

Septic Arthritis of Neonates: A Rare Case Report

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Abstract

Neonatal septic arthritis is a rare condition which may present as an orthopedic emergency. The sequelae may be devastating in untreated cases. The presentation of neonatal septic arthritis could lead to multitude of differential diagnosis which consequentially delays the final diagnosis. It is very crucial to make an early diagnosis in such cases and commence prompt or timely appropriate management to prevent serious complications. Worldwide incidence in the neonatal age group is 0.3 per 1000 live births, although higher incidence of 0.6 per 1000 live birth has been reported in India, [1,2]. Older children are affected more than the younger age group and the hip joint is most commonly affected because of its unique anatomy and blood supply. The Pathogenic bacteria most commonly found to be responsible for septic arthritis are staphylococcus aureus, haemophilus influenza and streptococcus agalactiae (GBS). We are reporting a rare case of septic arthritis in the shoulder joint to a neonate caused by GBS bacteria, presenting as a late onset infection.

Keywords: Septic arthritis; Neonates; Late-onset disease-LOD; GBS-group B Streptococcus

Introduction

Septic arthritis is defined as inflammation of the synovial membrane with purulent effusion into the joint capsule due to suppurative infection of a joint. The classic presentation has an acute onset of fever with associated joint swelling and pain which may be widespread or limited during range of motion. Clinical symptoms in the newborn are typically subtle and nonspecific and may go unrecognized for long periods which can lead to osteomyelitis and septic shock. Damage can be irreversible if injury occurs in epiphyseal plate or ossification center of proximal humerus, thus early diagnosis and intervention are crucial. Pseudo paralysis, discomfort on handling, swelling of involved area and positional preference are four distinguishing features of neonatal septic arthritis (4).

Most common pathogen isolated in culture is staphylococcus aureus. Secondary hematogenous spread or seeding of infective organisms is a well-known mode of infection. The joints of newborn babies have a rich vascular supply, and they lack synovial basement membrane, which predisposes newborn infant's joints for this condition. The immature immune system also allows potentially very rapid progression of infection all over the body in addition to the destruction of the articular cartilage and ossification centers.

The prevalence of septic arthritis in the shoulder joints of neonates is extremely rare. It has been reported in only 3–5% of all septic joints [5]. Treatment recommendations vary; however, surgical exploration of the glenohumeral capsule and biceps tendon sheath are recommended for thorough cleansing of the joint [5] The following case presentation will discuss a case of neonatal septic arthritis diagnosed on day 16 of life after an initial misdiagnosis of Erb's palsy on day 5 of life.

Case Presentation

We report a 5 day old baby girl who was born vaginally at 39 weeks and 2 days of gestation in our network hospital, cried at birth with normal Apgar score. There was no history of obstructed labour or shoulder dystocia, Birth weight-2.820kg, Length-51 cm, Head Circumference -33 cm. No significant ante natal history. Maternal serologies and GBS screening were negative. Baby stayed with mother in post-natal ward for 24 hours and was discharged home in good condition. Mother brought the baby to the clinic on 5th day of life for well baby checkup and also complained that the child was not moving her right arm, while left arm was moving well. No history of fever, vomiting, refusal of feeds, or hypothermia reported.

Baby was initially diagnosed with suspected Erb's palsy. Xray right shoulder joint was done, which did not identify any fracture or reduction of joint space. Mother was reassured and advised to monitor closely. Baby was brought back on day 16 of life with persistent symptoms. Physical Examination revealed paucity of movement in right arm with tenderness on passive movement of the right shoulder. There was fullness of the right shoulder, with poor grasp in the right hand. Left arm and other joint movement was normal. Baby was afebrile, Vitals sign HR -170/min, RR- 52/ min, well perfused with otherwise normal physical examination.

An Ultrasound scan of the right shoulder was performed which revealed evidence of joint effusion. The muscles appeared normal. Fluid collection noted surrounding the long head of biceps tendon, which was intact. Orthopedic referral was made, with advice for lab workup including acute inflammatory markers and MRI of right shoulder with IV contrast was planned to rule out septic arthritis. MRI revealed signs of septic arthritis of the right shoulder joint. Intravenous antibiotics were started, and case was referred to our hospital to see pediatric orthopedic surgeon under care of the neonatal service.

