

## A neonate presenting with hip septic arthritis: a rare case report

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### ABSTRACT

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Hip septic arthritis is a serious condition that requires prompt diagnosis and treatment to prevent complications such as joint destruction, growth arrest, or the spread of infection. The incidence of septic arthritis ranges from 2 to 10 cases per 100,000 individuals per year generally. Although septic arthritis can affect people of all ages, it is more common in the elderly and infants under 5 y.o. We described a case of a 5-mo.o. child who presented with right hip swelling for ten d. The patient started acting agitated and appeared to be in a lot of discomfort whenever her right leg was moved. The patient is taken to a traditional massage therapist and gets a massage. Then, the patient's right hip began to swell, accompanied by intermittent fever and limited hip movement. The patient was hospitalized for four d due to hip dislocation and received skin traction with broad-spectrum antibiotic therapy, but no clinical improvement was observed. The patient was then referred to Dr. Sardjito General Hospital, Yogyakarta, Indonesia and underwent emergency open debridement followed by immediate IV antibiotic treatment. Traditional massage therapy can cause further musculoskeletal injury, causing the formation of hematoma or hemarthrosis and even causing the development of septic arthritis. As soon as septic arthritis is suspected, adjusted antibiotic treatment and adequate joint drainage are necessary, as this condition is an orthopedic emergency, especially in neonates. From this case can be concluded that early diagnosis and treatment of septic arthritis in newborns is very important to prevent complications. The public needs to understand the dangers of massage for musculoskeletal injuries during the acute phase.

### ABSTRAK

Artritis septik pinggul adalah kondisi serius yang memerlukan diagnosis dan pengobatan segera untuk mencegah komplikasi seperti kerusakan sendi, terhentinya pertumbuhan, atau penyebaran infeksi. Insiden artritis septik umumnya berkisar antara 2 hingga 10 kasus per 100.000 orang per tahun. Meskipun artritis septik dapat menyerang orang-orang dari segala usia, penyakit ini lebih sering terjadi pada orang lanjut usia dan bayi di bawah usia 5 tahun. Kami melaporkan kasus seorang anak berusia 5 bulan yang mengalami pembengkakan pinggul kanan selama sepuluh hari. Pasien mulai bertingkah gelisah dan tampak merasa sangat tidak nyaman setiap kali kaki kanannya digerakkan. Pasien dibawa ke tukang pijat tradisional untuk dipijat. Kemudian pinggul kanan pasien mulai membengkak disertai demam intermiten dan pergerakan pinggul terbatas. Pasien dirawat di rumah sakit selama empat hari karena dislokasi pinggul dan menerima traksi kulit dengan antibiotik spektrum luas, namun tidak ada perbaikan klinis yang terlihat. Pasien kemudian dirujuk ke RSUP Dr Sardjito, Yogyakarta, Indonesia dan menjalani debridemen terbuka darurat yang dilanjutkan dengan pengobatan antibiotik IV segera. Pijat tradisional dapat menyebabkan cedera muskuloskeletal lebih lanjut, menyebabkan terbentuknya hematoma atau hemarthrosis dan bahkan menyebabkan berkembangnya artritis septik. Segera setelah dicurigai adanya artritis septik, pemberian antibiotik yang disesuaikan dan drainase sendi yang memadai diperlukan karena kondisi ini merupakan kedaruratan ortopedi, terutama pada neonatus. Dari kasus ini disimpulkan bahwa diagnosis dini dan pengobatan artritis septik pada bayi baru lahir sangat penting untuk mencegah komplikasi. Masyarakat perlu memahami bahaya pijat terhadap cedera muskuloskeletal pada fase akut.

### Keywords:

neonate;  
septic arthritis;  
traditional massage;  
acute hematogenous  
septic arthritis;  
antibiotics

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## INTRODUCTION

Hip septic arthritis is a serious condition that requires prompt diagnosis and treatment to prevent complications like joint destruction, growth arrest, or the spread of infection. The incidence of septic arthritis ranges from 2 to 10 cases per 100,000 individuals per year in the general population. Septic arthritis can affect people of all ages, but it is more common in the elderly and infants under 5 y.o. The lower extremities, namely the knees, hips, and ankles, account for up to 80% of cases and are the most frequently affected. Identification and therapy of this illness are urgently required.<sup>1-3</sup>

