JCIMCR Journal of

OPEN ACCESS Clinical Images and Medical Case Reports

ISSN 2766-7820

Case Report

Open Access, Volume 6

Campylobacter Jejuni Bacteremia in an immunocompetent 3-year-old child with concomitant diarrhea and septic arthritis symptoms: Case report and literature review

Davis Hardell, BS¹; Jake Knight, BS¹; Samarth Mishra, BS¹; Linh Kha Huynh, DO²; Jason Prince, MD²; Julisa M Patel, MD³; Hasan Samra, MD⁴; Ingrid Y Camelo, MD, MPH⁵*

¹Medical College of Georgia, Augusta University, USA.
²Pediatrics Department, Wellstar/MCG Children's Hospital of Georgia, USA.
³Allergy-Immunology and Pediatric Rheumatology Division, WellStar/MCG Children's Hospital of Georgia, USA.
⁴Microbiology Department, Wellstar/MCG, USA.
⁵Pediatric Infectious Diseases Division, Johns Hopkins All Children's Hospital, USA.

*Corresponding Author: Ingrid Y Camelo

Pediatric Infectious Diseases Division, Johns Hopkins All Children's Hospital, USA. Email: icamelo1@jh.edu

Received: Apr 15, 2025 Accepted: May 15, 2025 Published: May 22, 2025 Archived: www.jcimcr.org Copyright: © Camelo IY (2025). DOI: www.doi.org/10.52768/2766-7820/3602

Abstract

We report a case of an immunocompetent 3-year-old boy who presented with fever, diarrhea, acute onset of monoarticular joint pain, and refusal to move the affected lower extremity. He was subsequently found to have concomitant Campylobacter Jejuni bacteremia. Campylobacter Jejuni bacteremia in the pediatric population is a rare event. Typically, C. Jejuni manifests as gastroenteritis with various degrees of clinical manifestations but the infection is infrequently associated with concomitant osteoarticular manifestations. However, when C. Jejuni has been found to cause bacteremia, it is generally seen in immunocompromised patients. The combination of this immunocompetent pediatric patient found to have C. Jejuni [1-3]. Jejuni bacteremia as well as the unusual clinical manifestations of septic arthritis presenting at the same time with his gastrointestinal symptoms highlights the atypical nature of this case.

Keywords: Campylobacter Jejuni; C Jejuni; Bacteremia; Septic Arthritis; Diarrhea; Pediatric.

Abbreviations: CJ: Campylobacter Jejuni; GBS: Guillain-Barre Syndrome; ED: Emergency Department; CRP: C-Reactive Protein; ESR: Erythrocyte Sedimentation Rate; MRI: Magnetic Resonance Imaging; GI PCR: Gastrointestinal Polymerase Chain Reaction; IV: Intravenous; MALDI-TOF: Matrix-assisted laser desorption/ionization-time of flight; REA: Reactive Arthritis; XLA: X-linked Agammaglobulinemia; IBS: Irritable Bowel Syndrome; ADEM: Acute Disseminated Encephalomyelitis; HLA: Human Leukocyte Antigen; SI: Sacroiliac. **Citation:** Hardell D, Knight J, Mishra S, Kha Huynh L, Prince J, et al. Campylobacter Jejuni Bacteremia in an immunocompetent 3-year-old child with concomitant diarrhea and septic arthritis symptoms: Case report and literature review. J Clin Images Med Case Rep. 2025; 6(5): 3602.

Introduction

A gram negative, microaerophilic bacterium, Campylobacter Jejuni is one of more than 20 species belonging to the campylobacter genus. According to the US Center for Disease Control and Prevention, Campylobacter Jejuni remains the most common cause of acute bacterial gastroenteritis in the US, particularly in pediatrics. Recent studies of food-borne illnesses in the US have estimated the incidence of campylobacter infections at 19.2 infections per 100,000 people [4]. C Jejuni gastroenteritis has also been documented to be associated with a variety of post-infectious sequelae such as reactive arthritis and Guillain-Barre syndrome (GBS) [5]. Despite its prevalence as a cause of gastroenteritis [6], C Jejuni has rarely been documented as a cause of bacteremia, particularly in pediatrics. To our knowledge, all reported cases of C Jejuni bacteremia in pediatrics are described in immunocompromised children. Additionally, in the reported cases of C Jejuni bacteremia in pediatrics, septic arthritis occurring concomitantly has not been reported. However, septic arthritis has been documented to occur concomitantly in adults with C Jejuni infection, such as in one case report that discusses an immunocompetent 53-year-old man with prosthetic devices who developed septic arthritis of the left hip after initially presenting with enteritis due to C Jejuni. In this report, however [7], we outline a case of C Jejuni bacteremia in a previously healthy 3-year-old male with concomitant septic arthritis and diarrhea symptoms.

