A Case Report of Septic Arthritis Following Varicella

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Abstract

Varicella is generally a benign infectious disease; however, it can causes complications, such as secondary bacterial infections of the skin and soft tissues, pneumonia, and hematological and neurological complications. Also, it can be rarely complicated with septic arthritis. Here, in this article, a 3.5-year-old boy who developed swelling, erythema, and pain at the right wrist and right knee 5 days after varicella, diagnosed as septic arthritis based on synovial fluid investigation and radiological imaging, is reported.

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Keywords: Complication, septic arthritis, varicella, varicella zoster virus

Introduction

Varicella is a self-limiting disease with vesiculobullous rashes on the skin whose agent is Varicella zoster virus (VZV) which is bound to Herpesviridae family.

Varicella is a widespread disease in our society. Although it is a benign disease, it can result in mortality in immunosuppressed individuals and even lead to significant morbidity and mortality by causing complications such as secondary bacterial infections of the skin (1). Primary or secondary bacterial involvement of the joint or bony tissue is among the rare complications of varicella. The other possible complications are gastrointestinal system and hematologic and neurologic system involvements (2-4). It is the infection of acute hematogenous septic arthritis joint with pyogenic bacteria. *Staphylococcus aureus* is seen as the most frequent agent in children. Unless an early diagnosis is made and sufficient treatment is provided, it creates a serious picture as it can cause joint failure.

In this article, the case of a healthy 3.5-year-old boy who developed septic arthritis following varicella was reported.

Case Report

A 3.5-year-old boy who had complaints of swelling at right wrist and right knee, erythema and pain was admitted to our hospital. We learnt that five days before his history, the boy was diagnosed with varicella by the doctor he was taken to due to the rashes on the skin and that he was referred to our hospital following the onset of swelling, fever and pain at right wrist and right knee three days later. The patient was hospitalized in order to investigate the arthritis etiology and eventually treat him. There was no peculiarity in the personal background or family history of the patient. The physical development of the patient was within the normal limits and the other vital findings were normal except the high fever. The boy had helminthiasis varicella lesions on his body, but no active lesions. The patient developed swelling on the right wrist and right knee, erythema and limitation of movement ability. As a result of laboratory tests, white blood cell count was 18,200/mm^3, absolute neutrophil count 11,570/mm^3, Hb 10,3 g/dL, thrombocyte count 201,000/mm^3, erythrocyte settling rate (ESH) 111 mm/s, C-reactive protein (CRP) 49,7 mg/L (normal 0,5-5 mg/L), and antistreptolysin O (ASO) 965 tU. No atypical cell was seen in the

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peripheral blood smear. Hepatic and renal functions and total blood examination was normal.

The patient who was initially diagnosed with septic arthritis based on the existing symptoms it was found that have brucella, salmonella and hepatitis indicators, antinuclear antibodies, anti-ds DNA and complement levels examined with a definitive diagnosis were within normal limits. In the dual roentgenogram of the right knee joint, there was an increase in the joint distance and an extension in the joint capsule. Besides, the reduction in the Hoffa distance in the lateral image was assessed in favor of the size of the pressure caused by increased the intra-articular liquid (Figure 1-3). Following the orthopedic consultation, 15 mL joint liquid was taken from the right knee joint of the patient. The joint liquid, which had macroscopically purulent character, was found to have 85,000/mm^3, 90% of which was microscopically polymorph-nuclear leucocyte. No microorganism was found in gram coloration. The biochemical values of the liquid content were lactate dehydrogenase (LDH) 1254 U/L, glucose <5 mg/dL, protein 5.8 g/dL and was compatible with exudate (simultaneous serum values were LDH 165 U/L, glucose 81 mg/dL, protein 5.5 g/dL). The treatment was initiated with the combination of ceftriaxone and vancomycin. The VZV PCR from the joint liquid tested for the segregation of varicella arthritis was negative. There was no growth in the blood and joint liquid cultures. The patient continued to have fever for two more days after the antibiotic use in the follow-up and afterwards, the fever did not recur. At the end of the second week, the test results were ESH 25 mm/s and CRP 8 mg/L. The swelling findings on both joints with arthritis remitted at the end of the third week. The antibiotic treatment was completed in for week time and the patient was discharged.

Figure 1. An extension in the right knee joint capsule of both knees in the anteroposterior graph

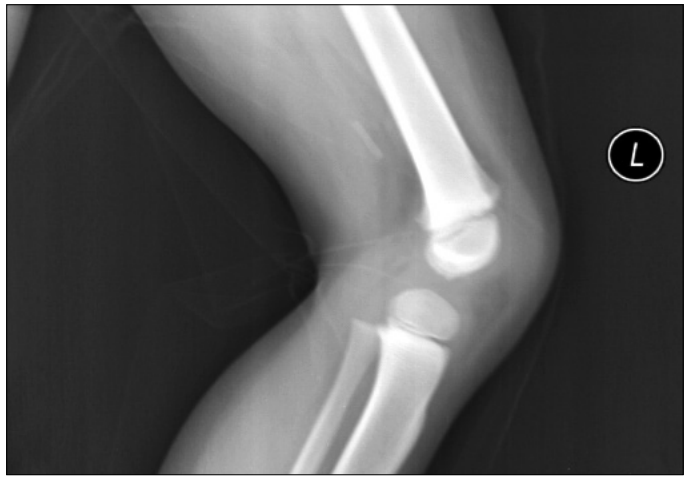

Figure 2. Normal image in the left knee collateral graph

Figure 3. An increase in the joint distance in the right knee collateral graph, an extension in the joint capsule, a reduction in the Hoffa distance in the lateral image