Hematogenic inoculation through the transphyseal channel, infection spreading from the nearby metaphysis, or direct inoculation from trauma or surgery are all possible ways to infect the joints. Compressive ischemia in the hip joint can result from elevated intracapsular pressure. If not treated right away, the femoral head may develop avascular necrosis.<sup>4</sup>

Neonatal septic arthritis (SA) is a bacterial infection that damages joints and spreads to human joints through bleeding or other trauma. The hip and knee are frequently affected by this infection by the *Staphylococcus aureus* pathogen in children, affecting them by 32%-39% and 26%-47%, respectively. Other bacteria that have been found in culture include *Klebsiella pneumoniae*, Group B *Streptococci*, *Escherichia coli*, *Enterobacter* sp., *Kingella kingae*, and *Candida* spp.<sup>5-7</sup> *Staphylococcus aureus* is the major cause of bacterial arthritis in all age groups, while *Streptococcus pneumoniae* is more common in the first two years of life, especially in the absence of vaccination against these bacteria. Gram-negative bacteria, particularly *Kingella kingae*, have been linked to septic arthritis in children under 4 y.o. Because Group B *Streptococcus* and *Neisseria meningitidis* are more

common during the newborn period, they require special treatment. Gram-negative bacteria, unlike in the past, are now being discovered as a cause of hip septic arthritis. It was reported that *K. pneumoniae* was the most frequent Gram-negative bacterium, accounting for around 36% of the cases, followed by *E. coli* and *S. aureus*.<sup>8,9</sup>

Management of septic arthritis must be commenced rapidly after obtaining blood and synovial fluid analysis. Treatment always begins with empiric antibiotic treatment. Previous studies suggested first-generation cephalosporin and clindamycin as the first choice of treatment before readjusting to the specific antibiotic based on microorganism sensitivity tests. The length of antibiotic therapy, both intravenous and oral, should be administered on average of 2 – 3 wk, in some cases longer administration might be needed.<sup>9,10</sup>

Septic arthritis can go unnoticed and have significant consequences, including neonatal death, due to the absence of symptoms in the early stages. The previously published case reports and series reported by Almatrafi *et al.*<sup>5</sup> described this condition to be restricted to neonatal age, and that the disease has a propensity to spread quickly and result in some poor outcomes, including the destruction of articular cartilage and ossification centers, osteomyelitis, sepsis, meningitis, formation of abscesses in tissue spaces, urinary tract infections, and others.<sup>5</sup>

## CASE PRESENTATION

A 5-mo.o. child who had previously been carried by a baby hip carrier, started acting agitated and appeared to be in a lot of discomfort whenever her right leg was moved. Her parents initially took her to a traditional massage where she received several massages. Shortly after, the patient's right hip

started to swell, along with intermittent fever and restricted hip movement. She was admitted for 4 d in the previous hospital where her case was treated as a hip dislocation and received skin traction with broad spectrum antibiotic therapy (ceftriaxone), but no clinical improvement was observed. Ten days after the initial complaint the patient was then referred to Dr. Sardjito General Hospital, Yogyakarta, Indonesia, where she underwent emergency open debridement followed by prompt IV antibiotic treatment.

The right limb was supported in a slight external rotation, abduction, and flexion position. Swelling and redness were noted, heat and tenderness were felt when palpating the right hip area. (FIGURE 1.A). We took a hip X-ray and it shows widening of hip joint space, lytic lesion on proximal femur metaphysis (FIGURE 2). She underwent emergency open debridement with anterior hip approach (FIGURE 1.B) and IV antibiotic

treatment (ceftriaxone 250 mg/12 hr). We found 400 cc of green yellowish pus during open debridement (FIGURE 3). The femoral head is still intact and we preserve the ligamentum teres to maintain vascularization (FIGURE 4). Drain tube was placed in the inferolateral of surgical site for 3 d (FIGURE 5).

The culture resulting from hip joint was *extended spectrum beta-lactamases (ESBL) E. coli*. From the sensitivity test, the *E. coli* shown to be resistant to multiple antibiotics including ceftriaxone. Thus, the treatment regimen was changed to ciprofloxacin 50 mg/kg/12 h until the 14<sup>th</sup> day and continued with oral antibiotic (cefixime 250 mg/12 h) for 4 wk. There was a significant decrease of infection markers CRP (from 53.4 mg/L to <5 mg/L) and WBC count (from 22.0 10<sup>3</sup>/μL to 7.8 10<sup>3</sup>/μL) (TABLE 1). There were also notable clinical improvements and the patient was discharged from the hospital on 15<sup>th</sup> day after improvement of overall condition.



