

Don't Do This Case Report

Patella Osteomyelitis Masquerading as Prepatellar Bursitis

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Abstract:

Osteomyelitis of the patella is a rare condition that presents with anterior knee pain and may be difficult to diagnose in younger children as the patellar ossific nucleus is not well formed and overt systemic signs and symptoms of infection may be lacking. We present a case of a 5-year-old male who presented to the emergency department (ED) with anterior knee pain and a swollen prepatellar bursa. This was initially diagnosed as benign and noninfectious prepatellar bursitis. The diagnosis of patella osteomyelitis was finally made once the infection spread to the knee joint requiring operative debridement. While prepatellar bursitis can occur in children as a result of acute or chronic irritation and/or trauma to the anterior knee soft tissues, spontaneous and painful bursitis should illicit consideration for patella osteomyelitis. Magnetic resonance imaging (MRI) may be needed to diagnose patella osteomyelitis, an uncommon site of hematogenous osteomyelitis.

Key Concepts:

- Spontaneous prepatellar bursitis is rare in the pediatric population and the predisposing risk factors are not well understood.
- Patella osteomyelitis can present as prepatellar bursitis that can spread to cause significant intraarticular morbidity if left untreated.
- While ultrasound can detect and quantify bursal fluid, MRI may be needed to assess the status of the patella especially in the young child with immature ossification of the patella.

Introduction

Prepatellar bursitis is extremely rare in children, with only 11 cases identified through a PubMed search for “pediatric prepatellar bursitis.” One case report occurred in an 8-year-old male who sustained a puncture wound to the knee after a fall from his scooter and presented with fever and purulent drainage from the wound. His diagnosis was identified based on wound and blood cultures and explorative arthroscopy.¹ Another case of prepatellar bursitis was documented in an 8-year-old male without preceding trauma presenting with knee pain and fever that was diagnosed with bursal aspiration and MRI. He was subsequently treated with antibiotics.² Pitts et al. published a case report in 2020 of *Kingella kingae* prepatellar bursitis in a 2-year-old female who struck her knee on a bed frame and had an upper respiratory infection one month prior to her knee symptoms.³ Paisley reports on eight cases of pediatric prepatellar septic bursitis, one of which was complicated by septic arthritis of the knee and patella osteomyelitis.⁴

Patella osteomyelitis most often occurs in children between 5 and 10 years of age.⁵⁻⁷ The first documented case was reported by Thirion from Belgium in 1829 and was treated with patellectomy.⁸ As of 2001, according to Roy et al., there have been less than 100 cases of pediatric patella osteomyelitis reported.⁹ Evans reported on five cases in 1962.¹⁰ In 1966, Angella reported on two cases of atraumatic pediatric osteomyelitis of the patella from *methicillin sensitive staphylococcus aureus* (MSSA) without preceding infection.⁵ Mollan and Piggott reported on cases seen in 93 patients in their 1977 article.¹¹ Roy et al. reported four cases of pediatric patella osteomyelitis in 1991 with one case suspected to be secondary to septic arthritis of the knee and one case suspected to be secondary to prepatellar septic bursitis.⁹ These cases demonstrate the highly variable presentation of patella osteomyelitis; this heterogeneity combined with the rarity of the disorder leads to an almost invariable delay in recognition and diagnosis. We present a case of patella osteomyelitis in a previously healthy 5-year-old boy without clear risk factors.

Case Report

A previously healthy 5-year-old male presented to the ED with a 2.5-week history of left anterior knee pain. The pain began on the car ride home after vacationing with his family in Northern Wisconsin. Shortly after the onset of left knee pain that afternoon, he refused to move the knee and later that night was febrile to 101 degrees F. He was prescribed a 10-day course of amoxicillin 250 mg three times daily by a family friend due to concern for Lyme disease endemic to the area. He completed treatment with some improvement in swelling and weight-bearing but never a full return to baseline.

