

## Eight-year-old patient have septic arthritis, rare location and rare pathogen

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### ABSTRACT

Septic arthritis generally affects the lower extremities in children. Shoulders involvement is rare. Although *Staphylococcus aureus* (*S. aureus*) is the most common pathogen causing septic arthritis in children, methicillin-resistant strains are rarely isolated from healthy children. An eight-year-old boy presented to the emergency outpatient clinic with a complaint of shoulder pain lasting for two days. Leukocytosis and an elevated C-reactive protein level and sedimentation rate were found in the examinations performed with the suspicion of arthritis, and a widening of the joint space was observed in the shoulder X-ray of the patient, who had no history of trauma. The magnetic resonance imaging, performed for the differential diagnosis of the patient, showed increased intra-articular fluid and bone marrow edema, and there was no sign of periarticular osteomyelitis. The patient's joint fluid was taken for diagnosis. The joint fluid was purulent, a high number of leukocytes was present in the microscopic evaluation and bacteria could not be isolated. The patient was scheduled for arthroscopy. Intra-articular washing was performed, septic vegetations were observed and debrided during the arthroscopy. After the arthroscopy, the patient was given teicoplanin and ceftriaxone parenterally as empiric antibiotic therapy. On the second day of treatment, the patient's fever and shoulder pain decreased. Methicillin-resistant *S. aureus* (MRSA) growth was observed in the joint fluid culture of the patient at the 36<sup>th</sup> h, and there was no growth in the blood culture. The course of parenteral antibiotherapy was continued for 21 days until the patient's laboratory results returned to normal values, and then oral clindamycin therapy was started. The patient's clinical and laboratory findings returned to normal after three weeks of oral antibiotic therapy, and the treatment was discontinued. The range of motion of the joint was evaluated to be full at the six-month postoperative follow-up. In conclusion, in this case of septic arthritis the shoulder joint was affected which is a rare occurrence in children, and MRSA, a pathogen rarely found in healthy children, grew in the joint fluid. Since the most important prognostic factor for septic arthritis is the duration of initiation of the treatment, the fact that the complaint is in an uncommon joint and the pathogen has a high antibiotic resistance may delay the initiation of appropriate treatment, which may negatively affect the prognosis.

**Keywords:** Atypical localization, atypical pathogen, pediatric, septic arthritis.

The incidence of septic arthritis in children ranges from 2 to 13 cases per 100,000.<sup>[1,2]</sup> Septic arthritis affects the lower extremities at a rate of 80% in the pediatric patient group.<sup>[3,4]</sup> The most commonly affected are the hip and knee joints. The joint involvement of the shoulder is rare in healthy children and is seen in only 3 to 4% of all septic arthritis cases.<sup>[3-5]</sup> Although *Staphylococcus aureus* (*S. aureus*) is the most common cause of septic arthritis in children, Methicillin-resistant *S. aureus* (MRSA) strains are rarely isolated from healthy children.<sup>[5,6]</sup>

### CASE REPORT

An eight-year-old male patient presented to the emergency service with a complaint of shoulder pain that had started two days ago without a history of trauma. Shoulder X-ray, complete blood count, C-reactive protein (CRP), erythrocyte sedimentation rate (ESR) and blood culture tests were requested with the suspicion of arthritis. The laboratory results were as follows: leukocytes 16,200/mm<sup>3</sup> (normal: <11,500/mm<sup>3</sup>), CRP 8.5 mg/dL (normal: <0.5 mg/dL) and

