Cureus
Part of SPRINGER NATURE

Open Access Case Report

Bilateral Septic Arthritis of the Hips in Two Children: Contrasting Presentations, Diagnostic Challenges, and Management

Review began 10/17/2026
Review ended 10/26/2026
Published 11/01/2026

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DOI: 10.7759/cureus.118951

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Abstract

Bilateral septic arthritis of the hip is rare in children and may lead to substantial joint damage if diagnosis and treatment are delayed. We report two children with contrasting presentations and clinical courses. The first was a previously healthy seven-year-old boy who presented with progressive bilateral hip pain and fever. Despite initially reassuring examination and ultrasonographic findings, clinical deterioration and rising inflammatory markers prompted bilateral hip aspiration and arthrotomy. Turbid synovial fluid supported a diagnosis of presumed septic arthritis, although cultures remained negative. Following six weeks of antimicrobial therapy, his clinical condition and inflammatory markers improved, and hip function was preserved at four months. The second patient was a 15-month-old boy with severe hemophilia B who developed methicillin-resistant *Staphylococcus aureus* (MRSA) bacteremia and bilateral hip infection. Imaging revealed bilateral hip effusions, right hip dislocation, and pulmonary lesions consistent with septic emboli. Bilateral arthrotomy and washout were performed with perioperative factor IX replacement. Persistent bacteremia resolved after removal of the central venous port and continued antimicrobial treatment. At five months, imaging showed no persistent hip dislocation or evident avascular necrosis, although a residual limp remained. These cases illustrate the variable presentation and potentially severe complications of bilateral septic arthritis in children. Repeated clinical assessment, timely surgical drainage, appropriate antimicrobial therapy, and multidisciplinary management are essential. Culture-negative cases require careful interpretation of clinical and operative findings, while children with underlying bleeding disorders and hip dislocation require individualized treatment and prolonged follow-up to assess hip development and function.

Categories: Orthopedics, Infectious Disease, Allergy/Immunology
Keywords: arthrotomy, bilateral septic arthritis, children, culture-negative infection, hemophilia b, hip dislocation, hip joint, methicillin-resistant staphylococcus aureus (mrsa)

Introduction

Septic arthritis of the hip is an orthopedic emergency in children because delayed diagnosis and treatment can result in irreversible cartilage damage, impaired femoral head development, and long-term functional disability. Early recognition may be challenging because clinical manifestations vary with age, the causative organism, and the stage of infection. Fever, physical examination findings, inflammatory markers, and imaging results should therefore be interpreted together. Clinical prediction tools can help differentiate septic arthritis from transient synovitis but should not replace clinical judgment when symptoms progress or findings remain concerning [1,2].

Simultaneous septic arthritis of both hips is uncommon and may create additional diagnostic challenges because bilateral joint symptoms can suggest inflammatory or postinfectious conditions. However, bilateral involvement should not reduce suspicion of infection in children with progressive pain, inability to bear weight, or elevated inflammatory markers. Ultrasonography and magnetic resonance imaging can identify joint effusions and associated abnormalities, while synovial fluid aspiration, Gram staining, and culture remain essential diagnostic investigations. Although prior antibiotic exposure may reduce microbiological yield, molecular testing can help identify pathogens when routine cultures are negative [3,4].

Kingella kingae is an important cause of osteoarticular infection in young children, particularly those aged approximately six months to four years. Its presentation may be relatively mild, with limited fever and modest elevations in inflammatory markers, complicating diagnosis. Moreover, this fastidious organism may not grow reliably using conventional culture methods. Molecular diagnostic techniques, particularly polymerase chain reaction (PCR) testing of synovial fluid, have improved pathogen detection. Therefore, K. kingae should be considered in young children with suspected osteoarticular infection, particularly when

routine cultures are negative [5,6].

Septic arthritis of the pediatric hip can compromise femoral head position and development through infection-related joint pressure and structural damage. Prompt antimicrobial treatment and appropriate surgical drainage are therefore important when bacterial infection is suspected. Management may be more complex in children with underlying hematological disorders, in whom joint infection can be difficult to distinguish from hemarthrosis and invasive procedures require additional planning. These challenges emphasize the importance of multidisciplinary care and appropriate follow-up to assess hip structure and function after treatment [2,7].

We report two children with bilateral septic arthritis of the hips and contrasting clinical presentations. The first was a previously healthy seven-year-old boy with progressive symptoms, elevated inflammatory markers, purulent bilateral joint aspirates, and negative cultures despite initially subtle imaging findings. The second was a 15-month-old boy with severe hemophilia B and methicillin-resistant Staphylococcus aureus (MRSA) bacteremia, whose bilateral septic hip arthritis was complicated by right hip dislocation. These cases highlight the need for clinical reassessment when symptoms progress despite initially reassuring investigations and the importance of monitoring hip structure and function following severe pediatric joint infection.

Case Presentation

Case presentation 1: bilateral septic arthritis of the hip in a previously healthy seven-year-old boy

A previously healthy seven-year-nine-month-old boy presented to King Hussein Medical Hospital emergency department in March 2026 with acute pelvic pain and inability to walk, beginning on the morning of presentation (Day 1). He had a concurrent upper respiratory tract infection but no history of trauma or recent antibiotic use. His medical history was notable for recurrent follicular tonsillitis associated with cervical lymphadenopathy since the age of five years.

Initial Presentation and Investigations

On initial examination, the patient was afebrile, with no visible swelling and preserved range of motion in both hips. Tenderness was elicited only during external rotation. Distal neurovascular examination was normal. Pelvic radiographs showed no fracture or other significant abnormality (Figure *1*), and initial hip ultrasonography demonstrated no joint effusion. Laboratory investigations revealed a white blood cell (WBC) count of 9.6 × 10^3/µL (reference range: 4.5-13.5 × 10^3/µL), a C-reactive protein (CRP) level of 51.6 mg/L (less than 5 mg/L), and an erythrocyte sedimentation rate (ESR) of 35 mm/h (reference range: 0-10 mm/h).

