

A Case of Septic Arthritis of the Shoulder Due to *Yersinia enterocolitica* with Review of the Literature

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***Yersinia enterocolitica* infection rarely can cause extra-intestinal infections. We present a case of septic arthritis of the shoulder due to this organism in an elderly man with liver and cardiac disease. We review previously published cases of *Y. enterocolitica* septic arthritis, and discuss risk factors and management.**

Keywords. *Yersinia enterocolitica*; septic arthritis.

Yersinia enterocolitica is a gram-negative coccobacillus responsible for enterocolitis and other gastrointestinal infections. It is transmitted through contaminated food or water, or by blood transfusion. Less commonly, musculoskeletal infections can occur, including osteomyelitis, discitis, and septic arthritis. We report a case of septic arthritis caused by *Y. enterocolitica* and review 3 decades of the medical literature on this rare diagnosis.

CASE

A 70-year-old man was transferred to our hospital for management of congestive heart failure. He had a history of alcoholic cirrhosis, right-sided heart failure, diverticulosis, and chronic anemia, for which he took iron

supplementation. He occasionally ate raw ground pork and beef. Two weeks prior to admission he developed abdominal distension and shortness of breath. One week prior to admission, he started having swelling and pain in his right shoulder and increasing lower extremity edema. He reported fatigue and anorexia but no nausea, vomiting, abdominal pain, or diarrhea. He presented to an outside hospital with fever to 103 degrees Fahrenheit. He had blood cultures drawn, was given a dose of vancomycin and piperacillin/tazobactam, and then transferred to our hospital for further management.

At our hospital, he had persistent fevers as well as right shoulder swelling and pain with range of motion. Plain films of the shoulder showed degenerative changes of the glenohumeral joint with no fracture and unremarkable soft tissues. A shoulder aspirate done 1 day after initiation of empirical antibiotics was bloody and turbid, with 180,000 leukocytes (98% neutrophils). Gram stain showed abundant neutrophils but no organisms. He was started on intravenous vancomycin to treat presumed septic arthritis and was taken to the operating room for irrigation and debridement of the shoulder. Blood cultures from the outside hospital were identified as gram-negative rods, so intravenous cefepime was added. Those blood cultures were speciated as *Y. enterocolitica*, sensitive to ciprofloxacin. The shoulder aspirate subsequently grew the same strain of *Y. enterocolitica*. The rest of his cultures from our hospital, including blood, urine, and ascitic fluid, were negative. He defevered and was discharged on oral ciprofloxacin to complete a 6-week antibiotic course. Unfortunately, the patient died 1 month later of heart failure. There was no evidence of recurrent infection at the time of death.

METHODS

We searched PubMed using MeSH terms “*Yersinia enterocolitica*” combined with “septic arthritis.” Based on this search, we identified a total of 15 previously reported cases, including 5 cases published in French language journals but summarized in an English language case series [1]. Data on patient demographics, joints involved, risk factors, culture source, antibiotic choices, and treatment outcome were available for all 15 cases.

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Information on antibiotic duration was available for 9 of the 14 cases that survived the infection.

DISCUSSION

In this case report, we present a patient with *Y. enterocolitica* septic arthritis of the shoulder. In addition, we identified 15 previously published cases of *Y. enterocolitica* causing septic arthritis from 1970 to 2010 (see Table 1). The age range was 1–85 years old, with an average age of 57 years (standard deviation 25.3). Joints involved included hip ($N = 6$), shoulder ($N = 5$), knee ($N = 4$), and wrist ($N = 1$). The most common preexisting medical conditions were degenerative joint disease ($N = 6$), cirrhosis ($N = 4$), and alcoholism ($N = 3$).

Y. enterocolitica transmission occurs mainly through food, especially pork products. Other sources include untreated surface water and blood transfusions, the latter because the organism proliferates in iron-rich environments at refrigerator temperatures [2]. Our patient presumably was infected through the oral route, perhaps from the raw pork that he occasionally ingested. Oral iron supplementation has been reported as a risk factor for *Y. enterocolitica* septicemia [3–5]. Our patient’s other

risk factors included cirrhosis, alcoholism, malnutrition, and degenerative joint disease of the shoulder.