Three days following completion of antibiotics, the patient formally presented to the healthcare system at the ED with his family. He had worsening knee swelling and pain without constitutional signs or symptoms. He localized his pain to his anterior knee just distal to his patella; he could bear weight through the limb but ambulated with a limp. Evaluation of the left knee showed the skin to be without wounds or erythema but with slight warmth compared to the contralateral knee. There was significant prepatellar swelling compared to the contralateral side. There was tenderness to palpation of the prepatellar region but no medial or lateral joint line tenderness. He had pain with terminal flexion but denied pain with axial loading or hip range of motion. He was able to actively extend the knee to 0 degrees and actively flex to approximately 130 degrees. Laboratory evaluation revealed a white blood cell (WBC) count of 10.7, erythrocyte sedimentation rate (ESR) of 36, C-reactive protein (CRP) of 2.6, and negative Lyme test. His left knee radiographs were significant for prepatellar effusion without evidence of a knee effusion (Figure 1). A left knee ultrasound was obtained which showed a 4.2 x 1.3 cm hypoechoic collection suggesting prepatellar bursitis (Figure 2).

At this point, the most probable diagnoses considered in the ED was prepatellar bursitis and conservative treatment of his prepatellar bursitis was advised, and



Figure 1. Left knee anterior-posterior (AP), laterals, and sunrise x-rays demonstrating prepatellar swelling without knee effusion. In retrospect, the ossific nucleus to the left patella has some subtle sclerosis and fragmentations in contrast to the right patella on the sunrise view.

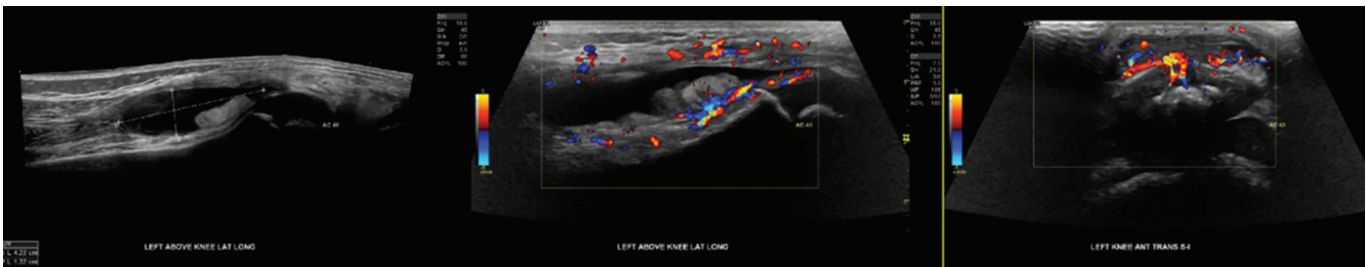


Figure 2. Left knee ultrasound showing 4.2 x 1.3 cm hypochoic prepatellar fluid collection. No significant knee effusion was detected.

follow-up with his pediatrician was arranged. The need for further antibiotic treatment was deferred to the ED team.

Seventeen days later the patient followed up in the ED for his left knee pain—he was refusing to bear weight after a fall onto his left knee into a metal playset. The prior evening, he developed worsening left knee pain, swelling, and was febrile to 101.8 degrees F. His repeat left knee radiographs were significant for a large knee joint effusion and truncation of his medial patella not present on previous radiographs (Figure 3). His pain more specifically localized to the superomedial parapatellar region and lateral joint line and was worse with any motion of the knee, deep flexion being worse. His examination was notable for obvious parapatellar and knee effusions, irritable range of motion with flexion

nearing 90 degrees, stiffness with only 15–90 degrees of active knee range of motion, and tenderness to palpation of the lateral joint line (Figure 4). His WBC was 11.7, ESR was 46, and CRP was 12.1. Left knee MRI was ordered and revealed an enhancing lesion within the anterior patella eroding through the anterior cortex of the patella into the prepatellar bursa highly suspicious for osteomyelitis with communicating infection of the bursa as well as thickening and enhancement of the synovium suggestive of infectious synovitis (Figure 5). Blood cultures were obtained, and a left knee aspirate revealed 5 mL of cloudy yellow sanguineous fluid. The aspirate was significant for 294,270 nucleated cells.