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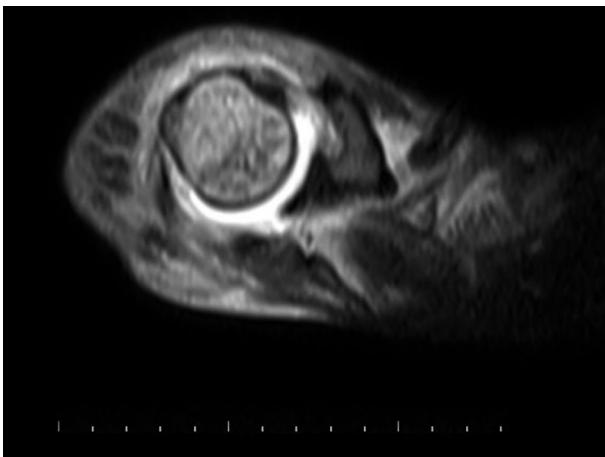
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ESR 89 mm/1<sup>st</sup> h (normal: <15 mm 1<sup>st</sup> h). The X-ray showed joint space widening in the shoulder (Figure 1), and magnetic resonance imaging (MRI), performed for the differential diagnosis, showed an increased intra-articular fluid, bone marrow edema and showed no evidence of periarticular osteomyelitis (Figure 2). When the patient's examinations were completed, the patient was referred to the orthopedics outpatient clinic with a preliminary diagnosis of septic arthritis four days after the initial onset of symptoms. The

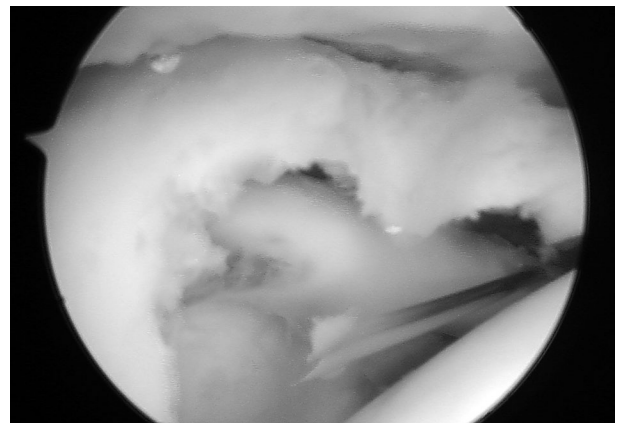
joint fluid was decided to be collected from the patient by aspiration for diagnostic purposes. The joint fluid was purulent, and a large number of leukocytes was observed under the microscope, but bacteria could not be isolated. An arthroscopy was scheduled for the patient. The joint was entered by the standard posterior portal during the arthroscopy. It was amply washed before the imaging. Septic vegetations in the glenohumeral joint were observed in the arthroscopy (Figure 3), and all of the vegetations were debrided with synovectomy (Figure 4). Combination therapy of parenteral teicoplanin and ceftriaxone was started on the patient. The patient was hospitalized and followed up. On the second day of treatment, the patient's fever and shoulder pain decreased. MRSA growth was observed in the joint fluid



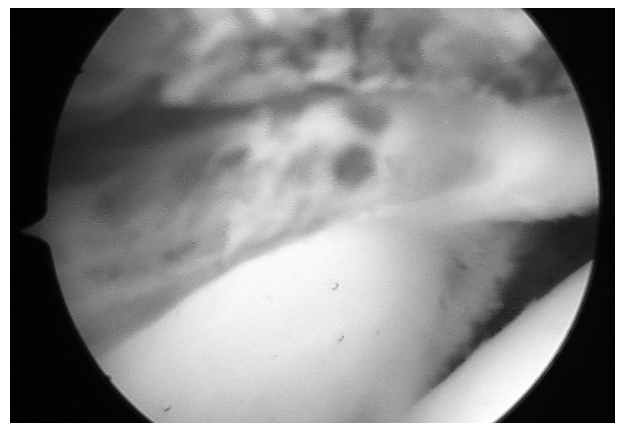
**Figure 1.** Joint space widening in radiography of the case.