Discussion

Varicella is generally a benign disease, which is frequently seen in childhood. The most common complications in order of frequency are secondary bacterial infections of the skin and soft tissues, neurological complications and pneumonia (2, 4). Hospitalizations are mostly related to the developing complications and the frequency of hospitalization in two different studies in Turkey was found as 6-10/100,000 (2, 3). The frequency of complications in children with an underlying chronical disease or receiving an immunosuppressive therapy has increased in comparison to the normal population and the hematologic system and gastrointestinal system involvements have become more significant. It was found that the average hospitalization period was 6 days and the cost of each patient was approximately 283 (4) and 338 (2) American dollars. Given the general loss of family work

Table 1. Varicella-driven septic arthritis cases reported in the relevant literature

Source	Date	Case	Involved Joint(s)	Author
8	2012	16-month old male	Knee	Lim JB
		2-year 7-month old female	Knee, hip	
9	2012		Knee	Rivero ME
5	2005	Male	Septic arthritis	Koturoğlu G
		Male	Septic arthritis and osteomyelitis (OM)	
10	2005	4-year old male	Septic arthritis	Tyrrell GJ
		11-year old male	Septic arthritis and OM	
		4-year old female	Septic arthritis	
11	2004	-	Elbow	Konyves A
12	2001	5 cases	Septic arthritis	Ziebold C
13	1998	10-year old female	Knee and wrist	Al Fifi A
14	1997	5-year old male	Elbow	Bradley TM
15	1997	3-year old female	Knee	Poon AH
		2-year old male	Knee	
16	1996	4 cases	Septic arthritis	Schreak P

force across the country and the only the hospital bill except the cost of school absence, the annual total cost is expected to be around 856,190-1,407,006 dollars (2). As varicella complications are mostly vaccine-preventable, the varicella vaccines was added to the to the national vaccination calendar as of December, 2012 as a result of cost calculation.

Joint involvement of varicella emerges both in the form of aseptic arthritis as a result of the direct invasion of the virus and Group A streptococci-driven secondary bacterial infections (5-7). In discriminating between the two, parameters such as viral DNA detection in the joint liquid in cases where the virus causes direct arthritis, bacteria growth in the joint liquid or blood culture in the bacterial arthritis, on the other hand, high level of LDH, high level of protein, low level of glucose, gram coloration and high levels in acute phase reactants are helpful. In our case, VZV PCR in the joint liquid was negative, LDH and protein high, and there was no growth in the blood and joint liquid cultures. These findings were mostly compatible septic arthritis developing on the ground of secondary bacterial infection.

Septic arthritis that develops following varicella is rarely seen. 22 cases reported in the literature are summarized in Table 1 (5, 8-16). It was reported in the literature that the frequency of growth in the cultures of patients with septic arthritis was 30% and around 70% in the joint liquid culture (17, 18). The most frequent agent in septic arthritis in all groups is *S. aereus*; and the subsequent agents are Group A streptococci*, Streptococcus pneumoniae* and *Kingella kingae* (19). Although primary viral agent-driven septic arthritis is very rare, they can be seen in the form of immune-mediated reaction especially following the live vaccines. The presence of all the four symptoms such as fever, resistance to walking, high sedimentation level (>40 mm/s) and leukocytosis (>12,000/mm^3) is 99% in favor of septic arthritis (20). All these four symptoms were present in our case.

Although varicella-driven arthritis is usually aseptic, it may also cause septic arthritis sometimes based on Group A streptococci and rarely on staphylococcus (21). It is crucially important to be able to distinguish the two as mistreatment of septic arthritis has a high level of morbidity. If there is no growth of agents in the culture in the treatment of septic arthritis, the antibiotics such as cefazolin or nafcillin are recommended in the empirical treatment; in the regions where there is much methicillin resistance, vancomycin or clindamycin is recommended (19). In the compilation article published by Pääkkönen M *et al.* (22), first generation cephalosporin or clindamycin was recommended in the regions where there was little resistance and vancomycin treatment was recommended in the regions where there was much methicillin or clindamycin resistance; besides, as Kingella-type bacteria were vancomycin or clindamycin-resistant, cephalosporin was recommended (23). Regarding the treatment, it was reported that 2-3 days after the patient's fever dropped or following an improvement in the laboratory before the onset of oral antibiotic, intravenous therapy could be started, which would totally last for 4 to 6 weeks; however, in more recent publications, this period could be shortened to as much as 10 to 14 days in non-complicated cases (22, 24). Despite the early fever-response of our case, as the symptoms such as acute phase response and joint swelling-pain took time to improve, we arranged the treatment to last for 4 weeks.

Conclusion

In conclusion, unless the fever following varicella improves within 3-4 days or if there are joint-pains or similar symptoms, attention should be paid regarding secondary bacterial infections. As the disease may cause squeals in the case of inadequate treatment, soft tissue infections and septic arthritis should certainly be present in the definitive diagnosis.

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