Culture of joint aspirate was positive for *Y. enterocolitica* in 14 of the 16 cases (88%) reviewed. Eight of the cases also had positive blood cultures (50%). Treatment of *Y. enterocolitica* septic arthritis had a high success rate in this series (88% survival). In addition to antibiotics, all but one of the patients who survived had a surgical procedure to irrigate and debride the joint. The most commonly pathogenic serotype of *Y. enterocolitica* produces chromosomally mediated β -lactamases and is resistant to penicillin, ampicillin, macrolides, and most first-generation cephalosporins [6]. In our case, the isolate was sensitive to fluoroquinolones, aminoglycosides, and late generation cephalosporins. He was treated with a fourth-generation cephalosporin and transitioned to an oral fluoroquinolone. In most of the cases in our series, several antibiotics were employed, often sequentially rather than in combination. The most common classes used were aminoglycosides ($N = 9$), penicillins (6), chloramphenicol (6), third-generation cephalosporins (6), tetracyclines (4), and fluoroquinolones (4) (see table; because many patients received more than 1 antibiotic during their treatment course, the total number of antibiotic classes employed adds to more than 16). There are no comparative data, but given the efficacy, safety, and tolerability of third-generation cephalosporins and fluoroquinolones, those are currently preferred agents. Aminoglycosides have had varied success [7] and, given their toxicity, should be considered second-line agents reserved for patients for whom fluoroquinolones or late-generation cephalosporins are not available due to drug allergy or unfavorable drug interaction.

There have been no controlled trials to guide duration of antibiotic treatment for *Yersinia* extra-intestinal infection, but the current recommendation is 3 weeks of therapy, based on case series, where duration ranged between 2 and 6 weeks [7]. In our reviewed cases, when reported, treatment duration ranged from 3 to 7 weeks. Our patient received 6 weeks of antibiotics because there was uncertainty about whether the surrounding bone was also infected.

Septic arthritis should be differentiated from reactive arthritis, which is a well-known post-infectious sequela of *Y. enterocolitica* infection. Reactive arthritis is associated with HLA-B27, an allele present in an estimated 6.1% of the US population, with higher prevalence among non-Hispanic whites at 7.5% [8]. As opposed to septic arthritis, *Yersinia* reactive arthritis may present several weeks after acute enteric infection with sterile axial joint arthritis, peripheral oligoarthritis, enthesitis, and dactylitis [9].

In conclusion, septic arthritis is a rare manifestation of *Y. enterocolitica* infection. Important risk factors include iron overload, cirrhosis, and degenerative joint disease. Treatment should include surgical irrigation and debridement. Preferred antibiotics include late-generation cephalosporins or fluoroquinolones.

Table 1. Cases of *Y. enterocolitica* Septic Arthritis, including the Current Case [1, 10–21]

Time frame	1970–2010
Number of cases	16
Age range	1–85 (mean age 57, standard deviation 25.3)
Joints involved	Hip ($N = 6$) Shoulder (5) Knee (4) Wrist (1)
Most common risk factors	Degenerative joint disease ($N = 6$) Cirrhosis (4) Alcoholism (3)
Positive synovial fluid culture	88%
Positive blood culture	50%
Survival	88%
Antibiotics classes used (N = number of cases) ^a	Aminoglycosides ($N = 9$) Penicillins (6) Chloramphenicol (6) Third-generation cephalosporins (6) Tetracyclines (4) Fluoroquinolones (4) Second-generation cephalosporins (3) Rifampin (2) Colistin (1) First-generation cephalosporins (1) Clindamycin (1) Trimethoprim-sulfamethoxazole (1)

^a In many cases, more than 1 antibiotic agent was used, so the number of antibiotics listed exceeds the total number of cases.

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