

## ***Salmonella* Septic Arthritis in a 3 year Old Immunocompetent Child**

**Preeti Madan<sup>1</sup>, Vijay Jain<sup>2</sup>, R. K. Mahajan<sup>1</sup>, Shweta Sharma<sup>1</sup>,  
Nandini Duggal<sup>1</sup>, Charoo Hans<sup>1</sup> and R.K. Arya<sup>2</sup>**

<sup>1</sup>Department of Microbiology, <sup>2</sup>Department of Orthopedics,  
PGIMER and Dr. R.M.L Hospital, New Delhi - India.

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**We report an extremely rare case of *Salmonella typhi* septic arthritis in a 3-year old immunocompetent patient. She presented with inability to bear weight on right hip joint and diagnosis was confirmed after bacterial isolation. The child responded favourably to intravenous antibiotics and surgical procedure.**

**Key words:** *Salmonella typhi*, Septic arthritis, HIP, Immunocompetent.

*Salmonella* infection is endemic in developing countries. Clinical manifestations of salmonellosis vary from acute gastroenteritis to bacteremia, carrier state or localised infections of meninges, joints, wounds or gallbladder<sup>3</sup>. Septic arthritis and osteomyelitis are uncommon due to this organism<sup>13</sup>. Most cases of *Salmonella* septic arthritis occur in the setting of hemoglobinopathies, connective tissue disorder, lymphoma, previous joint trauma or immunosuppressive states<sup>7</sup>. *Salmonella typhi* as a causative agent is rare and even rarer in pediatric age group<sup>1</sup>. Herein we report an immunocompetent child with monoarticular septic arthritis of hip without gastrointestinal manifestations due to *Salmonella typhi*. To the best of our knowledge there have been only two case reports of *Salmonella typhi* septic arthritis in otherwise previously healthy individuals from India<sup>1</sup>.

### **Case report**

A previously healthy three year old child presented to the department of Orthopedics with complaints of inability to bear weight on right lower limb. She was unable to stand and walk. In addition, the patient had high grade fever for past one month and was on treatment for same from a private practitioner. Despite treatment, the patient developed pain in right hip joint which gradually worsened until the child was unable to even bear weight on right lower limb. There was no history of trauma in the past. At the time of presentation, child was febrile (39°C) with pallor and no obvious lymphadenopathy. Physical examination was normal except for the tenderness on right hip joint anteriorly with slightly high up greater trochanter of femur. The movements were restricted and painful. Systemic examination revealed no abnormality. A provisional diagnosis of septic arthritis was made. Laboratory findings showed normocytic hypochromic anaemia. The white blood cell count was  $12.7 \times 10^9/L$  (Polymorphs 59%, Lymphocytes 37%, Eosinophils 4%), Hemoglobin 9.1 gm% and platelet count  $410 \times 10^9/L$ . peripheral blood film was negative for sickle cells. Erythrocyte sedimentation rate was 78mm in the first hour.

\* To whom all correspondence should be addressed.  
E-mail: preetimadan07@gmail.com

Aspartate aminotransferase and alanine aminotransferase were within normal range. Creatinine was 1 mg/dl. Serology for rheumatoid factor and antistreptolysin titre was negative while serum immunoglobulins IgG (1093 mg%), IgM (231.2 mg%), IgA (233 mg%) and complement levels were normal. X-ray pelvis of both hips showed decreased hip joint space on right side with subluxation of femoral physis, along with osteopenia and irregularity of physis, neck region and acetabular margin. An ultrasound examination of right hip region revealed a well defined walled off collection just anterior to the femoral head with debris in it. Computerised Topographic scan showed gross subluxation of the right hip with destruction of femoral epiphysis and increased joint space. Mild hypodense inflammatory changes in the vicinity of right physis was also present. On ultrasound guided aspiration, about 2 ml light yellow fluid was obtained. Joint fluid aspirate from the hip joint was processed as per standard protocol. Gram stained smear showed plenty of polymorphonuclear cells but was negative for bacteria. The aspirated joint fluid was inoculated on to the blood agar and MacConkey agar. Next day, the joint fluid culture grew a non lactose fermenter which was confirmed as *Salmonella typhi* by agglutination test with specific antisera. The isolate was susceptible to all tested antibiotics by Kirby Bauer method. The successive blood cultures were however sterile. Widal test showed titers of 1: 240 for TO and TH. Clinical diagnosis of septic arthritis was confirmed and patient was taken for arthrotomy under coverage of intravenous antibiotic ceftriaxone. Following surgical drainage and continued ceftriaxone therapy, she experienced a rapid improvement. Four days after drainage, she became afebrile. She received 2 weeks of ceftriaxone therapy. The patient was discharged on antibiotics. After two weeks of surgery, the erythrocyte sedimentation rate was normalised within four weeks and now she is able to stand and walk normally after 7 months of follow up.