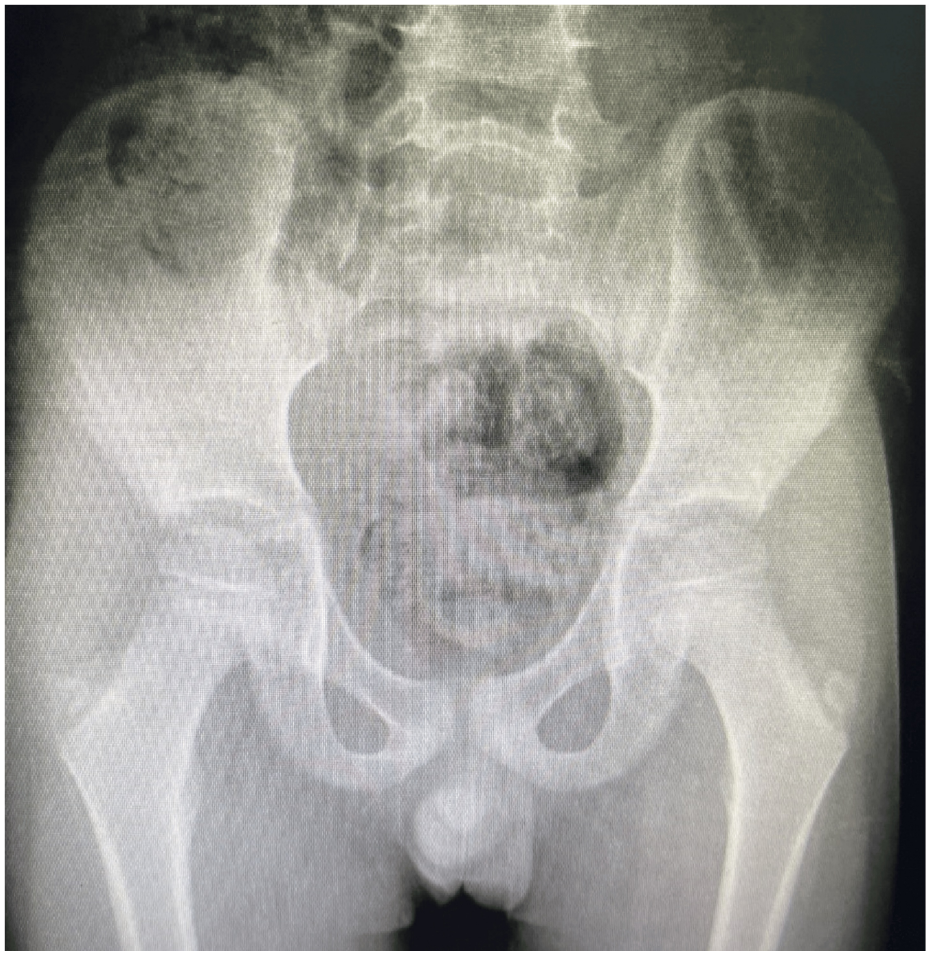


FIGURE 1: Case 1 Initial Pelvis Radiograph

Initial presentation anteroposterior pelvic radiograph, demonstrating the absence of an obvious bony abnormality.

Despite the elevated CRP and inability to walk, the initial orthopedic assessment resulted in a recommendation for rest, analgesia, and observation with instructions to return if symptoms worsened.

Over the following two days, the patient returned with persistent bilateral hip pain, a limp, reported lower-limb weakness, and fever. He was admitted under the pediatric team and commenced on intravenous ceftriaxone before definitive joint aspiration. On subsequent orthopedic reassessment, he was afebrile following paracetamol administration and had relatively preserved, painless hip range of motion. Laboratory investigations showed an ESR of 50 mm/h, a CRP of 65 mg/L, and a WBC count of 13 × 10^3/µL. Repeat ultrasonography demonstrated minimal effusions in both hips. Given the relatively reassuring examination and limited sonographic findings, septic arthritis was initially considered less likely, and the patient remained under observation.

Clinical Deterioration and Advanced Imaging

On Day 4, the patient's clinical condition deteriorated. He appeared unwell and developed a temperature of 38.9 °C, with increasing bilateral hip pain and moderate tenderness during passive hip movement. He could bear weight only partially and walked with a pronounced limp. Repeat laboratory investigations demonstrated a WBC count of 15 × 10^3/µL and a markedly elevated CRP of 186 mg/L.

Magnetic resonance imaging (MRI) of both hips was subsequently performed. The study demonstrated mild bilateral hip joint effusions, with symmetrical femoral heads and no abnormal bone marrow signal or edema. The limited effusions and absence of evident osseous abnormalities did not reflect the severity of the patient's clinical deterioration (Figure *2*).

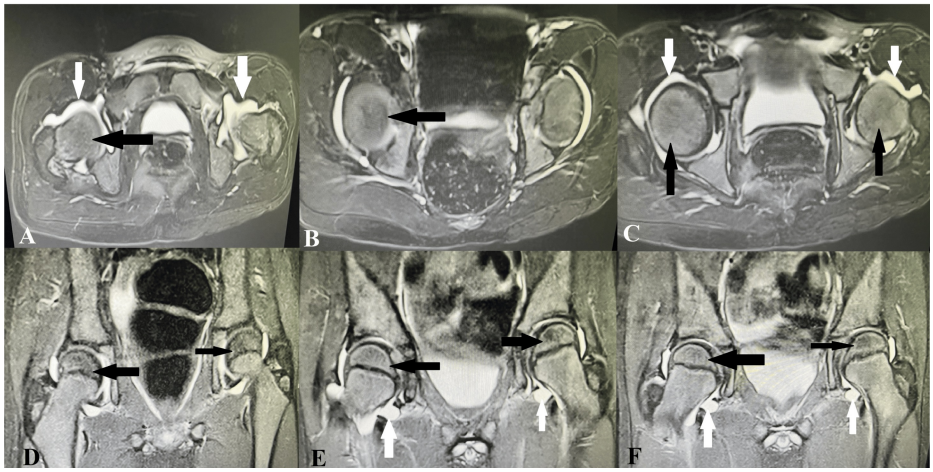


FIGURE 2: Case 1 MRI Findings

Preoperative MRI of both hips obtained on Day 4 includes representative axial (A-C) and coronal (D-F) images demonstrating bilateral joint effusions (white arrows) and the absence of obvious femoral head marrow abnormalities (black arrows).

Surgical Intervention and Intraoperative Findings

In view of the progressive clinical deterioration, fever, and substantially elevated inflammatory markers, bilateral hip aspiration and surgical drainage were undertaken on Day 4. Under general anesthesia, with the patient in the supine position, both hips were aspirated through a subadductor approach under fluoroscopic guidance. Approximately 6 mL of turbid fluid was obtained from each hip. The aspirated material had reduced viscosity and a positive string test. Synovial fluid analysis revealed WBC counts of 35,000/μL in the right hip and 25,000/μL in the left hip, with more than 85% neutrophils in both samples (Figure *3*).