Case report

A previously healthy, unvaccinated 3-year-old male presented to the emergency department due to right hip and knee pain and the inability to bear weight for 24 hours prior to admission. Additionally, the patient was febrile and had been experiencing non-bloody diarrhea for 2 days. Other family members had also experienced symptoms of gastroenteritis but none of them reported the presence of osteoarticular symptoms. Further history revealed that many animals were present in the family's house including a dog, a turtle, a cat, a pig and a duck. At the time of his presentation to the Emergency Department (ED), our patient was found to be tachycardic at 170 beats per minute, hypertensive with a blood pressure of 130/92 mmHg, and febrile at 38.0°C. Initial workup in the ED focused on the patient's fever, the hip and knee pain, and inability to bear weight. Significant findings from the physical exam performed by the orthopedics team consulted to evaluate the patient in the ED included an inability to bear weight on the right lower extremity, along with discomfort with manipulation of the right hip and upon flexion and extension of the right knee, and resistance to passive range of motion when the hip was held in a flexed, abducted, and externally rotated position. There were no signs of erythema in the affected area. Blood cultures were obtained and C-Reactive Protein (CRP) obtained in the ED was elevated at 6.174 mg/dL (RR<0.5 mg/dL), as well as erythrocyte sedimentation rate (ESR) at 35 mm/hr (RR 0-19 mm/hr). His white blood cell count was 10.8 x 10³ cells/mm3 (RR 4.5-11 x 10³ cells/mm³). X-ray of the right knee was positive for a small right knee joint effusion without fracture or dislocation while x-rays of the right hip and femur had normal findings. Based upon his initial presentation, the patient met only 1 of the 4 Kocher criteria for septic arthritis; however, given the severity of his symptoms,

dic surgery team recommended the patient be admitted to the pediatrics hospitalist unit for further observation. On admission, the differential diagnoses for our patient's symptoms included synovitis, septic arthritis, muscle sprain/strain, deep abscess, and osteomyelitis. The following day, the patient remained nonweight bearing on his right lower extremity. A sedated magnetic resonance imaging (MRI) with and/without contrast of the pelvis and right thigh revealed minimal bilateral hip joint effusions that appeared symmetric bilaterally. Additional findings included minimal high T2 signal and enhancement was noted on the right SI joint extending deep to the right iliacus muscle as well as the presence of no sizable fluid collections noted in the pelvis or right thigh. Furthermore, musculature seemed unremarkable. There were no reported definitive features consistent with septic arthritis, osteomyelitis, or deep abscess. Given the MRI findings, orthopedic surgery determined there was no need for any prompt procedure or surgery. Due to the patient being afebrile for >36 hrs, a normal white blood cell count, the previous MRI report, and 24 hours negative blood cultures, the patient was discharged home with a diagnosis of transient synovitis of unknown etiology. He was prescribed Tylenol and Motrin as needed for pain control with close follow-up and strict return precautions. The day following discharge, the blood culture from his admission showed growth of a gram-negative bacilli seen on gram stain at ~36 hours of incubation. The family was contacted and instructed to return to the ED for re-evaluation. Following his return to the ED, the patient was found to be tachycardic and tachypneic with a heart rate of 128 beats per minute and a respiratory rate of 28 breaths per minute. He was also hypertensive with a blood pressure of 105/93 mmHg but was afebrile with a temperature of 37°C. Physical examination revealed normal passive range of motion, no tenderness, and no swelling of his extremities bilaterally; however, he refused to ambulate. Follow up blood cultures were drawn and repeat ESR and CRP were elevated at 54 mm/hr and 5.142 mg/dL, respectively. Additionally, a FilmArray Multiplex Gastrointestinal (GI) Polymerase Chain Reaction (PCR) panel and stool cultures were obtained. He was subsequently admitted to the pediatrics floor per orthopedics recommendation and was started on intravenous (IV) Ceftriaxone 50 mg/kg pending further identification of the organism. Pediatric infectious diseases service was consulted to aid in the diagnosis and management of Gram-negative bacteremia pending final identification. FilmArray Multiplex GI PCR panel obtained was positive for Campylobacter species, but negative for any other GI pathogens detected by the assay. The follow up blood and stool cultures showed no growth. Final pathogen identification was performed by Matrix-assisted laser desorption/ionization-time of flight (MALDI-TOF) performed on bacterial isolate from positive blood culture, as Campylobacter Jejuni. Considering this new finding, ceftriaxone was stopped, and the patient was transitioned initially to 14 days of IV azithromycin due to concerns of early septic arthritis based on previously abnormal MRI report. Throughout the course of his hospitalization, he improved rapidly with regards to both his joint pain and diarrhea. On hospital day three, he was ambulating with slight pain while clinging to his bed, and his stools had also begun to become firmer. His joint pain resolved by hospital day four, he was ambulating with minimal limping, and the consistency of his stools had returned to normal by hospital day