**Figure 2.** Magnetic resonance imaging of the case.



**Figure 3.** Septic vegetations in glenohumeral joint during arthroscopy.



**Figure 4.** Arthroscopic image after debridement of vegetations.



**Figure 5.** Postoperative sixth month follow-up physical examination.

culture of the patient at the 36<sup>th</sup> h, and there was no growth in the blood culture. Parenteral therapy was continued for 21 days until the patient's CRP and ESR values returned to normal, then oral clindamycin therapy and outpatient follow-up were started. The patient's treatment was discontinued after three weeks of oral therapy, and the follow-up of the patient whose laboratory parameters returned to the physiological values was continued. The range of motion was full at the six-month postoperative follow-up (Figure 5).

## DISCUSSION

The most important prognostic factor in septic arthritis cases is the duration of initiation of treatment. Delay in the initiation of treatment may lead to the spread of the infection to adjacent tissues, development of avascular necrosis, and cessation of bone growth as a result of damage to the growth plate. Therefore, septic arthritis cases should be diagnosed quickly, and treatment should be started immediately. If the affected joint is not usual for septic arthritis, the prognosis is affected since the time needed for diagnosis is prolonged. Empiric parenteral antibiotic therapy should be started without

waiting for blood and joint fluid culture results so that time is not wasted. Empiric therapy will not yield results if septic arthritis is caused by a rare pathogen with antibiotic resistance, and effective treatment of the patient will be delayed.<sup>[1-5]</sup>

In our case, septic arthritis affected the shoulder joint. Since septic arthritis of the shoulder joint is uncommon and the signs of arthritis are not always obvious, it may not be considered at the forefront of differential diagnosis, and therefore, delayed diagnosis may adversely affect the prognosis.<sup>[7]</sup> In addition, the fact that pathogens with high virulence are frequently seen in the septic arthritis of the shoulder increases the risk of sequelae.<sup>[8]</sup> In our case, the diagnosis could only be made after the examinations were completed and MRI of the shoulder was performed. The patient was started on a parenteral antibiotic therapy that is also effective against MRSA, and the therapy did not need to be changed on the occasion of MRSA growth in the joint fluid culture.

The information on the transition time from parenteral antibiotic therapy to oral therapy differs in the literature, and studies are advocating three weeks of parenteral therapy, while other studies have shown that it can be reduced to three days.<sup>[3,9]</sup> In our case, parenteral antibiotic therapy was continued for 21 days until the laboratory values returned to normal since the growth of MRSA was observed in the joint fluid. Afterward, clindamycin, which is effective in *S. aureus*, was continued orally.

Surgical treatment is necessary for the removal of pathogens from the joint fluid. There are three methods for surgical treatment: needle aspiration and irrigation, arthrotomy (open surgery) and arthroscopy. Although needle aspiration is the least invasive method, the success rate is low, the risk of sequelae is high, and the patient may need to undergo surgery again. The joint space is sufficiently cleaned with arthrotomy, but it is the most invasive method and therefore may cause degeneration of the joint. Arthroscopy is both non-invasive and effective, but it is not easy to perform on every joint.<sup>[10,11]</sup> Shoulder arthroscopy is rarely performed, especially in children, and the studies on it are insufficient.<sup>[8,12,13]</sup>

In our case, arthroscopy, a rarely used method in septic arthritis of the shoulder in children, was successfully performed on the patient, and clinical, imaging and laboratory findings improved rapidly after arthroscopy. The patient recovered without sequelae in the six-month follow-up after arthroscopy.

In conclusion, this case was presented to draw attention to septic arthritis of the shoulder, which is rarely seen in children and can be overlooked since it is not initially considered in the preliminary diagnoses. However, another feature worth mentioning in our case is the growth of the MRSA pathogen, which is rarely seen in healthy children. The presence of rare resistant pathogens should be considered in patients receiving parenteral empiric antibiotic therapy if culture fails to grow and a positive clinical response to treatment is not achieved. Finally, we emphasize that although it is not a commonly used method in pediatric septic arthritis of the shoulder, arthroscopy is a good alternative to arthrotomy, especially since it is minimally invasive, provides detailed exploration and with less morbidity.

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