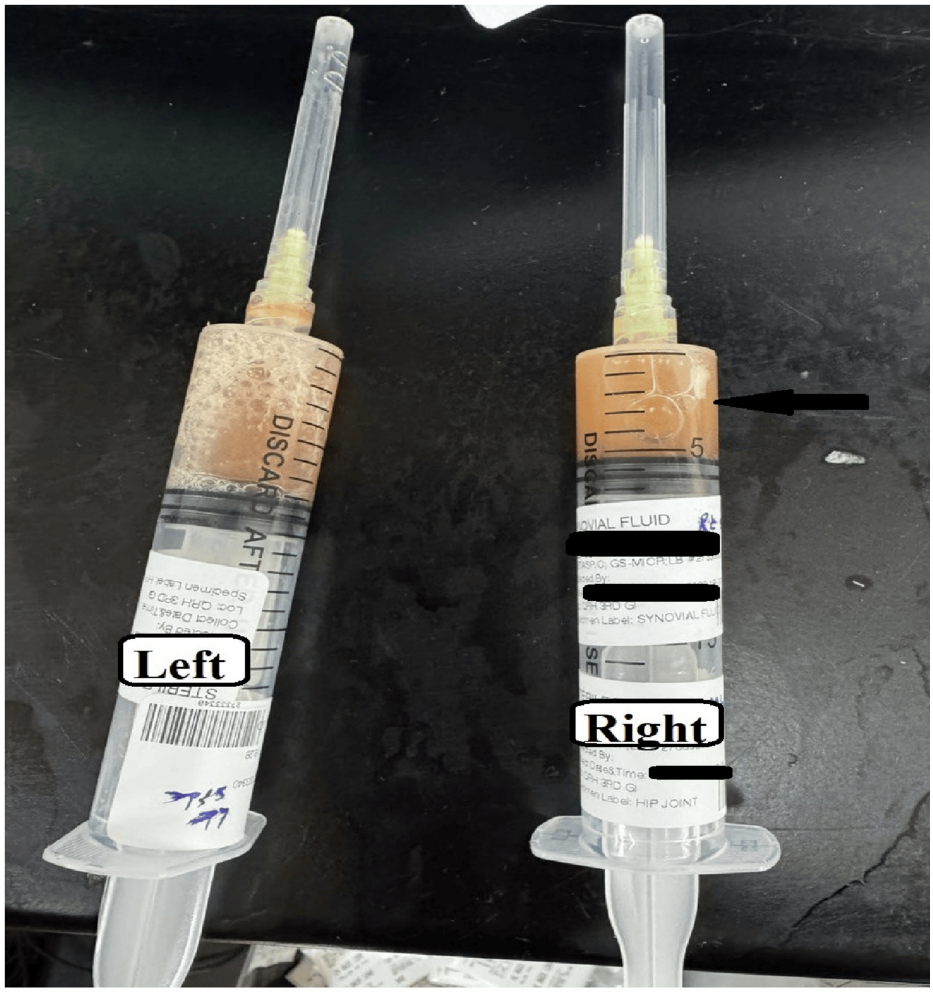


FIGURE 3: Case 1 Synovial Hip Aspirate

Clinical photographs of the aspirated turbid fluid from both left and right hip joints in syringes (black arrow), demonstrating its gross appearance. All patient identifiers were removed.

Given the aspiration findings and the high clinical suspicion of bilateral septic arthritis, both hips were surgically explored and drained during the same anesthetic session by the same surgical team. Each hip was approached through an approximately 5-cm anterior incision extending from just distal to the anterior superior iliac spine toward the patella. The sartorius-tensor fasciae latae interval was developed, and the rectus femoris was retracted medially to expose the hip capsule. Capsulotomy resulted in the release of turbid fluid, and both capsules appeared thickened. Swab specimens and capsular tissue biopsies were obtained for microbiological and histopathological examination. Both joints were thoroughly irrigated, and an intra-articular drain was placed in each hip before wound closure.

The patient was initially maintained non-weight-bearing and received analgesia and antimicrobial therapy. Both intra-articular drains were removed on postoperative Day 3 (Figure *4*).

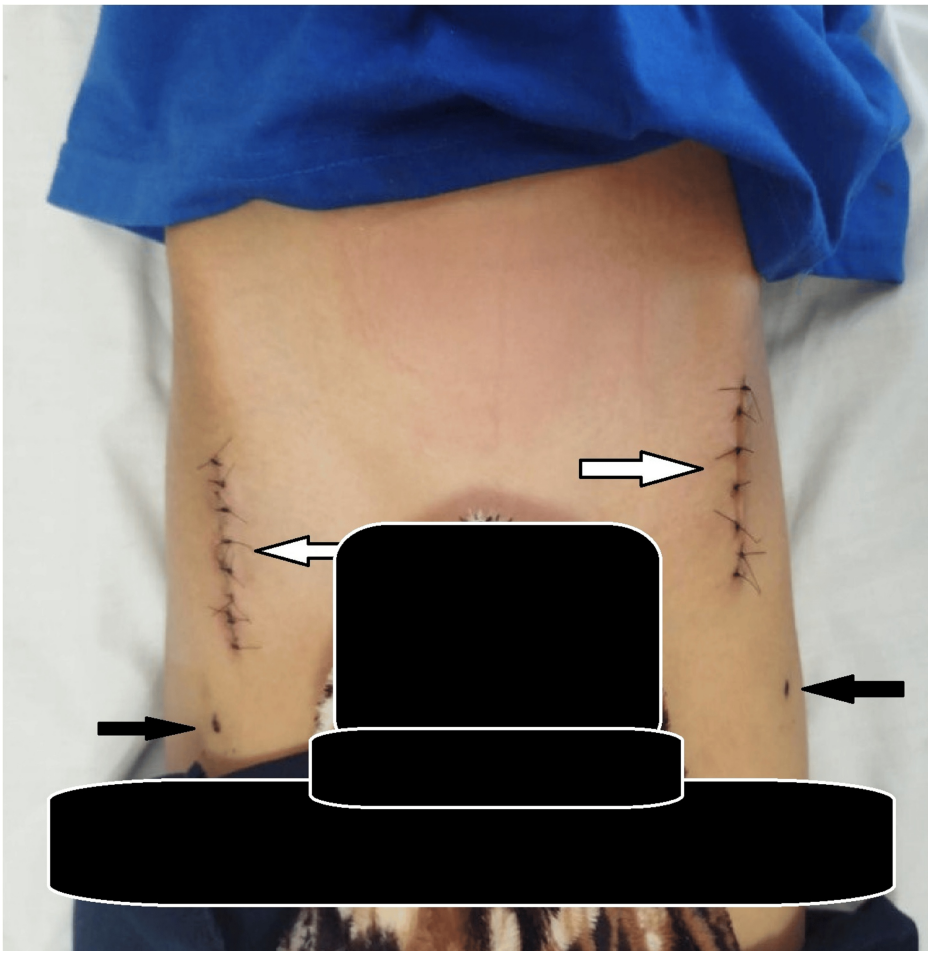


FIGURE 4: Case 1 Clinical Photo of the Surgical Incisions

Postoperative day 3 clinical photographs of the bilateral anterior hip incisions, demonstrating the wound appearance (white arrows), and drain sites post drain removal (black arrows).

Microbiological Investigations and Treatment

Gram staining of the synovial fluid demonstrated abundant white blood cells but no visible organisms. Cultures of synovial fluid, operative swabs, blood, and urine remained negative. A nasal swab for MRSA was also negative. These findings were interpreted in the context of intravenous antibiotic treatment initiated before definitive aspiration.

Histopathological examination of both capsular biopsies demonstrated fibroconnective tissue lined by benign synovium with chronic inflammatory changes, without granulomas or malignancy. Additional investigations, including immunoglobulin levels, flow cytometry, echocardiography, cytomegalovirus PCR, Epstein-Barr virus PCR, Brucella serology, and antistreptolysin O titre, did not reveal a significant abnormality.

By Day 6 of hospitalization, the patient was afebrile, his WBC count had decreased to $10 \times 10^3/\mu L$, and his CRP had declined to 147 mg/L. Subsequently, his ESR and CRP normalized. After a total hospital stay of 13 days, he was discharged following consultation with the infectious diseases team, with a recommendation to continue oral amoxicillin-clavulanate at 80 mg/kg/day in three divided doses. At discharge, all surgical incisions were clean and dry, and the sutures had been removed. He was walking well, with full range of motion and no functional limitations, tenderness, or overlying skin changes. The total documented antibiotic course was six weeks, including intravenous and oral treatment.

Follow-up and Outcome

At follow-up, inflammatory markers continued to improve. By Day 32, the CRP had decreased to 0.36 mg/L, the ESR to 8 mm/h, and the WBC count to $7.55 \times 10^3/\mu L$. At the latest clinical assessment, four months after discharge, the patient was ambulating with full weight-bearing and reported minimal pain. Both surgical

incisions were clean and dry, and no functional limitation was identified. Follow-up radiographs showed no significant abnormality or radiographic evidence of osteomyelitis nor femoral head avascular necrosis (AVN) (Figure 5). Laboratory investigations were within normal limits, with a CRP of 2 mg/L, an ESR of 12 mm/h, and a WBC count of 6.3 × 10^3/µL.

