Newborn Septic Arthritis—A Rare Presentation of Late-Onset Group B Streptococcal Disease: Case Report and Short Review of the Literature

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Abstract

Group B Streptococcus (GBS) disease is a leading cause of invasive bacterial infections among neonates. We present the case of an 11-day-old neonate with septic arthritis as a rare presentation of late-onset disease (LOD) with a favorable short-term outcome. GBS is a leading cause of neonatal infection. Early-onset disease (EOD) is defined as infection from birth to 6 days of age, while LOD occurs from 7 days to approximately 3 months of age. EOD is acquired through vertical transmission and can be reduced through application of intrapartum antibiotic prophylaxis (IAP). LOD can be acquired from the mother or from environmental sources, unlikely to be prevented by IAP. The most common presentation of EOD is bacteremia (83%), pneumonia (9%), and meningitis (7%). While the clinical picture in both EOD and LOD frequently resembles in LOD hematogenous spreading may predispose neonates to present with uncommon organ manifestation other than the classic systemic signs of sepsis, for example, septic arthritis. Herein, we report on the management and outcome of a term neonate with late onset GBS bacteremia and subtle clinical symptoms of septic monoarthritis.

Keywords

► septic arthritis
► newborn
► late-onset sepsis
► group B Streptococcus disease

Case Presentation

We report of a male neonate, born to a 29-year-old primigravida at 402/7 weeks of gestation, after an uneventful pregnancy and normal prenatal diagnostic screening. The uncomplicated spontaneous vaginal delivery took place in a regional hospital. Group B Streptococcus (GBS) screening of the mother was negative. The birth weight was 4,574 g; Apgar’s values were 10 and 10 at 5 and 10 minutes, respectively. The healthy infant was discharged 3 days after birth.

On day of life 11, the mother presented the infant to our outpatient department (OPD). Since the evening before the infant did not extend the left leg, with the affected limb kept in a continuously flexed position. Significant pain perceptions...
were reported whenever the leg was mobilized. The infant was otherwise healthy, feeding well; there was no fever and no known trauma.

Upon examination, the infant was alert, the body temperature was 37.8°C, the infant held the left leg in a flexed protective posture and resisted active extension of the knee joint. There was tenderness on palpation within the knee joint region without any redness or swelling. Clinically, no presence of fluid in the knee joint could be elicited. The physical examination was otherwise normal.

Laboratory results showed a slightly elevated C-reactive protein (CRP) of 21 mg/L and a normal white blood cell count without a left shift in the white blood cell differentiation. A blood culture was obtained. Sonography of the hip and knee was normal with no detectable joint effusions. After admission, antibiotic treatment with ampicillin (150 mg/kg/day) and gentamicin (4 mg/kg/day) was initiated due to the slightly elevated CRP and suspected osteomyelitis or arthritis. The magnetic resonance imaging (MRI) on the next day showed a small effusion within the left knee joint, suggestive of a local inflammatory process not affecting the extra-articular bone tissue and most likely considered as septic arthritis (► Fig. 1). The ultrasound scan one day later eventually confirmed a small effusion. After GBS isolation in the blood culture (positive after 6.2 hours) antibiotic treatment was switched to intravenous penicillin G (300,000 units/kg/day divided in doses every 8 hours) and continued for 21 days. Despite the positive blood culture, lumbar puncture was omitted due to lacking clinical signs of meningitis.

Forty-eight hours after the initiation of antibiotic treatment, the CRP level decreased to 11 mg/L and the infant started to move the affected leg actively. After 7 days, there was no more pain during active or passive movement of the leg.

Repeated GBS swabs of the mother and expressed breast milk yielded a negative result.

Before discontinuation of the antibiotic therapy, ultrasound of the knee was repeated and an X-ray was performed, both inconspicuous. Results of the clinical follow-up at the OPD 14 days after discharge indicated fully functional recovery of the left knee joint and ultrasound and X-ray imaging of the affected left knee (► Fig. 2) remained unremarkable.

Discussion

Septic arthritis is a rare presentation of group B streptococcal late-onset disease (LOD) and contributes to only 4% (4/100) in an Italian cohort (2003–2010)\(^1\); 0.73% (2/274) in a Japanese cohort (2011–2015),\(^2\) and no reported case (0/1036) in a cohort in the United States (1995–2005)\(^3\) of all cases of LOD.