FIGURE 1. A. Clinical appearance, B. Marking for surgical incision.

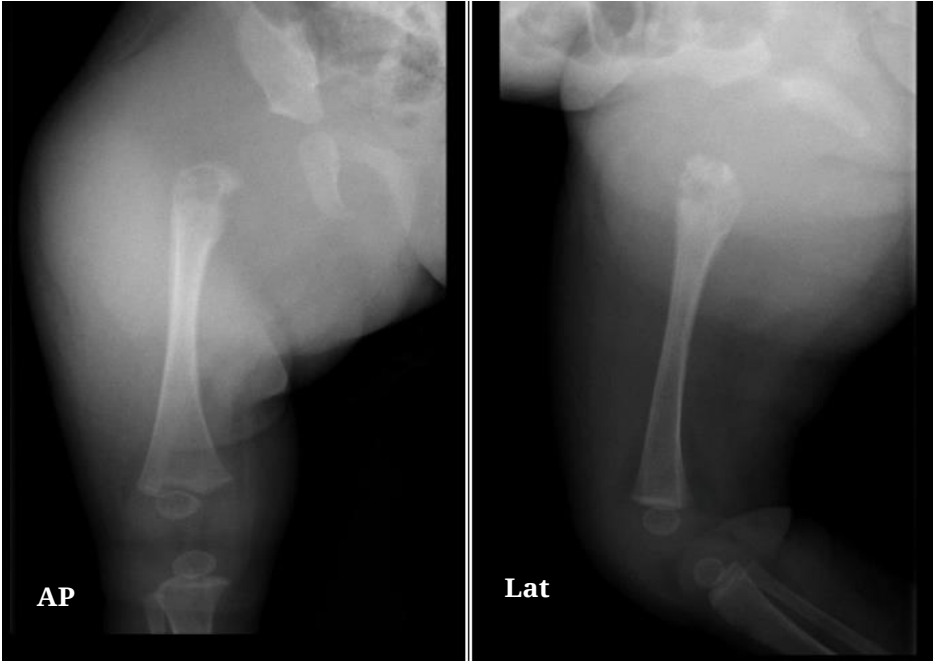


FIGURE 2. X-ray of the right hip before open debridement

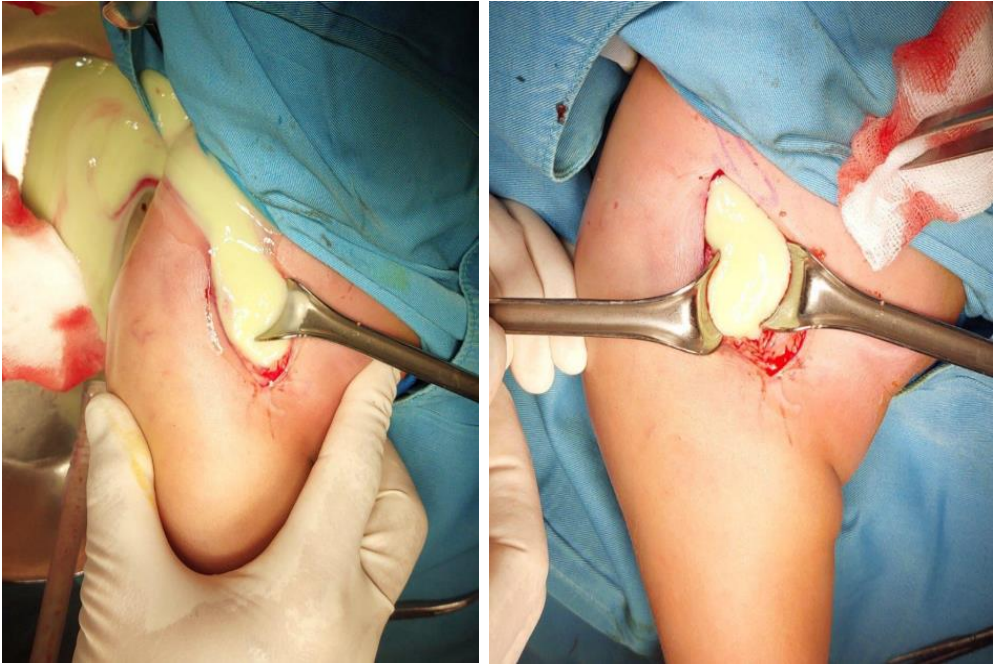


FIGURE 3. A green yellowish pus during emergency open debridement





FIGURE 4. Femoral head and ligamentum teres still intact



FIGURE 5. Drain tube placed in the inferolateral of surgical site

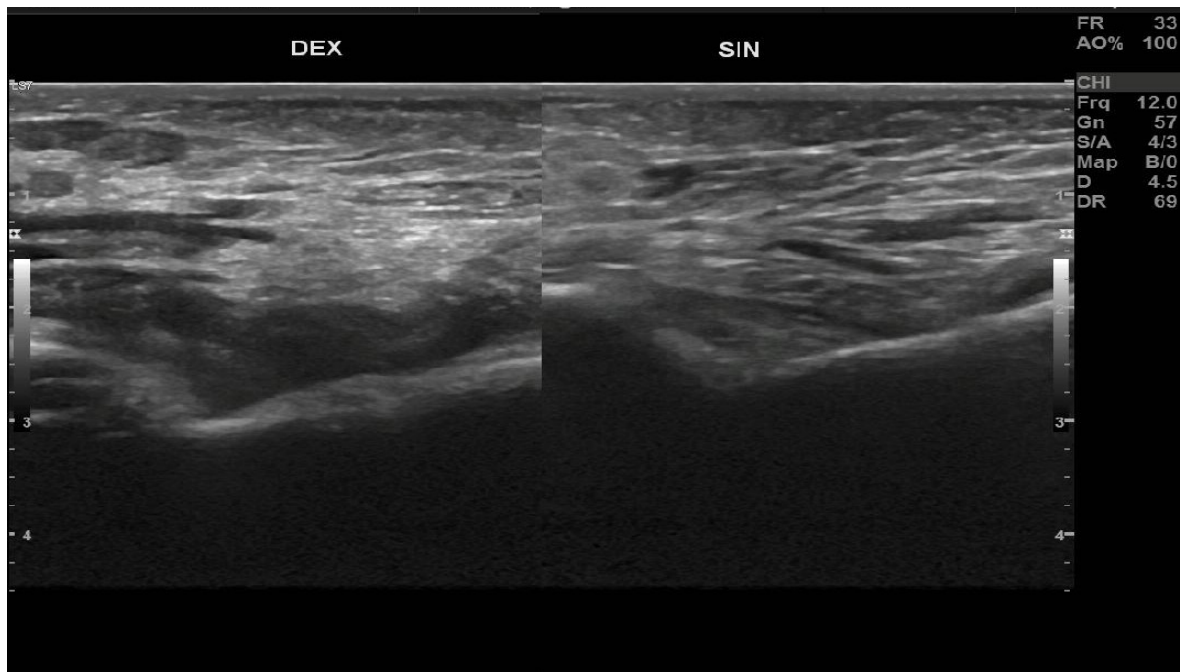


FIGURE 6. Ultrasonography 1 wk after open debridement shows minimal residual effusion

TABLE 1. Pre and post operative laboratory results

Inflammatory marker	Before open debridement	14 d after open debridement
Haemoglobin	11.3 (10.4 - 15.6)	8.8 (10.4 - 15.6)
Leukocyte	22.0 (6.0 - 18.0)	7.8 (6.0 - 18.0)
CRP	53.4 (< 5)	<5 (< 5)

## DISCUSSION

A wide variety of organisms cause septic arthritis in infants including Streptococci, Gram-negative bacteria like *H. influenzae* and *E. coli*, which responsible for up to 60% of cases.<sup>2,6,11</sup> In about one-third of cases, no specific organism can be isolated.<sup>2,11</sup> Infants are particularly susceptible to developing concurrent septic arthritis due to their vascular anatomy.<sup>11,12</sup> Neonatal septic arthritis affects roughly 0.3 out of every 1,000 live newborns globally.<sup>11</sup> However, due to the lack of symptoms, particularly in neonates, in the early stages and the moderate ones, as well as laboratory findings that may be within normal range, this incidence may be unreported. It is crucial to carefully evaluate those patients at this age, in particular, as those patients usually come with vague symptoms and signs such as fever, irritability, anorexia, and limited joint movement.<sup>5</sup> In which, all of the signs and symptoms presented in our case. Traditional massage therapy was one of the predisposing factors in this patient due to its ability to cause muscle injury and vascular injury. These injuries have the potential to lead to the formation of haematomas or hemarthrosis, and in severe cases, may even result in the development of septic arthritis.<sup>13</sup> The patient's delay to obtain proper diagnosis and hence, treatment, caused this septic arthritis to worsen.

