

Prepatellar Bursitis Secondary to Sepsis in the Neonatal Period

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Abstract

Bursitis, inflammation of small synovial fluid-filled pads, can be septic or nonseptic. Cases of bursitis are usually reported in adults, and to the best our knowledge, there is no report of bursitis in the neonatal period. In this report, we present the case of a newborn with prepatellar bursitis secondary to *Staphylococcus aureus* sepsis. Septic prepatellar bursitis is a rare infection in children and should be considered in the differential diagnosis of patients presenting with swelling of the knee. Early diagnosis and appropriate treatment can reduce morbidity and the need for surgery. (*J Pediatr Inf* 2016; 10: 68-71)

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Introduction

Bursas are synovial fluid-filled pads formed to protect the soft tissues from the bone, and the inflammation of these pads is termed as bursitis. There are many bursas in the vicinity of the knee joint. Prepatellar bursa is surface formation located between the patellas surrounding the knee joint frontally subcutaneous tissue. Bursitis can be in two forms as septic or non-septic (1). Although cases of bursitis are usually reported in adults, there is no report, to the best our knowledge, of bursitis in the neonatal period. In this report, we presented the case of a newborn with pre-patellar bursitis secondary to *Staphylococcus aureus* sepsis.

Case Report

Following 38 weeks of pregnancy, a baby born delivered from a twenty two year old mother pre-

sented to our intensive care unit on the 12th post-natal day with 39°C temperature and complaints of remission in his movements and sucking. In his history, apart from the story of hospitalization for 2 days due to hepatitis on the 5th postnatal day, there was no any significant specificity. In his physical examination, the patient whose general condition was bad, temperature 39°C; respiration rate 76/min and peak heart rate 196/min, had 2/6 systolic murmur, a decrease in the sucking reflex, redness in the left knee, temperature increase, limitation of motion and 1 cm increase in diameter in comparison to the right knee. The patient held his leg in the extension position and avoided the flexion posture. In the laboratory examination, white blood cell count was 11,600/uL, thrombocyte count, 253,000/uL, and immature/total neutrophil ratio 0.46. Of the acute phase reactants, procalcitonin level was: 8.4 ug/L (<0.5) and serum C reactive protein level: 18.42 mg/dL (0-0.5).



It was found that cerebrospinal fluid (CSF) protein in the lumbar puncture (LP) was: 122.6 mg/dL (20-170 mg/dL) (2), glucose: 77 mg/dL, cell count 110 cell/mm³ (0-32 cell/mm³) (2) and simultaneous blood glucose 100 mg/dL. In the direct radiography taken to evaluate possible septic arthritis and osteomyelitis, no pathological findings was detected except for a swelling in the surrounding soft tissues (Figure 1). In the ultrasonographic (USG) assessment performed due to septic arthritis, it was found that skin, subcutaneous tissue thickness and echogenicity increased in comparison to the right knee; however, no collection was monitored within the joint. The knee magnetic resonance imaging (MRI) performed on the patient, thickening in the prepatellar bursa and enhancement were monitored and it was considered as prepatellar bursa, and no finding was detected in favor of osteomyelitis or septic arthritis (Figure 2). The fact that from the patient had a story of hospitalization at another hospital for 2 days before admittance to our hospital, and that since it was only 5 days before being discharged from the hospital, taking nosocomial sepsis, meningitis, and soft-tissue infection into account, vancomycin (Abbott France Usine l'Isle-BP3 28380 Saint Remy Sur Avre France), meropenem (Astra Zeneca UK Limited Macclesfield - England) and amikacin (İ.E. Ulagay, The Turkish Pharmaceutical Industry, Inc. Topkapı-İstanbul) treatments were started. Due to the inflammation-related restricted movement of the left leg, the patient with discomfort was started the anti-inflammatory dose of (3x10 mg/kg/dose) ibuprofen (Turkish Hoechst Industry and Trade Inc.; Topkapı - İstanbul). In the blood and urine cultures obtained upon admittance of the patient, it was yielded methicillin resistant *S. aureus* growth; on the other hand, there was no growth in the BOS culture. According to the culture antibiogram, meropenem was discontinued and an antibiotic treatment consisting of vancomycin and amikacin was continued. The patient who was evaluated clinically and radiologically by the Department of Orthopedics was considered to have prepatellar bursitis and the existing treatment was recommended.