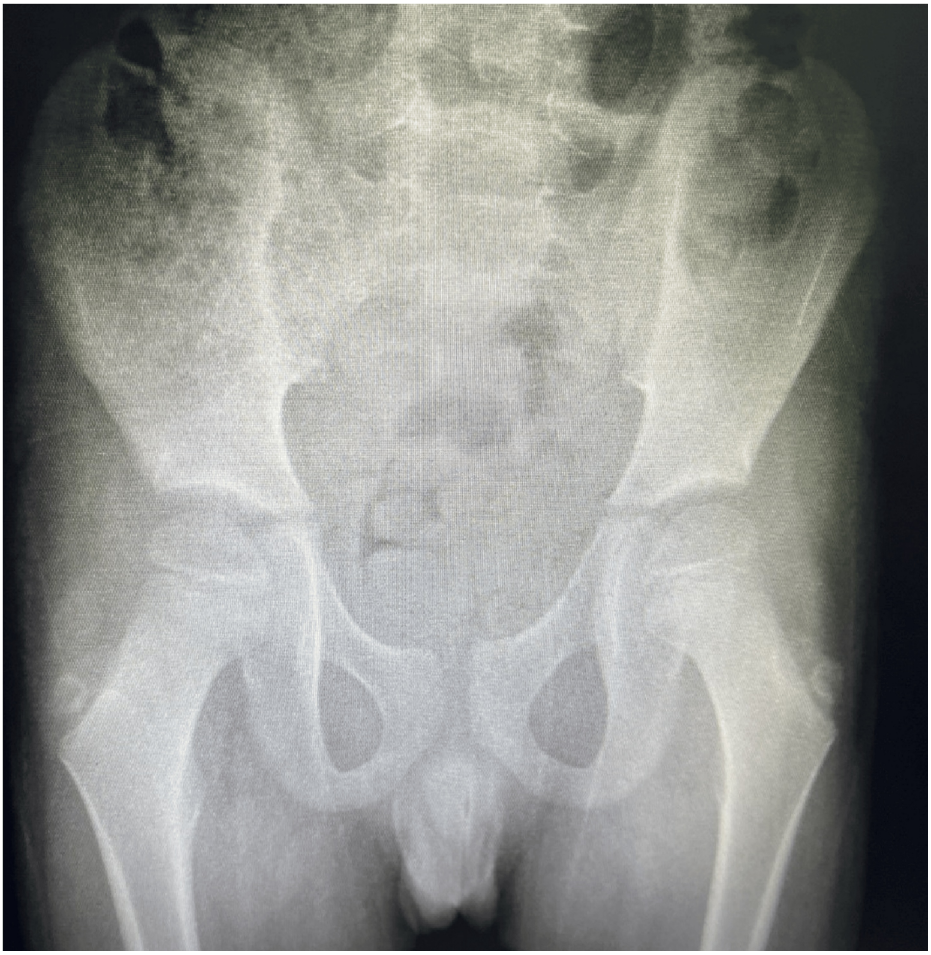


FIGURE 5: Case 1 Pelvis Radiograph Follow-up

Four-month outpatient clinic follow-up: Anteroposterior pelvis radiographs showed no significant abnormality or radiographic evidence of osteomyelitis or femoral head avascular necrosis (AVN).

Although the clinical course, purulent aspirates, synovial neutrophilia, and response to treatment supported the treating team's diagnosis of septic arthritis, the causative organism remained unidentified. The immunology team had also considered toxic synovitis in the differential diagnosis. Continued clinical surveillance was therefore important to assess sustained recovery and exclude the emergence of further joint abnormalities.

Case presentation 2: bilateral MRSA septic arthritis of the hips in a toddler with severe hemophilia B, complicated by right hip dislocation

A 15-month-old boy weighing 12 kg was admitted to Queen Rania Hospital For Children on May 2026 with a three-day history of fever, reaching 40 °C, and increasing irritability. The patient had severe hemophilia B and was receiving weekly factor IX (FIX) prophylaxis through an implanted central venous port. His most recent prophylactic dose had been administered one day before admission. His FIX activity level was 59%, and, following hematology consultation and assessment of his coagulation status, the hematologist approved proceeding with surgery. He had also sustained a head injury approximately three months earlier.

Initial Presentation and Investigations

On admission, the child appeared unwell, irritable, and dehydrated but was not in respiratory distress. There was no reported active bleeding, and the chest was initially clear on examination. The abdomen was soft, and the port insertion site showed no obvious signs of infection. Initial investigations included a complete

blood count, renal and liver function tests, blood cultures, urinalysis, and urine culture. Abdominal ultrasonography, brain computed tomography (CT), and pelvic radiography were also requested (Figure 6).

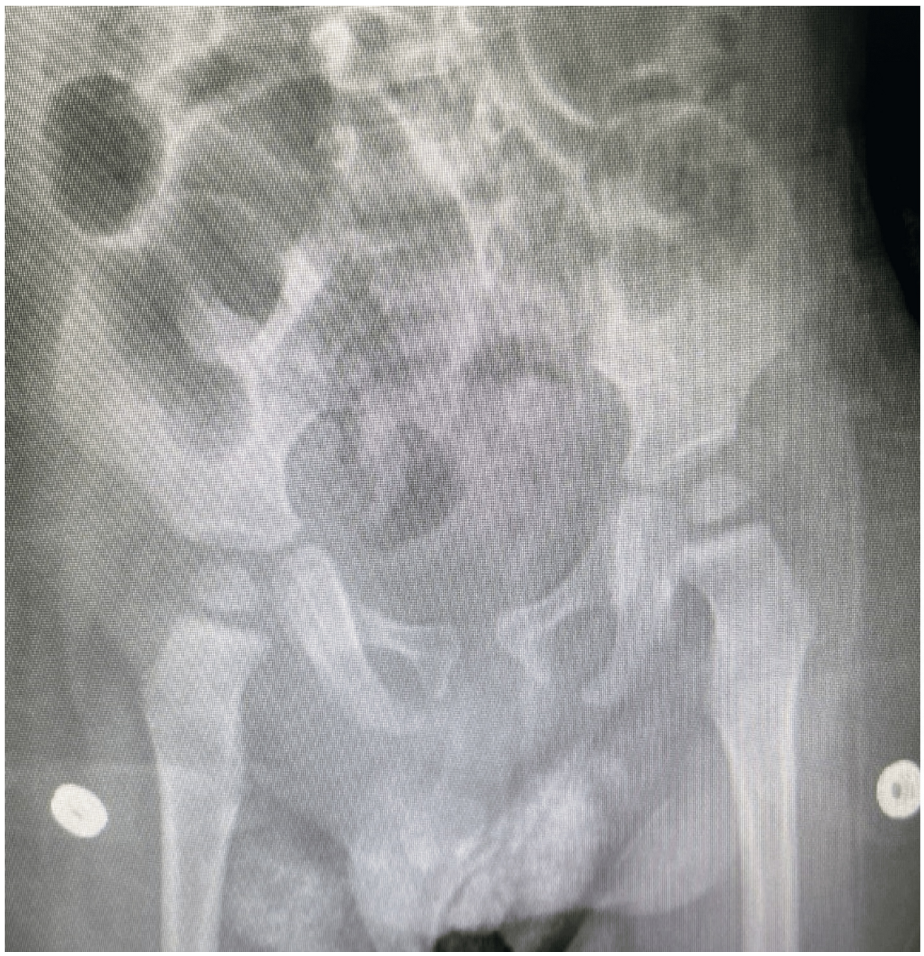


FIGURE 6: Case 2 Admission Pelvis Radiograph

Initial admission pelvic anteroposterior radiograph, demonstrating both hips appearance before the diagnosis of septic arthritis and right hip dislocation, showing no obvious boney pathology.