He was taken to the operating room for irrigation and debridement of left patella osteomyelitis and left knee septic arthritis. A longitudinal incision down to the

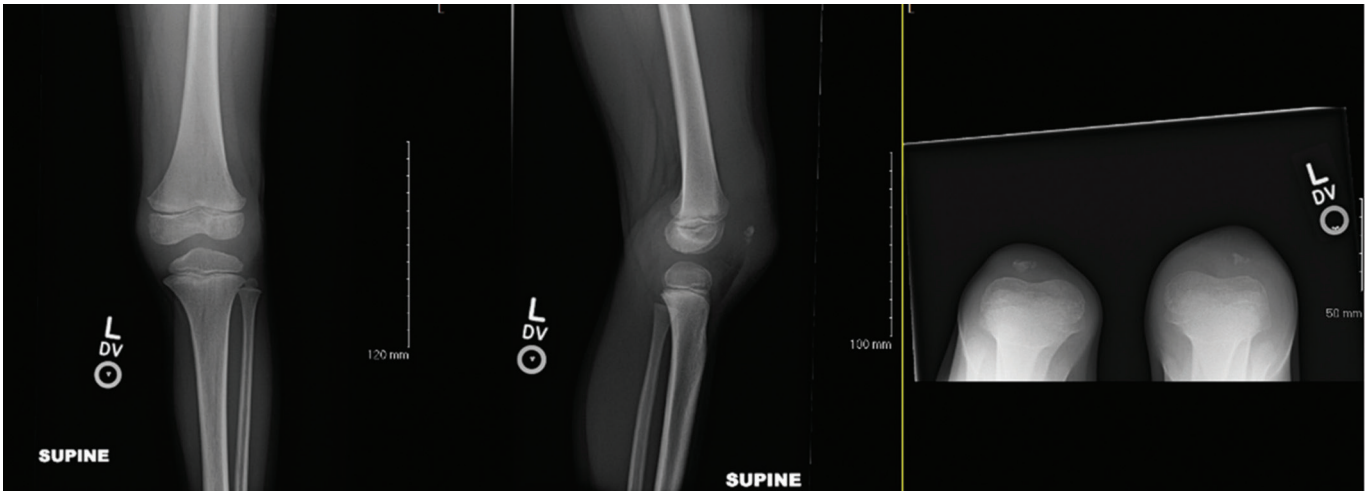


Figure 3. Left knee AP, lateral, and sunrise x-rays demonstrating a large knee joint effusion and further changes in the patella.

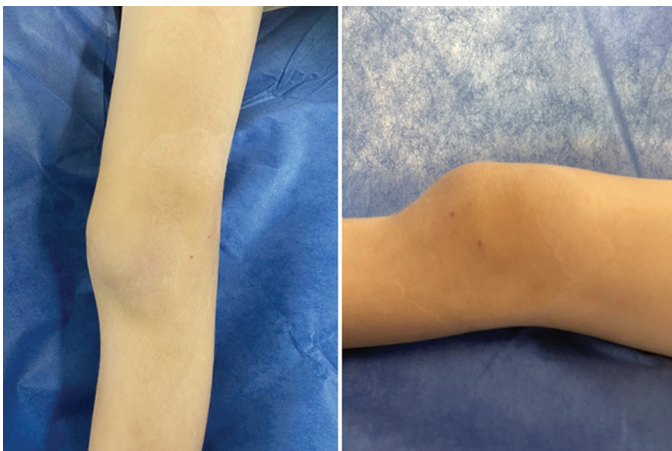


Figure 4. Left knee anterior and lateral views showing continued prepatellar swelling now with a knee effusion.

prepatellar bursa showed purulence, which appeared to track out of a hole in the patella (Figure 6). The patella was curetted, and debris removed. A medial parapatellar incision revealed a significant amount of purulence extruding from the knee joint. Specimens were sent for aerobic, anaerobe, acid-fast and fungal cultures from the patella and the knee joint as well as pathology from the patella and joint sent for permanent section.