An atrial septal defect was reported in the echocardiographic assessment performed for a possible bacterial endocarditis due to the cardiac murmur and resistant high fever; however, no findings of infective endocarditis were observed. Following the 5th day of hospitalization, the patient did not have fever and acute phase reactants turned to negative. In the lumbar puncture performed in the patient because of meningitis suspicion, no cells were found. BOS protein and glucose were within the normal limits. The difference between the diameters of the knee of the patient who was observed to have relaxation in joint movements after the fifth day decreased gradually and went back to normal in the ninth day. The vancomycin treatment of the

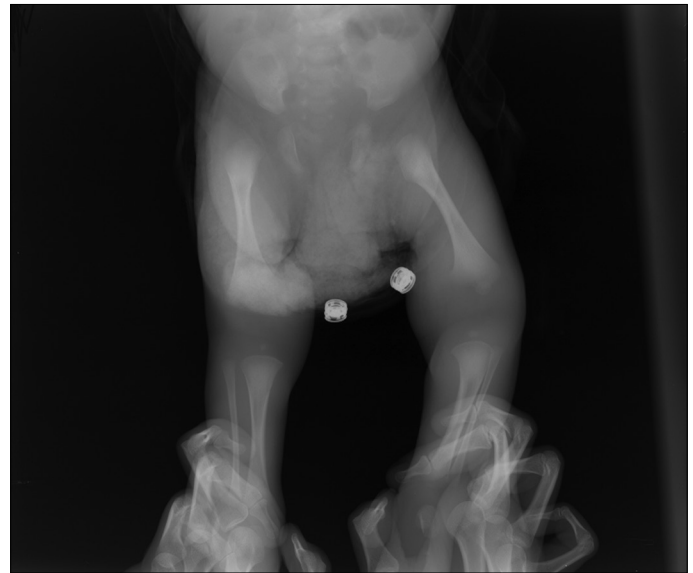


Figure 1. Direct radiography imaging which generates the appearance of swelling in the surrounding soft tissues

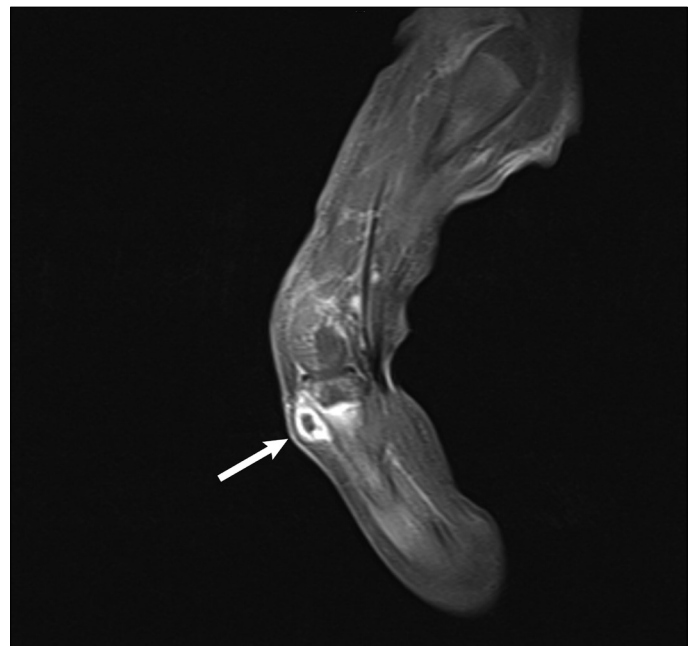


Figure 2. MR imaging of the knee showing enhancement and thickening in the prepatellar bursa

patient whose symptoms improved was completed in 14 days and then discontinued. After being discharged from the hospital, no recurrence or complications were observed in the patient during the six-month follow-up. Written consent was obtained from the family for the case report.

Discussion

Prepatellar bursa and olecranon bursa are two bursas that can be frequently infected in the body (3). Nearly

1/3 of the bursitis cases are septic and 2/3 non-septic (1). Prepatellar bursitis are caused by non-septic reasons such as direct trauma, prolonged pressure (long-term working on the knee), excessive use of the joint, gout arthroplasty, inflammatory arthritis (rheumatoid arthritis or spondyloarthropathies) and septic reasons such as infections (3, 4).

Septic bursitis is caused by the direct inoculation with penetrating microorganisms cases such as sharp object injuries, the progression of an infection such as cellulitis in the adjacent soft tissues or rarely a result of hematogenous spread of the agent in cases such as bacteremia or bacterial endocarditis (3, 5). In our patient, it was thought that bursitis turned to sepsis as a result of secondary hematogenous spread.

Since meningitis is highly likely to accompany neonatal sepsis, LP should be administered to all neonatal sepsis cases if there is no contraindication. Although the BOS protein of our patient was within normal limits according to postnatal age and the BOS glucose taken concurrently with the blood glucose was within normal limits, since cell count increased based on the age group, meningitis was unable to be eliminated. Since methicillin resistant *S. aureus* grew in the blood and urine culture samples of the patient taken on admittance, the treatment of the patient was completed in 14 days.