and the patient's non-ambulatory state, the pediatric orthope-

Case	Age/Sex	Immunological status	Clinical presentation	Treatment	Duration of treatment
van den Bruele et al, 2010 [3]	15 year/M	XLA	Appetite loss	IV Meropenem	2 weeks
			fever malaise	PO Erythromycin	4 weeks
			anorexia	PO Doxycycline (following recurrence)	4 weeks
Kim et al, 2017 [2]	18 year/M	Hypogammaglobulinemia	Pneumonia cellulitis (leg) diarrhea	IV Augmentin & Amikacin	8 days
				PO Roxithromycin	8 days
				IV Meropenem & PO Doxy- cycline	3 weeks

seven. His labs also improved, with CRP down to 1.072 mg/dL on hospital day three, and 0.586 mg/dL on hospital day five. The patient was discharged home after completing 10 days of IV azithromycin. Following discharge, he received the final four days of his azithromycin course orally without any side effects due to complete resolution of osteoarticular symptoms prior to discharge. Upon follow-up in the infectious disease clinic, the parents reported that after a period of complete normalization of his gait and ambulatory status and no pain or fever for two weeks including at time of discharge, his limping had returned 48 hours prior to the appointment. He did not have any other associated symptoms including urethritis, or conjunctivitis. On physical examination, he was noted to have subtle resistance to passive range of motion when the hip was held in a flexed, abducted, and externally rotated position, these findings were interpreted as possible asymmetric oligoarthritic of the Sacroiliac (SI) joint. He was then evaluated by pediatric rheumatology and diagnosed with reactive arthritis (ReA) secondary to Campylobacter Jejuni infection due to history of diarrhea plus bacteremia with Campylobacter Jejuni and his new clinical findings. An ESR was obtained and reported normal at 15 mm/hr. Patient was initiated on ibuprofen as needed for pain. At 2 weeks follow up, his symptoms have completely resolved.

Discussion

Campylobacter remains the most common cause of gastroenteritis in the pediatric population. Despite this, it has rarely been reported to be the cause of blood stream infections in pediatric patients. More often than not, documented cases of bloodstream infections with this organism happen in patients with immunodeficiencies such as X-linked agammaglobulinemia (XLA) and hypogammaglobulinemia. Additionally [1,2], C Jejuni bacteremia has also been reported in a patient with Acute Lymphoblastic Leukemia, further highlighting the tendency for this organism to cause bacteremia in patients with a variety of underlying immune system dysfunctions. While the reasoning for this occurrence is still under current research, it has been hypothesized that deficiencies in both IgA and IgM could make one more susceptible to Campylobacter infections [3]. Conversely, our patient described here, to our knowledge, was a healthy 3-year-old with no history of recurrent infections, hospital admissions or immunodeficiencies. It is worth noting, that due to our patient's unvaccinated status, his immune system's response to a vaccination had not been evaluated. Additionally, he has never received a work-up to assess immune system function, which in combination with his unvaccinated status limits our knowledge regarding his immune system's response [8]. In addition to being associated with patients with immunodeficiencies, C Jejuni bacteremia has also been documented to be