Clinical signs of septic arthritis include pseudoparesis, local swelling, redness, and fever.\(^4,5\) Our patient exclusively showed signs of pseudoparesis and local tenderness on palpation. The mildly elevated CRP pointed toward an inflammatory process, while the white blood cell count was normal. This, however, is in contrast to a case series from India, where infants diagnosed with septic arthritis universally had leucocytosis.\(^6\)

Due to the described subtle clinical signs along with the results of the MRI and the positive blood culture, we suspected septic arthritis in our case. As the onset of symptoms

Fig. 1  MRI (1.5 T), surface coil. T2 Turbo Spin Echo coronal 3 mm. Left knee: small amount of joint effusion in the suprapatellar and posterior recess (arrows). No bone affection was noted. MRI, magnetic resonance imaging.

Fig. 2  Anterior–posterior X-ray of the left knee 33 days after the MRI examination. MRI, magnetic resonance imaging.
in our patient just occurred the evening before the presenta-
tion in the OPD and the clinical evaluation and laboratory
results were unspecifc, the early diagnosis of septic arthritis
might have been missed without additional imaging inves-
tigations, that is, MRI. Particularly, the use of the ultrasound
was unreliable in the early course of the disease in our case
and might have led to a missed diagnosis of septic arthritis if
considered as a sole imaging investigation. Umadevi and
colleagues reported on a similar case of a term neonate with
septic arthritis of the elbow which was initially diagnosed as
joint dislocation. The ultrasound in this case, in contrast to
our patient, showed signifcant effusions indicating a more
progressive state of the disease as compared with our case,
and the culture of the effusion aspirate frally lead to the
diagnosis of GBS-induced septic arthritis in their case.7 As
GBS was cultured in the blood sample, we speculate that this
is the most likely pathogen and cause for the arthritis in our
patient, although we did not confirm this through a culture of
the effusion aspirate. The decision to omit needle aspiration
was mainly based on the insignifcant small effusion and in
consent with the pediatric orthopaedic consultant. It should
be mentioned that septic arthritis and osteomyelitis often
occur concomitantly in the newborn infant due to the unique
vascular anatomy of the neonate with transphyseal vessels
freely communicating between epiphysis and metaphysis.8,9
Although the diagnosis of osteomyelitis was unlikely based
on the results of the initial MRI, we cannot defnitely exclude
minor osteomyelitis.

Early diagnosis and immediate proper treatment are
important to avoid long-term impairment including joint
destruction, deformity of limbs, and growth failure.10

Surgical drainage of the affected joint is commonly rec-
ommended to obtain biological samples and decrease intra-
articular pressure. In our patient, the effusion was small and
there were no signs of increased intra-articular pressure.
Although surgical drainage could have provided a defnitive
diagnosis that we decided against it, we did not expect
drainage of the small effusion to improve the clinical out-
come. In a retrospective analysis of 52 cases of neonatal
septic arthritis, surgical intervention did not improve the
outcome8 but randomized trials are lacking.

Regardless of any surgical interventions, intravenous
antibiotic treatment for neonatal septic arthritis is addition-
ally required and the recommended duration of treatment is
currently 14 to 21 days.11 This is mainly based on expert
opinion or local guidelines. However, a recent retrospective
analysis reported on the safe use of shorter antibiotic courses
for uncomplicated GBS bacteraemia.12 Intravenous treat-
ment of septic arthritis or acute osteomyelitis in children
older than 3 months of age for only 2 to 4 days, followed by a
course of oral antibiotics for 7 to 10 days, was shown to be
effective as a course of 30 days of treatment (3 days intrave-
nous and 27 days oral) in two randomized trials from
Finland.13,14 Although there is a trend toward shorter
courses of antibiotic treatment in older patients and uncom-
plcated LOD, randomized data on such an approach for
neonates with complicated LOD are lacking. In a systematic
review regarding oral antibiotics for neonatal infections, the
authors conclude that although promising results are avail-
able, well-designed studies in high-income countries are
lacking and required before this approach can defnitely be
recommended for neonates.15 In our case, a 21-day course of
intravenous antibiotics resulted in a favorable short-term
clinical outcome and the results of the follow-up 35 days
after the diagnosis confirmed no signs of local or systemic
inflammatory relapse.

Conclusion

In neonates with proven late-onset GBS bacteremia, clinical
awareness including a thorough physical examination of the
infant and MRI scan in uncertain cases is recommended to
exclude or confirm local bone manifestations if suspected. As a
consequence of the diagnosis of septic arthritis associated with
GBS LOD, prolonged antibiotic treatment is warranted in addi-
tion to surgical intervention in selected cases to avoid long-term
functional sequelae. The early diagnosis of septic arthritis and
timely initiation of antibiotic treatment in our case may have
treated to the favorable short-term outcome.

Conflict of Interest
None declared.

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