On 18th day of life baby underwent an aspiration of purulent material and wash out of the joint. The sample was sent for culture and routine analysis which was positive for GBS. The blood culture was similarly positive for GBS. Laboratory findings showed Elevated C-reactive protein (CRP) and ESR and a normal white blood cell count. Antibiotics were later changed in response to the sensitivity pattern of the microbiology report. The baby received 21 days of iv antibiotic therapy, prior to discontinuation an ultrasound of the joint was repeated, and an X-ray was performed, both of which were unremarkable. Within 2 weeks of treatment completion, full recovery of shoulder joint function was achieved.

Discussion

Septic arthritis is a rare presentation in the neonatal age group. The most common pathogen is staphylococcus aureus in all age groups. Neonatal septic arthritis of the shoulder joints is also a less common presentation. This baby is a particularly rare case as not only did the neonate present with shoulder joint septic arthritis, but this was also a late onset manifestation of group B streptococcus pathogen. Previous studies have shown that GBS late-onset disease (LOD) contributed to only 4% (4/100) of cases in an Italian cohort (2003–2010)¹; 0.73% (2/274) in a Japanese cohort (2011–2015) and no reported cases (0/1036) in a cohort within the United States (1995–2005), (7). Septic arthritis is a rapidly progressing, highly destructive, life-threatening disease. A UK study found increasing incidence from 5.5/100,000 in 1998 to 7.8 /100,000 population by 2003 (Rutherford et al., 2016). Most important clinical features are soft tissue swelling and pseudo paralysis (6). In more than half of the cases no fever has been reported. This baby remained afebrile, showing discomfort and pain on physical examination of the affected upper limb. Our patient exclusively showed signs of pseudo paresis and local tenderness on palpation of right shoulder joints.

Management and diagnosis could be delayed due to the subtle nature of illness in this age group. Most common misleading diagnosis is Erb's palsy, which was the case with this baby. Prompt diagnosis of septic arthritis in the shoulder joint of a neonate is vital to prevent serious complications.

This case had elevated CRP which pointed toward an inflammatory process, while the white blood cell count was normal. However, this is in contrast to a case series from India, where infants diagnosed with septic arthritis universally had leucocytosis. (5,6). Xray and ultrasound of joints are not always reliable in early stages of infection. In this case, significant effusions were seen on ultrasound, which indicates a more progressive state of the disease. The diagnosis of septic arthritis was confirmed with MRI. *Umadevi and colleagues* (2013) 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 also showed significant effusions.

Surgical aspiration of effusions in the affected joint of our case grew a positive Culture of GBS, this confirmed a diagnosis of septic arthritis. Blood culture taken at the same time was also GBS positive, showing a hematogenous spread of infection. Early diagnosis and immediate proper treatment are important to avoid long-term impairment including joint destruction, deformity of limbs, and growth failure. It is commonly recommended to surgically drain the affected joint in order to obtain samples and decrease intra-articular pressure. All patients, regardless of any surgical interventions, require intravenous antibiotic treatment for neonatal septic arthritis. Current recommendation is 14 to 21 days duration. 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.

Although there is a trend toward shorter courses of antibiotic treatment in older patients and uncomplicated 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 available, well-designed studies in high-income countries are lacking and required before this approach can definitely be recommended for neonates. 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. The standard treatment is a combination of arthrocentesis and antimicrobial therapy. The study by *Kwon et al.2020* shown that single arthrocentesis and adequate antibiotics are sufficient to cure pediatric septic arthritis, regardless of the site and causative agents. A further study by *Volzke et al 2020* suggested targeted synovial cell therapy may be more promising in treating septic arthritis.

Conclusion

Diagnosis of neonatal shoulder joint septic arthritis early is a challenge that rarely presents. Proper clinical examination and timely intervention with a multidisciplinary team is important to avoid any future complications. When there is a diagnosis of septic arthritis with associated late onset disease by GBS, prolonged antibiotic treatment is warranted, in addition to surgical intervention to avoid long-term functional sequelae.

The early diagnosis of septic arthritis with timely initiation of antibiotic treatment and immediate involvement of pediatric orthopedic surgeon for early surgical intervention contributes to the favorable short-term outcome. Delays in diagnosis and treatment of septic arthritis are the most common causes of concomitant osteomyelitis at any age group which can predispose to the sequelae of septic arthritis like growth discrepancy.

Conflict of Interest

The authors declare no conflict of interest.

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