associated with a variety of post-infectious sequelae. Sequelae that have been documented with C Jejuni gastroenteritis include post-infectious irritable bowel syndrome (IBS), GBS, acute disseminated encephalomyelitis (ADEM), and ReA. ReA is a post infectious disorder considered to be under the umbrella of spondyloarthropathies, a group of disorders defined by arthritis, acute anterior uveitis, enthesitis, and positive human leukocyte antigen (HLA)-B27 [6,9-11]. However, not all patients have all these characteristics or experience them at the same time. Many patients are HLA-B27 negative (20-50%) [12,13]. Reactive arthritis is characterized by the triad of arthritis, conjunctivitis, and urethritis/cervicitis. By definition, Rea is an inflammatory arthritis that manifests several days to weeks after a gastrointestinal or genitourinary infection. The infectious etiology can be pharyngeal, enteric or genitourinary. The pathophysiology of Rea is thought to be due to the release of inflammatory cytokines by activated T-lymphocytes within the synovium because of the presentation of bacterial antigens by antigen-presenting cells that then leads to the inflammation within the joint. Additionally, there is thought to be a genetic component to the pathophysiology as well, specifically with regards to HLA-B27, as it is estimated that half of patients with Rea are HLA-B27 positive [14]. HLA-B27's role is suspected to be due to aiding in the activation of the inflammatory response. The most common pathogens associated with post infectious reactive arthritis include Salmonella, Shigella, Yersinia, Campylobacter and Chlamydia trachomatis. Less common pathogens include Mycoplasma pneumoniae, Chlamydia pneumoniae, and Clostridium difficile [14]. Enteric pathogen triggered Rea can occur at any age. Rea associated with Chlamydia is most commonly seen in adolescents. Rea tends to be a self-limiting disorder, often resolving within a few weeks, and up to 12 months in certain cases. Some patients may experience recurrent flares of arthritis and a subset of patients (up to 25%) may evolve into chronic arthritis [15]. Our patient's primary complaint at the time of presentation was diarrhea concomitantly happening with clinical symptoms consistent with septic arthritis and bacteremia, making it unlikely that he had Rea at time of presentation. Most likely, this patient presented with early septic arthritis with possible seeding of the joint space with bacteria. Typically, Rea associated with Campylobacter occurs following the resolution of diarrheal symptoms [19]. It is also well established that Rea tends to affect the joints of the lower extremity such as the knee and ankle. Although our patient did experience symptoms in his knee, the involvement of his right SI joint, an atypical location for ReA to occur, provides additional support that our patient's arthralgias were not due Rea but rather a bacterial seeding of the joint space [9]. In addition to Rea, there have been reports of C. Jejuni bacteremia associated with other osteoarticular manifestations such as osteomyelitis and septic arthritis. However, the reported cases in these instances have predominately occurred in adult patients, with one such case report from Denmark describing vertebral osteomyelitis in a 79-yearold man who was immunocompetent. Another reported case described bilateral femoral osteomyelitis occurring in a 54-yearold female with acquired hypogammaglobulinemia [16]. Additionally, a case of septic arthritis found to be associated with C [17]. Jejuni, also occurred in an immunocompetent adult. These adult case reports support the association between [17]. C Jejuni bacteremia and various osteoarticular diseases in this population, further underscoring the rarity of this presentation in pediatric patients. As a result of the infrequency with which Campylobacter bacteremia is diagnosed in pediatrics, there exists a lack of consensus regarding the appropriate antimicrobial management along with inconsistencies in duration of treatment. In our case, a 14-day combination of IV and oral macrolides were selected following a single dose of a third-generation cephalosporin. Literature documenting C Jejuni bacteremia cases has outlined a variety of antimicrobial regimens implemented as treatment. One reported case in a 15-year-old patient with XLA used a combination of 2 weeks of IV meropenem followed by 4 weeks of oral erythromycin [1]. The above patient was then transitioned to four weeks of oral doxycycline the following year when re-infection in the patient occurred.[1] Another case involving an 18-year-old with hypogammaglobulinemia utilized a few different antibiotic combinations due to several re-admissions over the course of a year. These included an initial course of IV Augmentin and amikacin for 8 days, followed by 8 days of oral roxithromycin a month later, and finally IV meropenem and oral doxycycline three months afterwards. Additionally, the use of fluoroquinolones have been reported to be a successful treatment for Campylobacter Jejuni and Coli bacteremia, with one study from Australia examining hospitalizations over a 9-year period, though it was not limited to pediatric patients, as the median age of those with bacteremia in this study was 59.5 years with a range from 12 years to 90 years of age [2]. The aforementioned cases and their treatment regimen are further outlined in Table 1 [18]. Another factor potentially contributing to the difficulty of developing a consensus treatment regimen is the high rates of resistance to a variety of antibiotic classes that has been observed in Campylobacter species. C. jejuni is usually sensitive to macrolides, fluoroquinolones, carbapenems, and aminoglycosides [18]. Macrolides, specifically azithromycin, have been an antibiotic of choice when it comes to treatment of C. Jejuni with fluoroquinolones being an alternative option. The rate of macrolide resistance has remained relatively stable over the past decade while fluoroquinolone resistance has steadily increased at varying rates across the world, with this increase coinciding with increased use of fluoroquinolones in poultry and other animal products that has occurred across the globe over the past 30 years. The use of fluoroquinolones in poultry products in the US has since been banned [19]. Despite this, however, rates of infections of fluoroquinolone-resistant Campylobacter will likely remain elevated due to the continued circulation amongst poultry flocks [19].

Conclusion

Campylobacter infections are a common cause of gastroenteritis in pediatric patients, but rarely the disease leads to a bloodstream infection. When it does, it is usually associated with immunoglobulins deficiencies or malignancy. Our patient was a healthy, unvaccinated 3-year-old without known immunodeficiencies, highlighting the atypical nature of this presentation. Furthermore, he presented at the same time with diarrhea and symptoms compatible with septic arthritis. Making the differentiation between septic arthritis and Rea is crucial to establish prompt therapy as it differs greatly between both diagnoses. Additionally, this case underscores the challenge in establishing standardized treatment protocols for Campylobacter bacteremia in pediatrics, resulting from the diverse antibiotic resistance patterns and variability in treatment regimens reported in the literature. As a result, there is a need for continued documentation of Campylobacter bacteremia cases such as this one to better define treatment courses and outcomes.

Acknowledgements: None.

Declaration of conflicting interest: The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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