

CASE STUDY

Unveiling the Complexity of *Campylobacter* Bacteremia

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Abstract

Campylobacter coli is a fastidious gram-negative rod that often causes gastroenteritis but may sometimes cause bacteremia. *Campylobacter* is the largest cause of infectious diarrhea and a major contributor to foodborne diseases globally. *Campylobacter* infection is typically spread by the eating of contaminated food, particularly raw meat, or untreated water; contact with infected animals or polluted settings; and poultry is the principal reservoir and source of human transmission. The clinical spectrum of *Campylobacter coli* infection is divided into two categories: gastrointestinal and extraintestinal symptoms. Later consequences include reactive arthritis, Guillain-Barré syndrome, and Miller-Fisher syndrome. Isolation and identification of the organism are critical, since early treatment may avert significant problems. Because regular biochemical identification is difficult due to the organism's fastidious character, automated technologies may assist in identification, allowing proper treatment. We present the case of an elderly diabetic male who acquired *Campylobacter* bacteremia without antecedent diarrhea and recovered with pathogen-targeted treatment.

Keywords Automated systems, Bacteremia, *Campylobacter coli*, Identification, Immunocompromised

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1 Introduction

Campylobacter species are slender, spirally curved, non-spore, gram-negative rods.^[1] *Campylobacter jejuni* and *Campylobacter coli* are the most clinically relevant species as they are responsible for around 90% of *Campylobacter* infections.^[2] *Campylobacteriosis* is estimated to affect 400-500 million people annually, making it a leading cause of bacterial diarrhea.^[3] A range of clinical manifestations, from asymptomatic to severe invasive disease conditions, can also result from it. Bacteremia is uncommon and frequently linked to a number of immunodeficient diseases, despite *Campylobacter* gastroenteritis being the most prevalent presentation.^[4] It requires high clinical suspicion for diagnosis since it is rare and can present without underlying diarrhea.^[1] According to studies, the isolation of *Campylobacter* species from blood culture ranges from 0.15 – 0.24%.^[5,6] Although it is a treatable disease, it causes serious health implications if not treated. Hence, prompt identification of the bacteria plays a very important role. With advancements in diagnostics and automated systems, rare cases of *Campylobacter* bacteremia are increasingly identified from different clinical settings. Here, we discuss a case of *Campylobacter coli* bacteremia in an elderly diabetic patient.

Case history

An 84-year-old male with bilateral distal femoral fracture, treated conservatively with bilateral above-knee slab and bedridden for 20 days, presented to the Orthopaedics OPD for follow-up. He was referred to the emergency department with complaints of mild difficulty in breathing. All vital signs were stable except for the mild desaturation of oxygen (86%) in room air. He had complaints of difficulty in breathing for the past two days with MMRC (Modified Medical Research Council dyspnoea scale) Grade 4, along with orthopnoea and cough with expectoration. He had no other respiratory, cardiac, or gastric complaints. He was a known case of type 2 diabetes mellitus and systemic hypertension on medication for the past 20 years. He was also a known case of adrenal adenoma. He was a non-smoker and had never consumed alcohol. On physical examination, penile and scrotal edema were noted. Complete haemogram done at the time of admission was not deranged. The USG of the leg revealed bilateral popliteal deep vein thrombosis (DVT). Anticoagulants were started in view of elevated D-dimer levels and DVT. Two days later, the patient developed an acute drop in Glasgow coma scale (GCS) and ketoacidosis, after which he was empirically started on Piperacillin-tazobactam intravenous injection 4.5 g every eight hours after sending urine, blood, and endotracheal tube aspirate samples for culture. Two aerobic blood culture bottles (10 ml blood per bottle) were collected from two peripheral veins and incubated in the BACTEC system. One of the blood culture bottles flagged positive with a turnaround time of 40 hours. It was subcultured onto 5% sheep blood agar and MacConkey agar and incubated for 18 hours, aerobically. A smear was made from the broth and gram-

negative curved rods were identified. Blood agar showed 1-2 mm, moist, translucent, non-hemolytic colonies as shown in Figure 1. Growth was not seen in MacConkey agar. The isolate was identified as *Campylobacter coli* by MALDI-TOF MS (BioMérieux). The colony smear was done from the plate which showed uniformly stained, slightly curved, gram-negative rods, with parallel edges and rounded ends, as shown in Figure 2.