The initial presentation raised concern for a serious systemic infection, and meningitis was considered in the differential diagnosis. Empirical treatment with intravenous ceftriaxone and vancomycin was initiated, together with dexamethasone. Daily FIX replacement was commenced to provide hemostatic support during the illness and any subsequent invasive procedures.

Clinical Progression and Identification of MRSA Bacteremia

By the third hospital day, the child had been afebrile for approximately 48 hours but remained hypoactive and had developed a cough. He cried whenever his right lower limb was moved, and examination revealed painful, restricted movement of the right hip. His admission blood culture grew MRSA, prompting orthopedic consultation.

The initial WBC count was 31.3 × 10^3/μL, with neutrophils comprising 74.7%, and the admission CRP was reported as 172 mg/L in the laboratory trend. The initial ESR was 84 mm/h. Although the CRP subsequently decreased during early antimicrobial treatment, the development of localized hip pain and restricted movement raised concern for a deep musculoskeletal focus.

In a child with severe hemophilia B, hip pain may initially be attributed to hemarthrosis. However, the presence of MRSA bacteremia, substantial systemic inflammation, and painful restriction of hip movement made septic arthritis a major concern. The absence of obvious bleeding and the stable hematocrit further supported investigation for an infectious cause.

Imaging and Identification of Associated Complications

Preoperative hip ultrasonography demonstrated effusions in both hip joints, more pronounced on the right, without echogenic free-floating debris. CT performed on second day of admission confirmed a moderate right hip effusion and a smaller left hip effusion, accompanied by soft-tissue edema involving both upper thighs, again more marked on the right.

The CT examination demonstrated multiple peripheral pulmonary opacities, including a cavitating lesion. In the context of persistent MRSA bacteremia, these findings, together with the musculoskeletal radiologist's report, supported the diagnosis of septic pulmonary emboli.

Radiographs and MRI confirmed a right hip dislocation (Figure 7). The precise timing of the dislocation relative to the onset of infection and surgical drainage could not be determined. Previous radiographs obtained during developmental dysplasia of the hip screening had reportedly shown no evidence of dislocation. In contrast, the pelvic radiograph obtained at the current admission clearly demonstrated the dislocation.

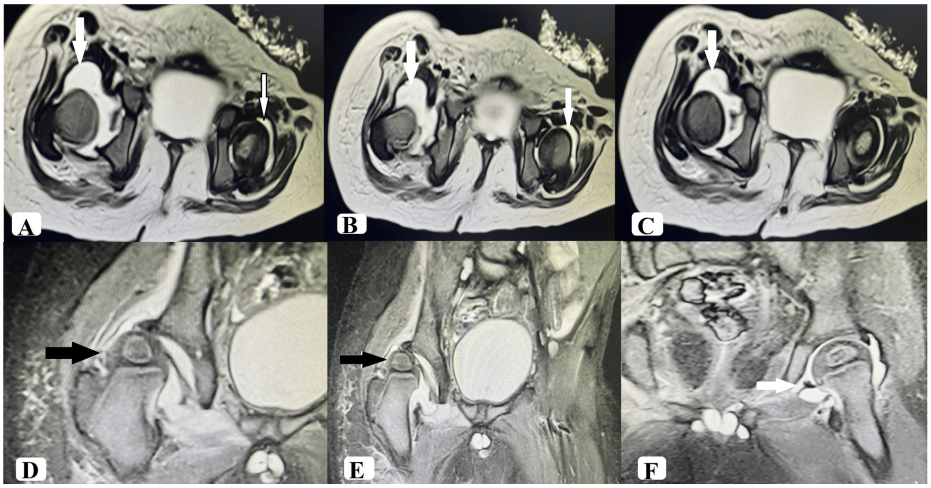


FIGURE 7: Case 2 MRI Findings

Pelvic MRI axial (A-C) and coronal (D-F) images demonstrating bilateral hip effusion (white arrows), more significant on the right side, without femoral head edema and obvious right hip septic dislocation (black arrow).

Surgical Management and Intraoperative Findings

On the sixth day of admission, the child underwent bilateral hip arthrotomy, Cultures, and irrigation under general anesthesia. Given his severe hemophilia B, FIX replacement was administered during the perioperative period to provide hemostatic coverage.

The right hip was approached first through an anterior longitudinal incision. The surgical approach was developed through the regular interval to expose the hip capsule. Capsulotomy released approximately 150 mL of frank pus from the right hip. The joint was irrigated with 300 mL of normal saline, followed by hemostasis and layered wound closure.

The left hip was subsequently approached using the same anterior approach. Approximately 50 mL of turbid fluid was encountered following capsulotomy. The left joint was irrigated with 200 mL of normal saline and closed in layers. A drain was placed in each hip, and postoperative dressings were applied (Figure 8).

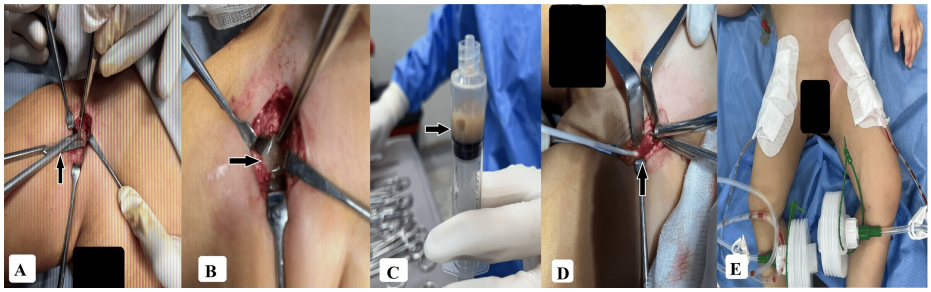


FIGURE 8: Case 2 Intraoperative Photographs Illustrating the Surgical Drainage of Bilateral Septic Hip Arthritis

(A) Right anterior hip incision, exposure of the joint capsule, and capsulotomy using scissors (arrow). (B) Evacuation of the frank purulent material from the right hip joint (arrow). (C) Frank pus aspirated from the right hip joint into a syringe (arrow). (D) Drainage of the left hip joint, demonstrating the appearance of the turbid intra-articular fluid (arrow). (E) Final appearance of the surgical incisions following placement of intra-articular drains and application of dressings.

Synovial fluid specimens were submitted for microbiological examination. The synovial culture subsequently demonstrated growth of MRSA, consistent with the organism isolated from the admission blood culture.

Antimicrobial Treatment and Management of the Central Venous Port

The initial antimicrobial regimen was subsequently modified to meropenem and vancomycin, with vancomycin providing targeted treatment against MRSA. Despite antimicrobial therapy, blood cultures remained positive until removal of the implanted central venous port on the ninth hospital day. The first documented negative blood culture was obtained on the day of port removal.

The temporal relationship between port removal and clearance of bacteremia, together with the subsequent inflammatory changes at the port site, supported the port as the probable source of the persistent bloodstream infection. The available records did not establish whether the catheter tip itself was cultured.

The child continued to receive FIX replacement according to the hematology team's protocol throughout the three-week hospitalization. Daily FIX dosing was documented from admission, with a regimen of 500 IU daily from hospital day 4. Weekly prophylaxis was resumed according to his established schedule. No clinically significant bleeding complications occurred during the bilateral hip procedures or the subsequent postoperative period.

Antibiotic therapy was guided by antimicrobial susceptibility results. The patient received intravenous vancomycin for three weeks, followed by an additional three weeks of oral antibiotic therapyoral linezolid following infectious disease review, for a total antibiotic treatment duration of approximately six weeks.