He was discharged home on intravenous (IV) cefazolin via PICC line 3 days after surgery with appropriate infectious disease and orthopaedic follow-up in place. At discharge, his inflammatory labs were down trending

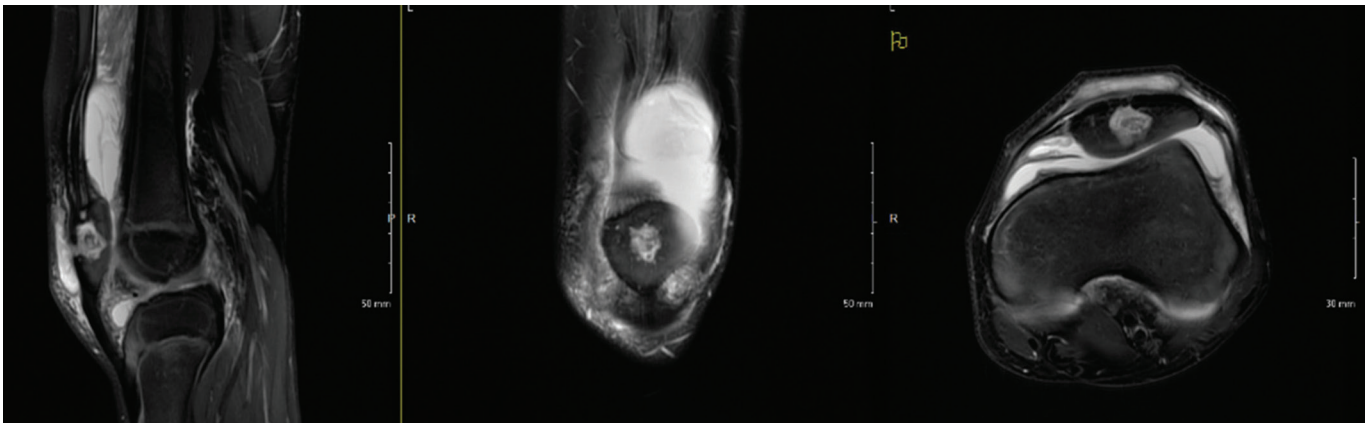


Figure 5. Left knee sagittal, coronal, and axial MRI showing an enhancing lesion in the anterior patella eroding through the anterior cortex of the patella into the prepatellar bursa with knee effusion and thickening and enhancement of the synovium.

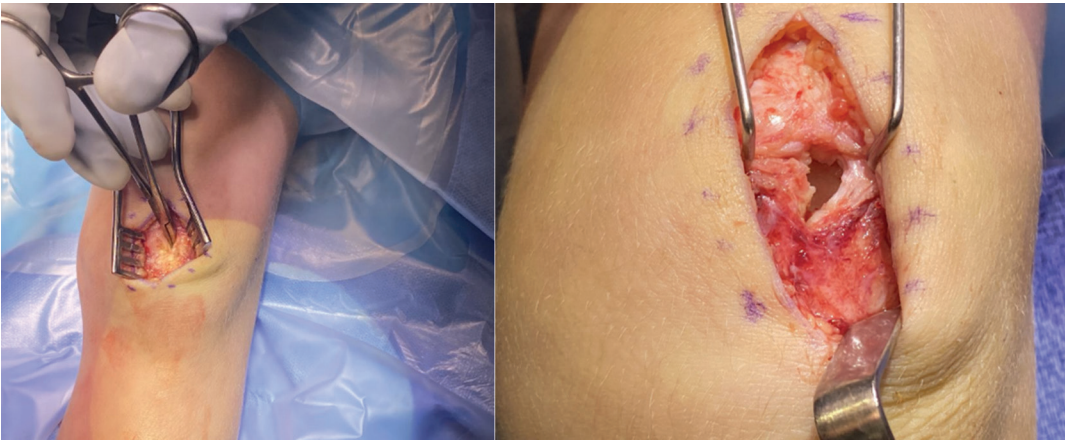


Figure 6. Intraoperative pictures showing longitudinal incision of prepatellar bursa with connecting tract between bursa and patella.