Figure 1 Colonies of *Campylobacter* seen on 5% sheep blood agar

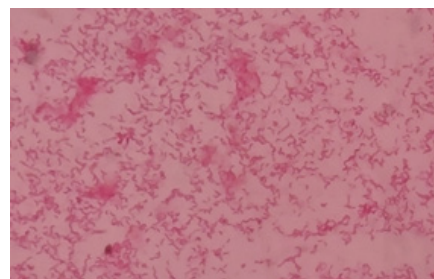


Figure 2 Gram stain of *Campylobacter coli*

He was started on Azithromycin 500 mg once daily for *Campylobacter* bacteremia. Patient improved symptomatically after treatment and the follow up blood cultures sent were sterile.

2 Discussion

Campylobacter coli are gram-negative fastidious rods. They are positive for oxidase and catalase. Over the decade, *Campylobacter* species have become more prevalent with a dramatic rise in North America, Europe, and Australia. In India, a hospital in Kolkata reported 7% of *Campylobacter* species in patients with gastroenteritis.^[7] According to a study conducted in Vellore, South India, 4.5% of children with diarrhea under the age of five tested positive for *Campylobacter jejuni* and *Campylobacter coli* using PCR. It is typically linked to elderly or immunocompromised people who also have additional co-morbidities such as cancer, splenectomy, or liver cirrhosis. If treatment is not received within 30 days of a positive blood culture, there is a 15% likelihood of death.^[8]

Contrary to a common belief, fever and gastrointestinal symptoms are not the preceding symptoms of *Campylobacter* bacteraemia.^[9] Cases of meningitis, cellulitis, reactive arthritis, and catheter-related bloodstream infections have been reported. In our case, the patient presented with an atypical presentation,

characterized by fever without associated gastrointestinal symptoms. Scrotal swelling was seen in our patient which may have been an atypical presentation of bacteremia. A similar clinical picture was seen in an elderly cirrhotic patient with *Campylobacter* infection.^[10] In this case, the age of the patient and comorbidities like diabetes and hypertension can be considered as risk factors.

A routine blood culture is missed in many cases because of low clinical suspicion, as it is a less commonly isolated pathogen and bacteremia can occur without prior gastroenteritis. The possibility of isolating *Campylobacter coli* in the blood increases if adequate samples from different sites are collected in early stages by a skilled phlebotomist with asepsis, as in our case. Since it is a slow-growing bacterium, it also requires an extended period of incubation. In a study conducted in Denver, it was seen that the growth rates of *Campylobacter coli* were slightly higher than those of *Campylobacter jejuni*.^[11] *Campylobacter* species, being non-saccharolytic, microaerophilic, and thermophilic, could easily be missed in a routine blood culture media setup. The use of automated systems like BACTEC and MALDI-TOF has a higher chance of identifying this rare organism, as conventional biochemical identification is challenging.

Since it is a treatable infection, timely diagnosis is essential for the initiation of antibiotic treatment. With automated systems, we were able to identify the causative agent and treat the patient with appropriate antibiotics. Immunocompromised individuals may require additional antibiotic therapy for better outcomes.

3 Conclusion

Campylobacter coli is a rare organism causing bacteremia which requires high clinical suspicion and aseptic sample collection with adequate volume for isolation. Early identification using an automated system and prompt treatment can aid in better clinical outcomes.

Declarations

Acknowledgments

Not applicable.

Artificial Intelligence Disclosure

The authors confirm that no artificial intelligence (AI) tools were used in the preparation of this manuscript.

Authors' Contributions

Mythilipraba Sambasivam was responsible for writing the manuscript. Hyma Kooleri Padinjare Veetil and Benedict Vinodhini contributed to reviewing and editing the manuscript. Kamini Mariyappan conducted data collection, while Pratap Upadhy and Apurba Sankar Sastry supervised the project's progress and provided overall guidance.

Availability of Data and Materials

The data analyzed are available in the medical records department, JIPMER, India.

Conflict of Interest

The authors declare no conflict of interest.

Consent for Publication

Not applicable.

Ethical Considerations

Written informed consent was obtained from the patient for publication of this case report and any accompanying images [Ethical code: JIP/IEC/2021/256]

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