our patient. As was our experience, cultures are usually slow and difficult to grow and identify (Lasry et al., 2000), posing a diagnostic challenge, particularly to rural clinics, which are not usually equipped with advanced diagnostic modalities. Empirical treatment with certain antibiotics has been proven to control the disease (Rimbara et al., 2013), which formed the basis for our therapeutic approach, given the absence of treatment guidelines.

**Case report**

A 64-year-old male presented to the emergency room with shortness of breath upon exertion, fever, body aches, chills, oedema and erythema of the left lower leg distal to the knee. Shortness of breath on exertion started after diagnostic left knee arthroscopy a month prior to presentation, while the remaining symptoms started 3 days previously.
He had a history of bisexuality, alcoholism and diarrhoea 2 months ago.

At presentation, his temperature was 100.2 °F, pulse was 83 min⁻¹, respirations were 20 min⁻¹ and O₂ saturation was 97% in room air. Physical examination was unremarkable except for left lower leg oedema and erythema. Laboratory tests were remarkable for blood urea nitrogen of 24 mg dl⁻¹, a white blood cell count of 11100 μl⁻¹ with 21.2% lymphocytes, a urine specific gravity of 1.030 and a D-dimer level of 887 ng ml⁻¹.

Two sets of blood cultures were obtained in the emergency room using Becton Dickinson Bactec culture vials: a set of Aerobic/F culture vials and a set of Lytic/10 anaerobic / F culture vials. Both sets were incubated at 37 °C in Bactec 9050. Bactec alerted a positive culture vial after 72 h of incubation. The first step taken was to set up a Gram stain from a small sample of each positive culture vial. Both aerobic sets showed Gram-negative spirochaete-like organisms. No growth was observed in the anaerobic culture bottle. Due to recent experience with a similar case that resulted in Campylobacter growth, a rapid Campylobacter antigen test (Meridian Bioscience Inc.) was performed, which resulted in a weak positive result, leading to a presumptive identification.

A diagnosis of left lower leg cellulitis was made, and the patient was given intramuscular ceftriaxone and placed on cephalexin four times a day for 10 days. A week later, he presented to the emergency room with persistent left lower leg oedema and erythema, at which time he was transferred to a tertiary-care facility for inpatient treatment. He was given intravenous (i.v.) vancomycin 1 g every 12 h, and i.v. ciprofloxacin 400 mg every 12 h, which resulted in a moderate reduction of the left lower leg oedema and erythema. Due to the lack of complete resolution of cellulitis, i.v. meropenem 500 mg every 8 h was added a day later, which resulted in substantial resolution of the cellulitis after just 1 day of administration. At this point, 6 days after initial presentation, the State Department of Health was able to identify the organism as H. cinaedi using PCR and 16S rRNA gene sequencing. However, the state laboratory was not able to perform any susceptibility studies on the organism. Vancomycin and ciprofloxacin were discontinued to preclude the creation of antibiotic resistance, and oral doxycycline 100 mg twice a day was added, which resulted in complete resolution of the cellulitis in 2 days. Therapeutic success was assumed due to resolution of the cellulitis and lack of bacterial growth in two venous blood samples 5 days after collection. The patient continued to be free of symptoms on follow-up, 2 weeks after discharge. However, due to the recurrent nature of H. cinaedi infections, our rural clinic was advised to consult the Infectious Diseases department at the tertiary-care facility upon future encounters with the patient.

Discussion

H. cinaedi is known to cause bacteraemia and cellulitis in immunocompromised patients but should be part of the differential diagnosis for immunocompetent patients with risk factors of homosexuality, bisexuality, cancer, alcoholism or pregnancy. Suspicion should be higher if the patient has a recent history of orthopaedic surgery (Kitamura et al., 2007) or gastrointestinal infection (Uçkay et al., 2006). Because identification and susceptibility testing are challenging, empirical treatment with proven antibiotics (including carbapenems and tetracyclines) should be started to avoid expensive transfers and to reduce the duration of infection.

With our patient, we faced two challenges: diagnostic and therapeutic. Diagnosis was difficult because of the slow growth of the organism and the unavailability of sophisticated procedures such as 16S rRNA gene sequencing for H. cinaedi.

Therapy was complicated both because of the delay in identification and because of the lack of guidelines for susceptibility testing from organizations such as the Clinical and Laboratory Standards Institute. Therapy was guided largely by reported susceptibilities, which were based predominantly on bacteria identified in immunocompromised patients (Rimbara et al., 2014). Outpatient treatment with ceftriaxone and cephalexin was unsuccessful, which ascertains the ineffectiveness of cephalosporins in the treatment of H. cinaedi (Kawamura et al., 2014). Addition of vancomycin or fluoroquinolone was not much help, which confirms mixed susceptibility (Kawamura et al., 2014). Carbapenems and tetracyclines proved to be successful in resolving the symptoms. However, there remains a need for our rural clinic to continue to consult the Infectious Diseases department at the tertiary-care facility, due to the lack of guidelines for identification and treatment of primary or recurrent H. cinaedi infections.

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