In order to aid clinicians in differentiating between septic arthritis and transitory tenosynovitis in paediatric patients with inflamed hips, Kocher

*et al.*<sup>14</sup> developed the Kocher score retrospectively. Four most prognostic criteria were identified. This is still a helpful clinical decision-making tool for young patients exhibiting the symptoms and signs of an inflamed hip.<sup>10,15</sup> Given the likelihood that an arthrotomy and drainage may be required in the near future, Nigussie *et al.*<sup>8</sup> suggested that these patients might make suitable candidates for aspiration in the operating room. Patients who develop septic arthritis of the hip with a medium likelihood (two positive predictors) can be suitable candidates for aspiration under ultrasonography. Patients with a very low likelihood of developing septic arthritis of the hip (zero or one positive predictors) may be suitable candidates for close surveillance without aspiration.<sup>8</sup> At presentation we assessed the patient using Kocher's criteria, and obtained a total score of three due to the fever, inability to bear weight, and leucocytosis, therefore concluded as a probability of 93% for septic arthritis.<sup>3,14</sup> Therefore we proceeded into surgical management followed by antibiotic administration. Previous studies suggested that a complete joint septic drainage that is performed immediately is essential to a successful septic arthritis treatment, whatever the surgical technique choice is.<sup>6,16</sup>

Donders *et al.*<sup>15</sup> stated in a recent study published in 2022 that if clinical suspicion of septic arthritis is based on Kocher's criteria, it is necessary to do laboratory tests such as CBC, ESR, CRP, and blood culture, as well as radiography and ultrasound if feasible. After

obtaining the culture sample, empiric antibiotic treatment is initiated while awaiting the result, and then modify the treatment as necessary. Tightly observe the clinical and laboratory improvements following seven days of intravenous antibiotic administration followed by oral treatment. The minimum duration of antibiotic therapy is four weeks. If there is neither clinical nor laboratory improvement, a sedated MRI should be performed to determine the likelihood of infection recurrence.<sup>6,8,16,17</sup> According to a study conducted by Monsalve *et al.*<sup>12</sup> children in their facility who had MRI evaluation with suspected musculoskeletal infection were commonly diagnosed with septic arthritis in all paediatric age groups. However, septic arthritis was more common in children under the age of two, and these children frequently had osteomyelitis as a concomitant illness. In this study, MRI is suggested to be used rather than USG alone in cases where septic arthritis is suspected.<sup>12,17</sup> Thus in our case, an MRI was not needed.

Follow-up should be carried out for a minimum of 2 yr.<sup>6,8</sup> It is essential to monitor clinical and laboratory outcomes following the drainage procedure. A prospective study demonstrated that the CRP level and ESR can rise within a few days of initiating therapy. The greatest scores were obtained on the second and third day. A second or third drainage treatment is not unusual. Especially in infants and neonates with septic hip arthritis, the duration of symptoms between onset and the procedure is negatively associated with prognosis. Serious musculoskeletal sequelae can result from septic hip arthritis, including leg length discrepancy, chondrolysis, growth disturbances of the proximal femur, septic dislocation of the hip, joint stiffness, aberrant hip dislocation, a hip joint surface irregularity, coxa magna, and avascular necrosis. Radiographic observation for at least two years is recommended as a form of close monitoring.<sup>8,12,16-18</sup> As soon as septic

arthritis is suspected and the appropriate sample for microbiological analysis has been obtained, appropriate antibiotic treatment and adequate joint drainage should commence immediately.<sup>2,11</sup> Joint decompression, joint debridement, and preservation of joint function are the primary goals of septic arthritis treatment.<sup>8,9,11</sup>

## CONCLUSION

Early diagnosis and treatment of newborn septic arthritis are essential to prevent complications. The patient had completely recuperated by the time of the final follow-up. It is important to highlight the necessity of informing the public about the dangers of massaging musculoskeletal injuries during the acute phase. The article discusses a single case of neonate hip septic arthritis, which the authors believe will impact future diagnostic and therapeutic strategies for children with septic arthritis.

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