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Case Report

Septic arthritis caused by *Salmonella enterica* serotype Rubislaw: A case report

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Abstract

An eleven-year-old boy presented with fever and hip pain, with limited mobility of the right side of the hip. Computed tomography scan revealed an increased volume of the right coxo-femoral joint, requiring surgical drainage of purulent secretion, from which *Salmonella enterica* was isolated. After four weeks of treatment with third-generation cephalosporin, he was discharged with a favorable evolution. Invasive disease caused by *Salmonella spp* represents a small proportion of salmonellosis cases, although it is responsible for greater rates of hospitalization, morbidity and mortality. Children under 5 years, elders over 60 years and immunodeficient patients have greater risk for invasive salmonellosis.

Keywords: Arthritis. *Salmonella spp*. Child.

INTRODUCTION

The *Salmonella spp* are gram-negative facultative anaerobic bacilli from the *Enterobacteriaceae* family, responsible for infections in humans and animals. There are two species of *Salmonella*: *S. enterica* and *S. bongori.* The first one has six subspecies: *enterica, salamae, arizonae, diarizone, houtenae,* and *indica*; the second has no subspecies. It is also possible to determine the serotypes of *Salmonella*, depending on the cell wall and flagellum proteins, through protein electrophoresis and genetic sequencing, adding up more than 2500 serotypes[1].

The main clinical manifestation of salmonellosis is diarrhea, although invasive disease, with greater rates of morbidity and mortality, may occur, evolving into bacteremia or localized infection affecting the lungs, central nervous system, kidneys, subcutaneous tissue, bones, and joints. The invasive forms of the disease usually affect children, elders, immunosuppressed and undernourished patients, and carriers of hemoglobinopathies[2,3].

Joint disease caused by *Salmonella spp* in healthy children is an unusual event, with an estimated incidence of 0.1 to 0.2% of septic arthritis cases among children[4]. The aim of this study was to describe the case of a healthy child, who presented with septic arthritis caused by *Salmonella enterica* serotype Rubislaw.

CASE REPORT

An eleven-year-old boy was taken to the emergency care unit on account of a five-day history of pain in the right side of the hip, associated with fever and difficulty walking from the second day after the onset of pain. He had no history of vomiting, diarrhea, trauma, surgery, previous hospitalization, or chronic disease. The family mentioned that the patient had used a non-steroidal anti-inflammatory (diclofenac) drug during the past five days.

At the moment of admission, the boy presented with an axillary temperature of 37.4ºC, an antalgic posture with pain and restricted internal and external rotation of the hip, and inability to extend the right coxo-femoral joint. Laboratory test results revealed: hemoglobin: 13.4 g/dL, leukocytes: 8410 /mm^3 (5% rods, 73% segmented, 20% lymphocytes, and 2% monocytes) and platelets: 254,000/mm^3, reactive C protein: 48 mg/L (reference: <3 mg/L). Serology for the human immunodeficiency virus yielded negative results, and

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hemoglobin electrophoresis confirmed the patterns HbA and HbA2. A computed tomography scan of the hip revealed an increased volume of the right coxo-femoral joint, with no findings on the radiogram or bone scintigraphy.

Guided by the clinical findings and the laboratory tests, the health assistance team performed a surgical arthrotomy, with drainage of a reduced quantity of purulent secretion and initiated antibiotic treatment with a first-generation cephalosporin (cefazolin).

By the fifth day of treatment after the surgical drainage, the boy was still experiencing fever daily, and the laboratory finally identified *Salmonella enterica* serotype Rubislaw in the secretion obtained during surgery. The antibiogram revealed that the organism was sensitive to ampicillin, sulfamethoxazole-trimethoprim, and ceftriaxone, and the latter drug was used to complete the intravenous treatment (100 mg/kg/day) over four weeks. The family of the patient was investigated via coproculture, and the asymptomatic carrier of the *Salmonella spp* was discovered to be his grandfather, who lived in the same residence. The patient remained well in the follow up, with no sequelae after the treatment.

DISCUSSION

Salmonellosis is an infectious disease that involves animals in its cycle, and some of those animals are part of the global population diet. In the USA, the FoodNet Institute revealed 7895 positive cultures for *Salmonella spp* in a four-year study. Only 6.8% of those cases were from supposedly sterile fluids (invasive diseases). From that 6.8 %, 96% were isolated from the blood and only 3% from the bones and synovial fluid. The majority of those cases affected children younger than 5 years and elders older than 60 years. The hospitalization time, and morbidity and mortality rates were greater in the group with invasive disease when compared with the group in which only the gastrointestinal tract was affected[3].

A retrospective study that included only the pediatric population showed 1087 positive cultures for *Salmonella spp* in a ten-year period. From those, 443 patients were younger than 14 years and only one of them presented with joint involvement[5]. Other retrospective studies have demonstrated an association between invasive disease caused by *Salmonella spp* and immunosuppression, as well as age younger than 5 years (especially younger than one year), hematological malignancies, biliary diseases, and thalassemia[6,7].

Although septic arthritis caused by *Salmonella spp* is a rare condition in developed countries, that diagnosis must be considered in the undeveloped ones, especially those with endemic salmonellosis. Some prospective and retrospective studies conducted in undeveloped countries have revealed high incidences of septic arthritis caused by *Salmonella spp*, although such finding could not be confirmed by other studies conducted in the same continent as the previous ones[7]. The majority of the studies about septic arthritis or osteomyelitis caused by *Salmonella spp* were published as case reports or literature reviews[8,9].

The bacteria isolated from the synovial fluid in the case described here is *Salmonella enterica* serotype Rubislaw. This serotype is usually described as a commensal inhabitant of the guts of reptiles, together with other serotypes of *Salmonella enterica*, supposedly spread in the environment with the animal's feces. It can also be found in herbs and spices[10]. The literature describes cases of gastrointestinal and invasive disease of the central nervous system caused by serotype Rubislaw; in both cases, contact with reptiles was evident[11,12].

Since *Salmonella spp* are intracellular bacteria, treatment with extracellular antibiotics is not effective. The use of a third-generation cephalosporin is usually indicated, as in the case described here, due to its intracellular penetration. The recommended dose of ceftriaxone is 100 mg/kg/day[7].

It is known that septic arthritis caused by *Salmonella spp* is a rare event, especially among healthy children. This paper intends to show that the isolation and correct identification of the etiological agent of the arthritis is crucial for the treatment, since the empirical antibiotics for general septic arthritis are not effective against *Salmonella spp*.

Conflict of Interest: The authors declare that there is no conflict of interest.

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