Primary Meningococcal Arthritis

Ori Efrati MD¹, Asher Barak MD¹, Jacob Yahav MD¹, Lea Leibowitz MD¹, Nathan Keller MD² and Yoram Bujanover MD¹

¹Department of Pediatrics and ²Department of Clinical Microbiology, Sheba Medical Center, Tel Hashomer, Israel
Affiliated to Sackler Faculty of Medicine, Tel Aviv University, Ramat Aviv, Israel

Key words: primary meningococcal arthritis, Neisseria meningitides, arthrocentesis

Arthritis is a recognized complication of acute meningococcal sepsis with or without meningitis [1,2]; however, primary meningococcal arthritis without other manifestations or other organ involvement of meningococcal disease is an uncommon phenomenon. A review of the English medical literature shows that since 1980, 23 cases of primary meningococcal arthritis have been reported and only 3 of them were in the pediatric age [1]. Primary meningococcal arthritis is a rare manifestation of meningococcal infection, especially in the pediatric age. We present a case of primary meningococcal knee arthritis in a 6 year old girl.

Patient Description
A healthy 6 year old girl was admitted due to fever, limping and left knee arthralgia during the previous 2 days, with no evidence of preceding upper respiratory tract infection or skin eruption. On admission, the child had fever (39°C), tachycardia (160 beats/minute), blood pressure 100/50, and normal room air saturation. Neurologic examination did not demonstrate nuchal rigidity, Kernig or Brudzinski signs. The left knee was painful, swollen, tender and red. Voluntary and passive knee motions were limited. The other joints were normal. The rest of the physical examination including the oropharynx was normal. White blood cell count was 13.3 x 10⁹/L with an absolute neutrophil count of 9.3 x 10⁹/L. Erythrocyte sedimentation rate was 59 mm/hour (Westergren method). Blood chemistry results were within normal limits. On admission, left knee arthrocentesis yielded a large amount of purulent fluid with 72 x 10⁹/L white blood cells and 67 x 10⁹/L absolute neutrophils, glucose 96 mg/dl and protein 50 mg/dl. Gram stain showed gram-negative cocci. Other laboratory data – including blood and throat culture, antistreptolysine-O titers, rheumatoid factor, antinuclear factor and complement levels (CH50) – were all normal.

The patient was treated for 2 days with intravenous cloxacillin (150 mg/kg/day), but since the clinical improvement was minimal antibiotic treatment was changed to ceftriaxone (100 mg/kg/day) that led to a marked improvement. Three days after the arthrocentesis, Neisseria meningitides serogroup B was isolated from the synovial fluid, which was sensitive to both antibiotics. Twenty-four hours after initiation of ceftriaxone treatment, body temperature returned to normal. Another two knee aspirations were performed as an integral therapy for septic knee arthritis and because of persistent signs of focal inflammation. No other bacterial growth was detected. The girl was discharged on the 14th day with normal knee examination and range of motion, and oral cefuroxime (250 mg twice a day) for another week.

Comment
Meningococcal infections are transmitted via aerosolization or contact with respiratory secretions leading to upper respiratory infection or colonization. A carrier state
Table 1. Pediatric meningococcal arthritis in the English medical literature since 1980