Annual incidence of prepatellar bursitis is 10/100,000 and given the hospitalization rate of these cases, it turns out that it is 1-12/10,000 (1). Prepatellar bursitis is most common in males aged between 40 and 60 with a ratio of 80% (1). It has been reported it is most common in some occupation groups such as carpenters, housekeepers, miners who have to work on their knees (3). The prepatellar bursitis reported to be more frequently seen in the adult age group, to our best knowledge, has not been reported in the neonatal age group.

The risk factors regarding the development of prepatellar bursitis include previous bursal trauma, existing bursal disease, diabetes mellitus, chronic alcohol abuse, chronic obstructive pulmonary disease, psoriasis, systemic sclerosis, spinal cord injury, systemic lupus, scleroderma, chronic renal failure, hemodialysis patients, human immunodeficiency virus (HIV) infection, steroids and immune deficiency (3, 6, 7). All these factors that generate predisposition have been detected in 25-75% of the patients (8). Since the neonatal period is period when immunity is not fully developed, susceptibility to infection is very high in this period. The risk factors that generated predisposition for our patient might be; that he was in the neonatal age group; the story of two-day hospitalization due to hepatitis; and the invasive procedures made during this period for the examination.

In prepatellar bursitis, swelling, redness and increased heat can be observed due to increasing amount of synovial fluid. Our patient had redness in the left knee, temperature increase, limitation of motion and 1 cm increase in diameter in comparison to the right knee. Taking fluid sample from the bursa, the leukocyte count, gram staining and sending the culture for test is important to for a diagnosis (9). It is also stated that especially MR imaging is the ideal technique for the recognition of pathologies developing secondary to soft tissue infections (10). For the differential diagnosis of bone, joint and soft tissue infection diagnosis, an MR imaging of our patient was taken and the prepatellar bursitis diagnosis was made by the MR imaging.

Although *S. aureus* is the most commonly isolated agent in septic bursitis cases, cases of septic bursitis based on different agents have also been reported in the literature (11). In a study in which a total of 56 adult cases were followed up due to septic bursitis and given an aspiration of bursal fluid were evaluated, while *S. aureus* was the most commonly isolated agent (87.5%), *Staphylococcus epidermidis*, *Streptococcus agalactiae* and *Streptococcus pneumoniae* were more rarely isolated (3). Although more rarely, there are also case studies that demonstrated that *Mycobacteria* spp., *Brucella* spp., fungus and algae were the agents. In a study in which they retrospectively evaluated 10 pediatric cases diagnosed with septic bursitis, Paisley et al. (12) reported that 80% of the cases had prepatellar bursitis; 70% had the history of direct trauma or local infection; *S. aureus* grew in nine of the bursal fluid aspirates and *Streptococcus pyogenes* in one.

Since our patient was a neonatal, was in septic table and had a small bursa, it was not possible to perform aspiration and obtain fluid in order not to damage the bone tissues. However, since *S. aureus* grew in the blood culture and the symptoms for these microorganisms improved after the treatment, it was thought that prepatellar bursitis developed secondary to sepsis.

The treatment of bursitis in adult patients can be carried out via the oral antibiotics (13). Since our patient was a neonatal, and sepsis co-existed together with meningitis and septic bursitis, the patient was hospitalized and vancomycin treatment was applied for *S. aureus* that grew in the blood culture. It is recommended that in recurrent aspirations, the treatment period be continued till the fifth day after the bursal aspirates were sterile (14). In patients who do not respond to antibiotherapy and percutaneous bursa aspirations, surgical drainage and bursectomy are recommended (1). Since the patients with prepatellar bursitis show more aggressive symptoms and are usually

presented with clinical findings of bacteremia; therefore, they are diagnosed and treated earlier, they do not require surgical drainage as much as olecranon bursitis. Our patient presented with a septic appearance; since he was diagnosed early and given an appropriate antibiotics for fourteen days, surgical drainage was not required.

In the differential diagnosis of bursitis-related prepatellar swelling, intra-articular effusion-related swelling, septic arthritis, osteomyelitis, fractures and nerve pathologies should be considered (15). The history and physical examination of the patient is crucially important in the differential diagnosis. In the evaluation of the patient, the knee position is a useful symptom in the differential diagnosis. While the patients with septic arthritis keep their knees at the flexion position, the patients with septic prepatellar bursitis prefer to minimize the pressure on the bursa and pain by keeping them at the extension position (16). Our patient also kept his knee joint on the side with bursitis at the extension position. In the follow-up of cases with bursitis, it was reported that osteomyelitis and septic arthritis developed as complications (12).

No complications were observed in our patient neither during the treatment nor the follow-up period.

In conclusion, septic prepatellar bursitis is a rare infection in children and should be considered in the differential diagnosis of patients presenting with swelling of the knee. Early diagnosis and appropriate treatment can reduce morbidity and the need for surgery.

Informed Consent: Written informed consent was obtained from parent of patient.

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