Postoperative Course and Hip Dislocation Management

Following surgery, the child remained clinically stable and became afebrile. However, his subsequent course was characterized by persistent pain and fluctuations in inflammatory markers. On the first postoperative day, his temperature was 37.2 °C, heart rate was 110 beats/min, and oxygen saturation was 98%. The port site subsequently developed swelling and erythema, prompting removal of the device as described above.

Between day 8 and day 14, the child remained active and afebrile, while the WBC count decreased from 21.4 to approximately 20 × 10^3/μL and the CRP declined to 31 mg/L. Repeat ultrasonography on day 16 demonstrated no residual effusion in either hip.

Despite these findings, the child continued to experience pain and refused to walk during the subsequent days. By day 18-20, the CRP had increased to 79.6 mg/L and the ESR to approximately 110 mm/h. Orthopedic reassessment was therefore undertaken to evaluate the persistent functional symptoms and inflammatory response.

The right hip dislocation was managed nonoperatively following drainage of the septic joint. No additional surgical procedure was performed specifically for the dislocation, and the treating team adopted a watchful-waiting approach with clinical and radiographic surveillance (Figure *9*).

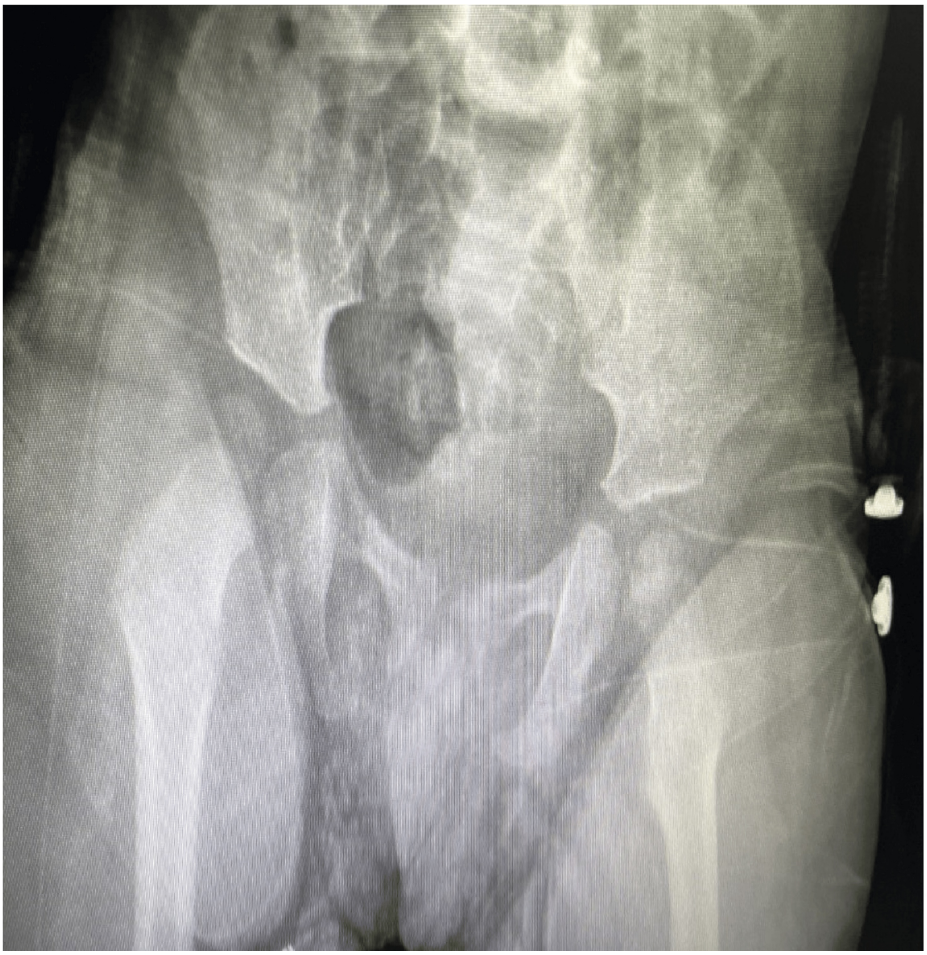


FIGURE 9: Case 2 Discharge Radiograph

Pre-discharge anteroposterior pelvis radiograph showing reduced both hips without signs of AVN or osteomyelitis.

AVN, avascular necrosis

The hospital course in the third week was uneventful, his inflammatory markers dropped significantly, on his last day of admission his WBC came back to normal limits with 7 x 10^3/µL, and CRP declined to 14 mg/L, and the ESR to 35 mm/h. The infectious team was involved with his discharge plan to switch him on oral Linezolid.

Follow-up and Outcome

At the latest follow-up, five months after the acute presentation, the child had no radiographic evidence of persistent right hip dislocation. There were also no reported radiographic signs of AVN of the femoral head or degenerative arthritis at that assessment. No additional surgery had been performed for the previous dislocation (Figure *10*).

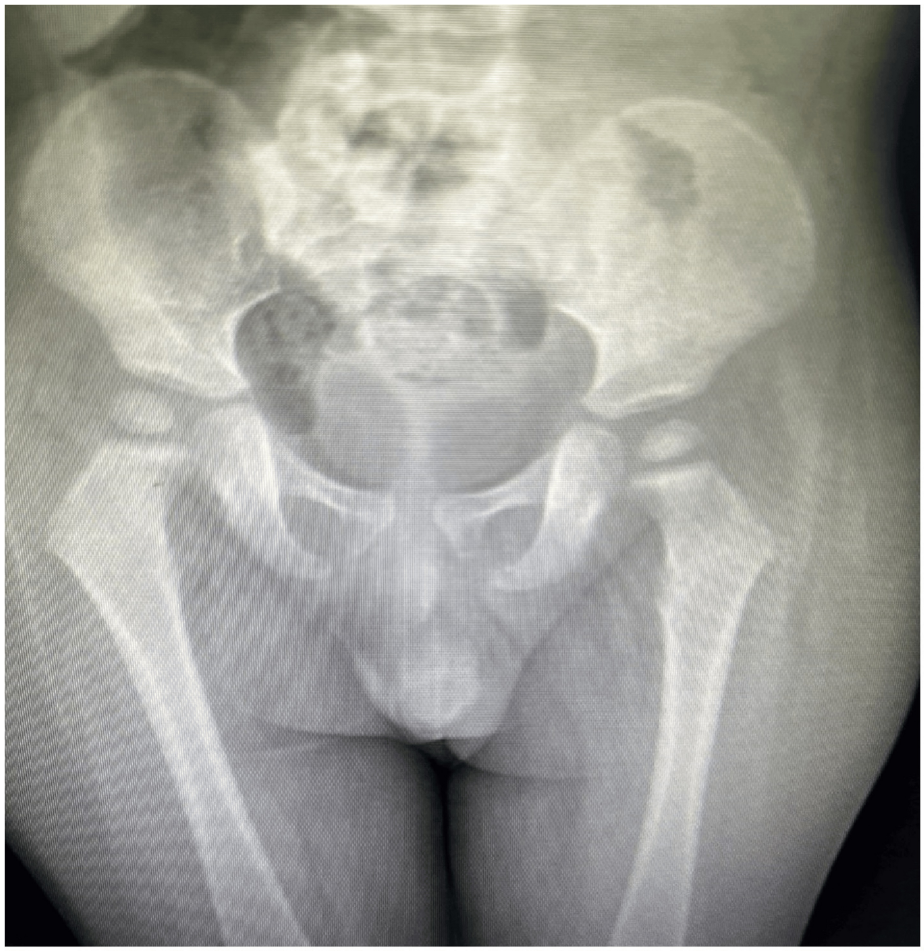


FIGURE 10: Five-Month Follow-Up Radiograph of Case 2

Five-month follow-up anteroposterior pelvis radiograph showing reduced both hips without pathological signs of avascular necrosis or osteomyelitis.

