Case Report

IMMUNE-MEDIATED MENINGOCOCCAL ARTHRITIS - A CASE REPORT

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Received: May 19, 2008
Revision received: August 08, 2008
Accepted: September 11, 2008

Summary

Arthritis is a rare manifestation of immune-associated complications of meningococcal disease. A 9-year-old boy presented with meningococcal meningitis and meningococcemia. On day 8 of his illness, after marked improvement, he developed pain in both legs. Two days later the knees turned swollen and tender to palpation, with painful limitation of movement, as did both ankles, though to a lesser degree. The appearance of these new signs was associated with a secondary rise in fever. Left knee arthrocentesis showed turbid synovial fluid with slightly white blood cell count elevation and polymorphonuclear cells predominance, but no organisms were seen, and culture yielded a negative result. The joint signs gradually resolved. Three months after discharge the patient regained full range of motion of his knees without pain and no sequelae. In patients with meningococcal disease secondary fever, immune-mediated complications, especially aseptic arthritis, should always be considered in differential diagnosis. Early accurate diagnosis of this complication could reduce hospital stay and prevent further unnecessary antibiotic treatment.

Key words: immune complexes, meningococcal arthritis

Introduction

Meningococcal disease is one of the deadliest childhood infections due to its occasionally rapid fatal course. Recent advances on the pathogenesis of the disease facilitate its early diagnosis and timely administration of antimicrobial therapy. However, little attention has been paid to complications in the subacute phase (4-10 days after initial antibiotic therapy) [1]. This so-called type 3 immune complex hypersensitivity reaction occurs in the form of arthritis, vasculitis, episcleratis and pericarditis, most likely as a result of immune complexes deposition. These manifestations are referred to as immune-associated complications (IAC). Clinical observations have suggested that IAC are due to local formation of immune complexes rather than deposition of circulating immune complexes [2,3].

They develop 4-10 days following onset of the disease, when clinical features improve, and are usually accompanied by a secondary temperature rise.

Case presentation

A 9-year-old boy presented at the Infectious disease department, St.Anna University Hospital, Sofia, with a 24-hour history of fever, headache, vomiting and backache. Past history included chickenpox. On initial examination, he was drowsy but orientated, with mild neck stiffness and positive Kerning and Brudzinski signs. Petechiae on his legs and buttocks were present. Examination did not reveal other abnormal signs. Meningococcal infection was suspected. Fundoscopy showed no papilledema, and then lumbar puncture was performed. Initial treatment included Ceftriaxon and Penicillin G. Investigations showed a very high white blood cell count (WBC) 34.7x10^9/L (9% bands, 80% neutrophils, 6% monocytes and 5% lymphocytes), erythrocyte sedimentation rate (ESR) was 20 mm/hr. Cerebrospinal fluid analysis showed normal glucose level, slightly elevated protein level (0.65G/l) and WBC 9 698x10^6/L (85% neutrophils, 15% lymphocytes).The Gram-stained smear showed no bacteria. On the second day, cerebrospinal fluid culture revealed *Neisseria meningitis,* while the two sets of blood cultures taken on the day of admission were sterile. The child's general condition improved quickly, and seven days later he was in good health and about to be discharged. The second lumbar puncture, performed on the 7th day, revealed no abnormalities. The following day he developed pain in both legs but there was no swelling. Two days later the temperature rose again (38.4ºC), both knees turned swollen and were tender to palpation, as were the ankles, although to a lesser degree. Both active and passive flexion and extension were limited by pain. Orthopedic consultation was obtained. Left knee arthrocentesis showed turbid synovial fluid with slight WBC elevation (20x10^9/l) and polymorphonuclear cell predominance but no organisms were seen, and culture test was negative. ESR had increased to 90 mm/hr. Other two sets of blood cultures were again sterile. The results of radiography of the chest and left knee were normal. On suspicion of septic arthritis the antibiotic was switched to Maxipime, and Profenid was added. The joint signs gradually improved in the course of a few days. Three months after discharge the patient regained full range of motion of knees, without pain and no sequelae. However, it was unusual and inexplicable for the septic arthritis to develop too late in the course of the disease. Furthermore, the antibiotic therapy was adequate and commenced on time. All these were an impetus for the first author to continue perusing the literature, reconsider the diagnosis and finally accept the complication as immune-mediated arthritis rather than a septic one.

Discussion

Arthritic complications of meningococcal disease are not uncommon. Three types of arthritis have been described. The first one is hemarthrosis due to coagulopathy, which occurs early in patients with severe course. The second one is septic arthritis, appearing around the fifth day as a result of direct hematogenous invasion of the joints by meningococci. The third type is immune-mediated aseptic arthritis, the most common presentation of IAC. It may be seen in 2% to 16% of the cases of meningococcal infection, and occurs even later in the course of the disease. The risk factors are severe disease (higher antigen load), as well as serogroup C infection [4,5]. The most commonly involved joint is the knee, followed by elbow, wrist and ankle. Synovial fluid is turbid with WBC of less than 50 x10^9/l and polymorphonuclear cell predominance, though culture is negative. All of the above-mentioned were present in our patient, but the correct diagnosis was not made on time. A high index of suspicion is required for the diagnosis of immune-mediated arthritis. Primary meningococcal arthritis (purulent) has to be excluded, as well as other complications such as subdural effusion, persisting infection and nosocomial infection. Broad spectrum antibiotics should be continued. and withdrawn when the microbiological findings (synovial and blood cultures) and/or the clinical course excluded the other entities with bacterial origin. Specific treatment is not indicated except for non-steroidal anti-inflammatory drugs as first-line therapy. The prognosis is always favorable [5].

Conclusions

In patients with meningococcal disease in case of secondary fever and secondary increased ESR,

IAC and especially aseptic arthritis, should always be considered in the differential diagnosis. Early accurate diagnosis of this complication could reduce hospital stay and prevent further unnecessary antibiotic treatment.

References

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