Figure 7. Clinic photos 6 weeks from surgery demonstrate good healing, no pain, and full range of motion.

and cultures were growing MSSA. The patella biopsy was consistent with acute osteomyelitis with fragments of necrotic bone, acute inflammation, fibrinopurulent debris, and focal marrow fibrosis.

At his 2-week clinic follow-up he was doing well with no signs of infection. Radiographs showed expected postoperative changes without signs of recurrence. After 3 weeks of IV cefazolin, his inflammatory markers had normalized, and he was transitioned to 2 weeks of oral Keflex. On his 6- and 12-week postoperative clinic visits, he continued to clinically improve (Figure 7). His 12-week radiographs demonstrated continued ossification of his patella similar to his contralateral side (Figure 8).



Figure 8. Left knee AP, lateral, and sunrise x-rays demonstrating decreased soft tissue swelling and truncation of the left patella remains but with progressive ossification.

Discussion

In children, osteomyelitis is usually a hematogenous infection of the metaphysis and often presents with nonspecific findings such as pain over the involved bone, local inflammatory changes, and systemic symptoms.¹²⁻¹⁴ Intraarticular spread of metaphyseal osteomyelitis can occur at the proximal humerus, proximal radius, proximal femur and distal tibia. Osteomyelitis of an epiphysis is less common but can more easily spread to the joint. Osteomyelitis in the patella is rare in children and requires a high index of suspicion as early recognition and intervention allow a high cure rate.^{3,15} In our case, we suspect that patella osteomyelitis was the original cause of anterior knee pain and the delay in diagnosis was a result of antibiotic use for presumed Lyme disease.

Spontaneous prepatellar bursitis in pediatric patients without risk factors e.g., activities that involve repetitive anterior knee trauma such as wrestling or penetrating trauma is rare, and the causes are not clear. We believe the early swelling in the prepatellar region was a result of the underlying osteomyelitis. Eventually the infection spread anteriorly into the prepatellar space and posteriorly into the knee joint itself. One could hypothesize that the infection first started in the prepatellar bursa and then spread into the patella and then the knee joint—yet we believe this to be unlikely.

Our initial work up included plain radiographs, ultrasound, and nonspecific laboratory values which suggested a diagnosis of prepatellar bursitis. An ultrasound was utilized to help differentiate prepatellar bursitis versus intraarticular effusion to help differentiate prepatellar bursitis from septic arthritis; however, ultrasound has not been demonstrated to be effective in diagnosing patella osteomyelitis. For this reason, it is important to include patella osteomyelitis in the differential of anterior knee pain and *spontaneous* prepatellar bursitis and order MRI evaluation. Haine et al. also stressed that MRI is critical to the accurate diagnosis of osteomyelitis.¹⁶

In conclusion, spontaneous prepatellar bursitis with knee pain is uncommon in the pediatric population especially with a lack of acute or chronic causes. In these cases,

one should consider early patella osteomyelitis in the differential diagnosis with advanced imaging in the form of an MRI. Prompt diagnosis and appropriate treatment can potentially avoid the risk of intraarticular spread.

Additional Links

POSNAcademy videos of Patella Osteomyelitis:

- Pediatric Orthopaedic Emergency Cases https://www.posnacademy.org/media/Pediatric+Orthopaedic+Emergency+Cases/0_tp514azk/19139942
- Management of Bone Loss in Osteomyelitis https://www.posnacademy.org/media/Management+of+Bone+Loss+in+Osteomyelitis/0_57vwcjzk/19139942
- Musculoskeletal Infection: Hijacking the Acute Phase Response https://www.posnacademy.org/media/Musculoskeletal+InfectionA+Hijacking+the+Acute+Phase+Response/0_c56h8t2u/19139942

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