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CASE REPORT

Non-typhoidal *Salmonella* septic arthritis in an immunocompetent child with a pharyngeal streptococcal infection

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Summary We report the case of an immunocompetent child who showed monoarticular arthritis and fever, preceded by pharyngitis and arthralgias. Because group A β -hemolytic Streptococcus had been detected in the pharyngeal swab, erythromycin was given on admission. However, based on ultrasound examination, therapy with ceftriaxone and joint fluid drainage were promptly performed, and a rapid and full recovery followed. Meanwhile, *Salmonella enterica* infection was revealed in blood and joint fluid. Our case suggests that septic arthritis caused by a non-typhoidal *Salmonella* infection may occur without gastrointestinal manifestations and concomitantly with a pharyngeal streptococcal infection.

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Introduction

Non-typhoidal *Salmonella* serotypes (NTSS) are major causes of foodborne infections, which most often result in self-limited acute gastroenteritis.¹ However, approximately 5% of individuals with a gastrointestinal illness caused by NTSS develop bacteremia.² Septic arthritis is a rare consequence of *Salmonella* bacteremia, usually occurring in patients with underlying diseases, such as sickle cell disease and systemic lupus erythematosus (SLE).³ We report on an immunocompetent child with monoarticular septic arthritis without gastrointestinal manifestations due to *Salmonella enterica*, concomitantly with group A β -hemolytic Streptococcus (GAS) pharyngitis.

Case report

A 5-year-old boy was admitted because of a 7-day history of fever (38.5 °C) and arthralgias, particularly on the right elbow. There was no history of trauma or injections. On examination, the child showed signs of right elbow joint involvement including warm-skin, swelling, edema, erythema, pain, and limited range of motion. The remainder of his physical examination was unremarkable. His white blood cell count (WBC) was $13.22 \times 10^9/l$ with 61% neutrophils, 34% lymphocytes, 4% monocytes, and 1% eosinophils. The erythrocyte sedimentation rate (ESR) was 83 mm/h and C-reactive protein (CRP) was 15.34 mg/dl. Results of serum electrolyte, blood urea nitrogen, glucose, and liver function tests were normal. Since a pharyngeal swab, which had been performed before admission, yielded a GAS infection and the anti-streptolysin O (ASO) titer was 311 IU/ml (normal <200), therapy with erythromycin

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was started. On the following day, a chest radiograph, electrocardiogram, and echocardiogram were unremarkable, while ultrasound examination of the right elbow showed corpuscular fluid. An arthroscopy was performed and the joint fluid drained: WBC was $1.735 \times 10^9/l$ and Gram-negative bacilli were found in the joint fluid. *S. enterica*, which was found to be susceptible to third generation cephalosporins, was identified both in the joint fluid and blood cultures. The Widal–Wright test was negative. Therapy with ceftriaxone (1 g/24 hours intravenous) was given for two weeks. Meanwhile the ASO titer increased to 641 IU/ml, WBC was $9.650 \times 10^9/l$, ESR was 53 mm/h, and CRP became negative. Immunoglobulin levels and T- and B-cell subset lymphocytes were within normal limits. At a 1-month follow-up, the child was in good clinical condition with full recovery of the right elbow, while all laboratory tests were normal except that the ASO titer was 529 IU/ml.

Discussion

Acute arthritis with sepsis occurs rarely in immunocompetent children. It is generally caused by bacterial infections starting from the skin (after cutaneous lesions) or throat (i.e., *Staphylococcus* or *Streptococcus* species). In developing countries, although invasive disease due to serovar Typhi as well as NTSS is rather common in children younger than 5 years of age, septic arthritis caused by *Salmonella* has been reported in <1% of the cases, often resulting in serious sequelae.^{1,4,5} In immunocompetent children, retrospective studies by Zaidi et al. and Galanakis et al. reported septic *Salmonella* arthritis in only two of 144 (1.38%) and one of 1087 (0.09%) patients, respectively.^{6,7} In another retrospective review of culture-confirmed non-typhoidal *Salmonella* cases, Fisker et al. showed that 233 of 3328 patients (7%) had complicated diseases and 135/233 (57%) experienced an extraintestinal infection; bone and joint infections occurred in only six patients (0.2%). In a multivariate analysis, immunosuppression was a risk factor associated with the development of extraintestinal *Salmonella* infections (odds ratio 3.1, 95% confidence interval 1.5–6.2, $p = 0.001$).⁸ In the study by Sirinavin et al., including 172 patients <15 years of age, from whom at least one nonfecal and nonurinary specimen was culture-positive for non-typhoidal *Salmonella*, only three cases (1.7%) of septic arthritis occurred; immunocompromising diseases were found in 19% of 74 infants and 77% of 98 children.⁹ The absence of gastrointestinal manifestations was not reported in any case of septic arthritis occurring in immunocompetent children. Several studies have suggested the occurrence of elevated virulence and invasiveness of certain NTSS, including *S. enterica* and subsp *enterica* serovars Enteritidis and Typhimurium.^{8,10–12} In a retrospective analysis, Hsu et al. observed that the predictors of primary bacteremia were age, presence of SLE, group B, C, or D *Salmonella* infection, and immunodeficiency.¹³ In our immunocompetent child, NTSS infection, which occurred without gastrointestinal manifestations although presumably acquired by the usual oral–fecal route, spread to the bloodstream causing a septic fever with arthralgias and a subsequent monolateral arthritis. Since the boy had a pharyngeal GAS infection, we can presume that the immune defenses

were decreased by the streptococcal infection and the consequent cytokine-induced inflammatory condition, making the *Salmonella* infection more invasive. The localization of *Salmonella* to the right elbow, which could have been favored by the child's activity or body position, was probably related to a local vasculitis and consequent thrombosis. A recent experimental study in mice on the dissemination of *S. enterica* to the brain showed the presence of thrombosed subarachnoid vessels in the areas of meningitis.¹⁴ In conclusion, two interesting aspects are present in our case: (1) monoarticular arthritis by non-typhoidal *Salmonella* infection was associated with sepsis but not gastrointestinal manifestations; (2) an inappropriate antibiotic therapy was initially given because the pharyngeal swab yielded group A β -hemolytic *Streptococcus*, which was considered the cause of arthritis, but the yield of *S. enterica* from the joint fluid and blood suggested the correct therapy with ceftriaxone.

Conflict of interest: No conflict of interest to declare.

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