<table>
<thead>
<tr>
<th>Age</th>
<th>Gender</th>
<th>Rash</th>
<th>Joints</th>
<th>Positive cultures</th>
<th>Blood</th>
<th>Synovial fluid</th>
<th>Group</th>
<th>URI</th>
<th>Ref.</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 yr</td>
<td>M</td>
<td>Yes</td>
<td>Hand, knee</td>
<td>Yes</td>
<td>B</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>Case</td>
</tr>
<tr>
<td>2 yr</td>
<td>M</td>
<td>Yes</td>
<td>Knee</td>
<td>Yes</td>
<td>W135</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 yr</td>
<td>M</td>
<td>Yes</td>
<td>Ankle</td>
<td>Ankle</td>
<td>C</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 mo</td>
<td>M</td>
<td>Yes</td>
<td>Hand</td>
<td>Hand</td>
<td>Yes</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.5 mo</td>
<td>F</td>
<td></td>
<td>Knee</td>
<td>Knee</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 yr</td>
<td>M</td>
<td>Yes</td>
<td>Hip</td>
<td>Hip</td>
<td>C</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.5 yr</td>
<td>M</td>
<td>Yes</td>
<td>Knee, hip</td>
<td>Knee</td>
<td>B</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 yr</td>
<td>M</td>
<td>Yes</td>
<td>Hand, knee</td>
<td>Yes</td>
<td>C</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 yr</td>
<td>F</td>
<td></td>
<td>Knee</td>
<td>Knee</td>
<td>B</td>
<td>Our case</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

URI = preceding upper respiratory infection. Throat cultures in all cases were negative.

large joints – especially the knees – are most commonly involved [1]. Once the possibility of Neisseria meningitidis arthritis is raised, low complement levels and meningococcal antigen with or without bacterial isolation can be detected in the synovial fluid [2].

We present a child with isolated Neisseria meningitidis knee arthritis that was not associated with skin rash, upper respiratory tract infection, or other organ involvement. Since 1980, 26 cases of primary meningococcal arthritis have been described in the English medical literature [1,34], of which only 2 had pure monoarthritic arthritis in the pediatric age group (Table 1). Other reported cases of meningococcal arthritis included: three of meningococcal sepsis (positive blood culture) with joint involvement (1 to 3 joints) [1,4], a child with preceding upper respiratory tract infection [1], and five children with skin eruption [1,4]. Our case differs from the others because of the monoarticular disease and the absence of extra-articular disease such as upper respiratory tract infection, skin rash or isolation in blood culture. The Neisseria meningitidis serogroups most commonly isolated were group C in up to 36%, group B in 30%, and group W135 in 13% [1]. In our case group B was isolated, which was sensitive to the ceftriaxone that was given on the third day.

Two major forms of meningococcal arthritis have been described [1]. Type I, referring to early-onset arthritis, occurs during the first few days of acute meningococcemia and arises once bacteria invade the synovium directly. Synovial infection can occur during acute meningococcal sepsis or can manifest as primary meningococcal arthritis. Skin eruption accompanies the arthritis in 96% and meningitis in 26% of cases [4]. Type II refers to late-onset arthritis, which is a sub-acute, mono- or oligoarthritis that occurs usually on the fifth day, when the meningococcal infection is subsiding [1]. Usually, this is an immunomediated form of arthritis that occurs during the recovery stage, with sterile effusion and immune complex deposition within the joints due to host immunologic response to the bacterium [1,4,5]. The knee is the most commonly involved joint. The arthritis usually resolves slowly and the synovial fluid tends to re-accumulate despite repeated aspirations. Our case is more closely related to type I because of the monoarticular involvement, with the isolation of pathogen within the synovial fluid.

The prevalence of primary meningococcal arthritis is unknown, however it seems to be underestimated since a routine arthrocentesis is not performed in some of the reported cases [4]. Therefore it is recommended that the involved organ be evaluated thoroughly, including arthrocentesis, before initiating antibiotic therapy.

Although this is a very rare presentation of meningococcal infection, especially in the pediatric population, it is important to be aware of this organism as a potential pathogen in the patient presenting with pure septic arthritis. The prognosis is excellent, and joint complications are rare once rapid diagnosis and treatment are completed.

References


Correspondence: Dr O. Efrati, Dept of Pediatric Pulmonology, Sheba Medical Center, Tel Hashomer 52621, Israel. Phone: (972-3) 530-2884 Fax: (972-3) 530-2884 email: oryefraty@hotmail.com

IMA*J* • Vol 4 • May 2002

Primary Meningococcal Arthritis 387