The child continued to demonstrate a limp and experienced minimal pain during right hip range-of-motion examination. Because he was younger than two years and was still developing independent walking, it remained uncertain whether the observed gait abnormality reflected normal developmental variation or residual impairment associated with the previous septic arthritis and hip dislocation.

Although the absence of current dislocation and the lack of reported radiographic evidence of AVN or arthritis were reassuring, the long-term structural and functional outcome remained uncertain. Continued follow-up was planned to monitor hip congruity, femoral head development, possible growth disturbance, and gait progression.

Table *1* summarizes the clinical course, diagnostic investigations, surgical interventions, antimicrobial treatment, and follow-up outcomes of both patients. It highlights the contrasting presentations, culture-negative infection in Case 1, and the MRSA-associated complications and prolonged recovery in Case 2.

Time point	Case 1: 7-year-old boy	Case 2: 15-month-old boy
Initial presentation	Day 1: Acute pelvic pain and inability to walk. Afebrile; WBC 9.6 × 10^3/μL and CRP 51.6 mg/L. Initial ultrasound showed no effusion.	Day 1: Fever up to 40 °C and irritability. WBC 31.3 × 10^3/μL, CRP 172 mg/L, and ESR 84 mm/h.
Early investigations	Days 2–3: Persistent bilateral hip pain and fever; ESR 50 mm/h, CRP 65 mg/L, and WBC 13 × 10^3/μL. Ultrasound showed minimal bilateral effusions.	Day 2: CT showed bilateral hip effusions, greater on the right, and peripheral pulmonary nodules, including a cavitating lesion.
Clinical deterioration	Day 4: Temperature 38.9 °C, worsening bilateral hip pain, WBC 15 × 10^3/μL, and CRP 186 mg/L. MRI showed mild bilateral effusions without obvious marrow abnormalities.	Day 3: Painful, restricted right hip movement; admission blood culture grew MRSA.
Definitive intervention	Day 4: Bilateral hip aspiration followed by simultaneous open arthrotomy and irrigation. Synovial WBC was 35,000/μL on the right and 25,000/μL on the left.	Day 6: Bilateral hip arthrotomy and irrigation; approximately 150 mL of frank pus from the right hip and 50 mL of turbid fluid from the left.
Microbiology and source control	Day 5: Blood, synovial fluid, and operative cultures remained negative after antibiotic pretreatment.	Day 9: Synovial culture grew MRSA. Persistent bacteremia cleared following port removal.
Early postoperative course	Day 6: Afebrile; WBC decreased to 10 × 10^3/μL and CRP to 147 mg/L. Drains removed on postoperative day 3.	Day 10: Ultrasound showed no residual hip effusions. Inflammatory markers subsequently rose; by Day 11, ESR was approximately 110 mm/h and CRP was 79.6 mg/L.
Antibiotic treatment	Six weeks total of intravenous and oral antibiotics.	Vancomycin for three weeks intravenous followed by linezolid for extra 3 weeks
Latest follow-up	Four months after discharge: Full weight-bearing, minimal pain, clean and dry incisions, normal inflammatory markers, and no radiographic evidence of osteomyelitis.	Five months: No current radiographic hip dislocation or reported signs of AVN or arthritis. Persistent limp and minimal pain with right hip movement.

TABLE 1: Clinical Timeline of the Two Cases

AVN, avascular necrosis; CRP, C-reactive protein; CT, computed tomography; ESR, erythrocyte sedimentation rate; MRI, magnetic resonance imaging; MRSA, methicillin-resistant Staphylococcus aureus; WBC, white blood cell count.

Discussion

These two cases illustrate the diagnostic and therapeutic challenges of pediatric septic arthritis of the hip, particularly when both hips are involved. Although bilateral disease was present in both children, their clinical courses differed substantially. The first child presented with initially subtle findings and persistently negative cultures, whereas the second developed severe MRSA infection with bacteremia, pulmonary lesions compatible with septic emboli, and right hip dislocation. Together, the cases emphasize the importance of repeated clinical assessment, timely joint drainage when infection is suspected, and follow-up extending beyond the resolution of the acute infection [2].

Diagnostic challenges in bilateral hip disease

Septic arthritis of the hip is an orthopedic emergency because increased intra-articular pressure and the inflammatory response may damage articular cartilage and compromise the developing femoral head. Early diagnosis can nevertheless be difficult in children, as fever, restricted movement, inflammatory markers, and imaging findings may vary according to the stage of infection [2].

The first child demonstrates how an initially reassuring examination can be misleading. At his first assessment, he was afebrile, had relatively preserved hip movement, and had no effusion identified on ultrasonography. His elevated CRP, however, was an important finding in the context of acute pelvic pain and impaired mobility. Over the following days, his symptoms and inflammatory markers worsened, eventually prompting aspiration and bilateral arthrotomy. This evolution highlights the importance of interpreting laboratory results alongside the clinical picture rather than relying on a single examination or imaging study.

Clinical prediction tools, including the Kocher criteria and their subsequent modification by Caird and colleagues, can help estimate the probability of septic arthritis in children presenting with acute hip pain [5,6]. However, these tools should support rather than replace clinical judgment. Their performance may be less reliable in atypical presentations, and the absence of several classical features does not independently

exclude infection.

In Case 1, these criteria could be considered retrospectively; however, their applicability depends on the availability of the relevant clinical and laboratory parameters at the initial assessment. The early preservation of movement and absence of a substantial effusion did not reflect the subsequent clinical deterioration, highlighting the importance of serial clinical assessment.

The second child presented a different diagnostic challenge. His severe hemophilia B and implanted central venous access port complicated the clinical context, while the systemic presentation initially prompted evaluation and treatment for possible meningitis. The subsequent development of painful restriction of right hip movement, bilateral effusions, and a positive blood culture for MRSA established a much stronger basis for diagnosing invasive bacterial infection. The contrast between these cases reinforces the need to reassess children whose clinical course does not follow the expected pattern, even when an alternative diagnosis has initially been considered.

Culture-negative infection and microbiological confirmation

The interpretation of synovial fluid leukocyte counts should also take into account prior antibiotic exposure. In a retrospective study of 126 patients with native-joint septic arthritis, Puzzitiello et al. reported that patients who received antibiotics before joint aspiration had significantly lower synovial white blood cell counts and neutrophil percentages, as well as lower culture positivity, than patients who had not received antibiotics [8]. These findings suggest that antimicrobial treatment initiated before aspiration may attenuate the inflammatory and microbiological findings used to establish the diagnosis. This is particularly relevant to our first patient, who received ceftriaxone before aspiration and subsequently had culture-negative synovial fluid despite operative findings consistent with septic arthritis. Nevertheless, the study involved adults, and its findings should be extrapolated to pediatric septic arthritis with caution. The timing of antibiotic administration should therefore be considered when interpreting synovial fluid results, and a relatively modest WBC count or negative culture should not be used in isolation to exclude infection [8].

In the first child, synovial fluid, blood, and other collected specimens did not identify a causative organism. Nevertheless, the progressive symptoms, markedly increasing CRP, turbid aspirates, inflammatory synovial fluid findings, and operative evidence of purulent material supported treatment for presumed septic arthritis. A negative culture does not exclude bacterial arthritis, particularly when antibiotics have been administered before definitive sampling [2,9].