## DISCUSSION

Salmonella infection is endemic in developing countries. Salmonella causes broad spectrum of human illnesses from gastroenteritis, typhoid fever and bacteremia to the asymptomatic

carrier state<sup>14</sup>. Salmonella has been recognised as a causative organism of septic arthritis however it is a rare cause<sup>5</sup>. In a review of 95 cases of septic arthritis, only 1% caused by salmonella of which only 5% salmonella arthritis associated with pediatric cases. It appears that the spread of bacilli to joints results from the secondary bacteremia. Salmonella osteomyelitis is usually associated with underlying diseases including hemoglobinopathies, previous joint trauma, surgery, lymphoma, systemic lupus erythematosus (SLE) or immunocompromised individual<sup>13</sup>. Our patient did not have any of these predisposing factors and was apparently an otherwise healthy child. Only 12 cases of septic arthritis caused by *Salmonella typhi* with predilection to sacro-iliac joint followed by hip have been reported in the literature (Table 1)<sup>1, 2, 4, 8, 9, 10, 12, 15</sup>. Out of 12 reported cases only 6 were of pediatric age group. To the best of author's knowledge ours is the second youngest child. Salmonella that causes septic arthritis is almost invariably a non-typhoidal species like *Salmonella typhimurium* and *Salmonella choleraesuis*<sup>6, 11</sup>. In majority of septic arthritis cases, salmonella etiology is not suspected and diagnosis is made after its isolation<sup>7</sup>, similar to the index case. The patient was suspected for tubercular arthritis as tuberculosis being more common in this country. In our patient, Salmonella was isolated and confirmed as *Salmonella typhi* from the joint fluid aspirate. With confirmed isolate, high serum Widal titres (TO and TH) of 1:240 and negative previous history suggests the diagnosis of *Salmonella typhi* septic arthritis. There was no pre-existing disease. The immunoglobulin levels were within normal range. The child had an episode of diarrhoea or abdominal pain as there have been reports of salmonella reactive arthritis about two weeks after enteric fever<sup>4</sup>. Of note, only half of the patients with Salmonella septic arthritis give a history of diarrheal illness. The child with inability to bear weight poses a diagnostic dilemma for the physician because of varied causes responsible for the limp and difficult to pinpoint the exact area of joint involved in a young child<sup>14</sup>. Septic arthritis is associated with *Staphylococcus aureus* infections although; *Hemophilus influenzae*, *Streptococcus* species and *Neisseriae gonorrhoeae* have also been reported<sup>14</sup>. *Salmonella typhi* arthritis is unusual in previously

**Table 1.** Cases of septic arthritis caused by *Salmonella typhi* in paediatric patients

Author	year	No. of cases	Age	Sex	Predisposing condition	GI symptoms	Location	Treatment	Follow up/ outcome
Oka and Mottonen	1983	1	46	F	None	Present	Sacroiliac	Antibiotic	Good
Menon and Gupta	1993	2	23,17	M	None	In one patient bloody diarrhoea	Sacroiliac	Antibiotic	3 months in both cases
Siam et al	1993	1	13	F	None	None	Sacroiliac	Antibiotic	Residual pain
Fule and Chidgupkar	1994	1	4	M	None	None	Elbow	Surgical drainage and antibiotic a	NA
Osman and Govender	1995	4(1)	15,417, 29,41	NA	None	None	Sacroiliac	Antibiotic	Good
Chiu S	2001	1	2.5	M	None	Fever, vomiting and abdominal pain	Hip	Surgical drainage and antibiotic	4 weeks good
Agnihotri et al	2005	1	7	F	None	Fever, and abdominal pain	Hip	Arthroscopy and antibiotic	Good
Rahul Naithani	2008	1	5	M	All	None	Hip	Antibiotic	2 yrs follow up good
Present case	2008	1	3	F	None	None	Hip	Arthroscopy and antibiotic	4 months good

Abbreviation: ALL- Acute lymphoblast leukemia; F- female, M- Male; GI- Gastrointestinal; NA- Not available

healthy child without a predisposing factor. Diagnosis of septic arthritis includes history supported by various imaging techniques and arthrocentesis<sup>14</sup>. Definitive therapy is based on identification and antibiotic susceptibility of bacteria isolated. Most of the gram negative infections are cured by 2-4 weeks of appropriate intravenous antibiotics. Intraarticular antibiotics are not required<sup>1</sup>. Septic arthritis responds well to arthrotomy combined with antibiotic coverage especially in pediatric age group in those femoral head viability may be compromised<sup>9</sup>.

To summarise, septic arthritis of hip in a healthy child due to *Salmonella typhi* is a very rare condition and to author's knowledge, this is the second case reported from India. This case highlights the unusual complication of *Salmonella typhi* infection and stresses the physician to maintain a high index of suspicion in patients presenting with flank pain as many pediatric patients experience delay in diagnosis due to vague complaints of hip pain. Early diagnosis, careful evacuation of the joint collection, and two to four weeks of appropriate antibiotic therapy with hip immobilisation are the keys to good functional outcome in most cases of salmonella arthritis.

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