The first child received intravenous ceftriaxone before aspiration, which may have reduced the likelihood of recovering a pathogen. Other possible explanations include a low organism burden, limitations of conventional culture methods, or an organism that is difficult to recover using routine techniques. K. kingae is an important consideration in culture-negative osteoarticular infection in young children, although its relevance varies with age and clinical setting [3]. It was not identified in this patient, and the available findings do not establish it as the cause. Similarly, the possibility of transient synovitis was considered during follow-up, but the available evidence cannot definitively distinguish it from a culture-negative bacterial infection retrospectively [10].

The second child had microbiologically confirmed MRSA infection in both blood and synovial fluid. This finding provided a clear etiological diagnosis and distinguished his presentation from the culture-negative first case. Pediatric S. aureus osteoarticular infections may be associated with substantial systemic illness, and MRSA can complicate antimicrobial selection and clinical recovery [11]. In this child, the combination of persistent bacteremia, pulmonary abnormalities compatible with septic emboli, and a large volume of purulent material from the right hip indicated an extensive infection requiring coordinated orthopedic, pediatric, infectious disease, and hematology management.

Potential role of the central venous port

The implanted port in the second child deserves particular consideration. Blood cultures remained positive until the port was removed, after which the first documented negative blood culture was obtained on the same day. This temporal relationship raises the possibility that the device contributed to persistent bacteremia or served as a reservoir for infection. Central venous access devices are recognized sources of infectious complications in children with hemophilia, in whom long-term venous access may be required for factor replacement [10].

However, the available information does not establish the port as the definite primary source. The catheter-tip culture result was unavailable, and the direction of spread between the bloodstream, port, and infected joints cannot be determined from the clinical timeline alone. The port should therefore be described as a possible source or contributor to persistent bacteremia, rather than a proven source of the infection. This distinction is important when interpreting the case and avoiding conclusions that exceed the microbiological evidence [12].

Surgical drainage and antimicrobial treatment

Both children underwent bilateral hip arthrotomy and washout during a single anesthetic episode. In the first child, operative findings included turbid fluid and a thickened capsule in both hips. In the second, the right hip contained a substantially larger volume of frank pus than the left, demonstrating marked asymmetry despite bilateral involvement. These findings support the importance of evaluating and treating each hip individually rather than assuming that the severity of disease is equivalent on both sides.

The choice of drainage method in pediatric hip septic arthritis depends on the clinical presentation, the extent of infection, the adequacy of initial drainage, and local expertise. A comparative study by Cohen and colleagues reported fewer treatment-related complications in children treated with arthrotomy than in those managed with repeated aspiration-lavage, although the study design and patient selection limit the extent to which these findings can be generalized [7]. The present cases cannot establish the superiority of one approach over another. They do, however, demonstrate that open drainage can provide direct access to the joint, permit removal of purulent material, and allow specimens to be collected for microbiological and histological assessment.

Antimicrobial treatment was individualized according to each child's presentation and microbiological findings. In the first case, the absence of an identified organism required empirical treatment guided by clinical response and specialist review. In the second, MRSA identification allowed treatment to be directed toward the documented pathogen, with the antimicrobial regimen adjusted during the hospital course. The prolonged systemic infection in the second child also illustrates why treatment decisions should not be based solely on improvement in fever or an isolated decrease in CRP. Clinical status, culture clearance, inflammatory-marker trends, source control, and evidence of metastatic infection must be considered together [2,11].

Hemophilia B and perioperative management

The second case also highlights the practical challenges of performing urgent orthopedic surgery in a child with severe hemophilia B. His factor IX activity was reported as 0.9%, placing him in the severe range if this value represents the measured percentage activity. Urgent drainage was necessary despite the increased bleeding risk, requiring coordination between the surgical, anesthesia, hematology, and infectious disease teams.

Perioperative management of hemophilia B requires an individualized factor IX replacement plan, with appropriate hemostatic coverage for surgery and the postoperative period. Published reviews emphasize that the evidence base for precise perioperative factor targets remains limited and that treatment should be coordinated with a specialist hemophilia team [12]. In this case, factor replacement was administered during the operative course, and no bleeding complication was documented. This favorable perioperative observation should not be interpreted as evidence that a particular replacement regimen is universally sufficient; the precise factor levels achieved and the adequacy of coverage should be reported where records are available.

Right hip dislocation and the importance of follow-up

The right hip dislocation in the second child is an important complication. Pathological dislocation may occur in association with severe hip infection, potentially through increased intra-articular pressure, capsular changes, and damage to the developing joint. However, the exact timing and mechanism of dislocation in this patient remain uncertain. Previous developmental dysplasia screening was reported as normal, but the available information cannot establish whether the dislocation developed before admission, during the evolution of infection, or at another point in the clinical course.

Agarwal and Rastogi described outcomes in children with acute septic hip dislocation treated by open reduction at the time of arthrotomy. Although many children in their series achieved satisfactory functional outcomes, acetabular dysplasia remained an important radiographic concern during follow-up [13]. Their findings underscore that the apparent resolution of an acute infection does not necessarily mean that the developing hip has escaped long-term consequences.

In the present case, no additional operation for the dislocation was performed, and subsequent imaging at approximately five months did not demonstrate persistent dislocation or reported signs of AVN or arthritis. Nevertheless, the child continued to have a limp, with minimal pain during right hip movement. Because he was younger than two years and still developing his walking pattern, the relative contributions of developmental gait variation, residual weakness, and the previous hip infection cannot yet be determined. Moreover, the absence of radiographic AVN or arthritis at five months is reassuring but does not exclude later growth disturbance or acetabular dysplasia. Continued clinical and radiographic surveillance is therefore warranted.

Strengths and limitations

The main strength of this report is the presentation of two uncommon bilateral hip infections with contrasting microbiological and clinical features. The cases also illustrate different diagnostic problems: a culture-negative presentation in a previously healthy child and confirmed MRSA infection in a toddler with severe hemophilia B, persistent bacteremia, and right hip dislocation. The operative findings and follow-up observations add clinically relevant details to these presentations.

Several limitations must be acknowledged. This is a two-case report and cannot support comparative conclusions regarding treatment effectiveness or prognosis. The causative organism in the first case remains unknown, and the possibility of a nonbacterial inflammatory process cannot be entirely excluded retrospectively. In the second case, the precise source of MRSA bacteremia and the timing of hip dislocation were not established. Follow-up is also insufficient to determine the long-term effects on femoral-head development, acetabular morphology, and gait. These uncertainties should be considered when interpreting the outcomes.

Conclusions

These two cases illustrate the variable presentation of bilateral septic arthritis in children, ranging from subtle early findings to severe systemic infection and major joint complications. They highlight the importance of repeated clinical assessment, timely investigation, appropriate surgical drainage, and antimicrobial therapy guided by microbiological findings when available. Antibiotic administration before joint aspiration may affect synovial fluid findings and culture yield; therefore, these results should be interpreted in the context of prior antibiotic exposure and the overall clinical presentation. In culture-negative cases, diagnostic conclusions should remain proportionate to the available evidence. The case involving MRSA bacteremia and hip dislocation illustrates the importance of effective source control and careful follow-up. The second child's hemophilia B also highlights the importance of coordinated perioperative hemostatic management. Long-term clinical and radiographic follow-up is important to monitor hip development, identify potential late complications, and assess functional recovery after the acute infection has resolved.

Additional Information

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All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

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Disclosures

Human subjects: Informed consent for treatment and open access publication was obtained or waived by all participants in this study. Jordanian Royal Medical Services Institutional Ethics Committee issued approval 15/2026. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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