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Multifocal Neonatal Osteomyelitis: Case Report

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Abstract **Case Report**

Neonatal osteomyelitis may present with very few clinical signs and symptoms, which makes prompt diagnosis challenging. Delayed treatment may result in serious long-term consequences. Moreover, all patients should be followed up for orthopaedic sequelae. Here we describe a case of neonatal osteomyelitis, at multiple sites. A preterm male presented with fever and mild abdominal distension on the 14th day of life. Investigations were done to rule out sepsis, meningitis and other common cause of fever. Despite starting empiric antibiotic coverage immediately, fever continued followed by respiratory distress, tachypnea and tachycardia. Three weeks later baby became pale and irritable with cell count of 34,450/cumm and was shifted to neonatal intensive care unit. In subsequent days, baby developed swelling in right thigh and knee region with paucity of movements, however ultrasonography failed to detect any pathology. Blood culture revealed methicillin resistant staphylococcus aureus, after which injection vancomycin was started, after which fever subsided and the baby's general condition improved clinically. Ultrasonography suggested effusion in left shoulder and right knee, probably of infective etiology. Drainage and decompression with arthrotomy helped us evacuate sero-sanguinous turbid fluid and granulation tissue, which were sent for histopathological examination which diagnosed pyogenic synovitis. On 40th day of life the patient was discharged healthy.

Keywords: Diagnosis, neonatal, osteomyelitis, outcome.

INTRODUCTION

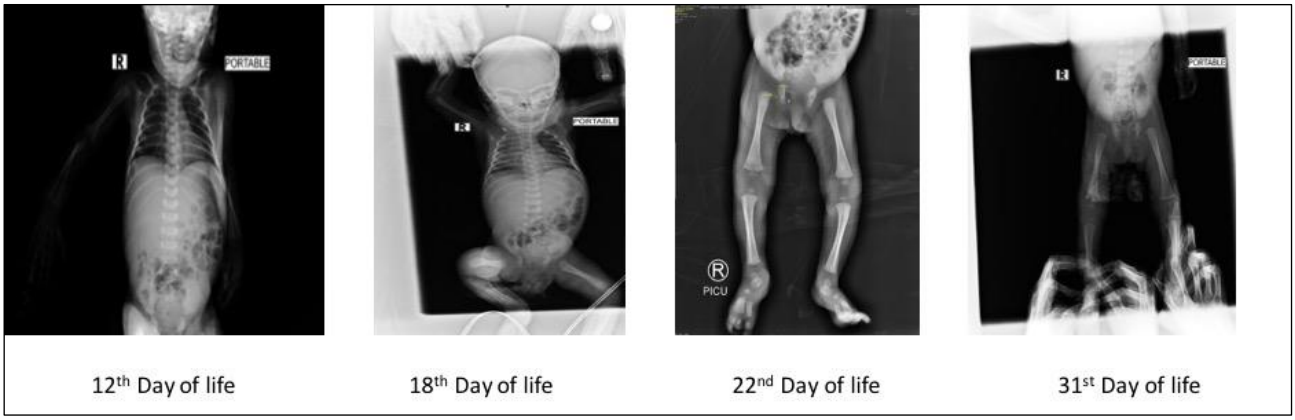
With the advent of modern antibiotics and improved healthcare, acute osteomyelitis is now encountered only when it is caused by drug resistant strains of pyogenic organisms [1]. In neonates, osteomyelitis is often seen as a result of septicemia after hematogenous spread from bacterial seeding within a bone from a remote source [2]. Neonates are more susceptible to osteomyelitis than older children due to their immature immune response. Preterm infants are at even higher risk for osteomyelitis because they are subjected to frequent blood drawing, invasive procedures and receive drugs intravenously [3]. Because of the dearth of clinical signs and symptoms, prompt diagnosis of neonatal osteomyelitis is challenging. Nevertheless, prolonged neonatal sepsis should alert of its possibility, as favourable clinical outcome is dependent on rapid diagnosis and immediate start of treatment. Neonatal osteomyelitis may have serious long-term consequences if the diagnosis and treatment is delayed. In this report we describe a case of neonatal osteomyelitis and a brief discussion of relevant literature.

CASE REPORT

We present a case of a preterm male (gestational age 35 weeks) who was born by lower section caesarean section. The baby cried immediately after birth and had an Apgar score of 8 and 9 at one and five minutes respectively. On examination, the baby had stable vitals with good activity and tone and weighed 2.03 kgs. Systemic examination was unremarkable. On 13th day of life, the baby developed fever and mild abdominal distension. Haemogram

revealed haemoglobin of 12.6 gm/dl and leucocyte count of 9950/cumm, with elevated C reactive protein (CRP) (208 mg/dl). Peripheral smear for malarial parasite was negative. Abdominal and skull ultrasonography and magnetic resonance imaging (MRI) of brain were normal. Though empiric antibiotics were started immediately after sending blood culture (which showed no growth), fever continued and a week later respiratory distress, tachypnea and tachycardia developed. Haemoglobin dropped to 8.9 mg/dl and leucocyte count increased further to 28,250/cu mm. Acute phase reactants like CRP and erythrocyte sedimentation rate (ESR) were at 248 mg/dl and 120 mm/hour respectively. Blood cultures were repeated and antibiotic coverage was stepped up.

A couple of days later (22st day of life), baby became pale and irritable with heart rate of 220/min, haemoglobin of 8.1 gm/dl and leucocyte count of 34,450/cu mm. The baby was shifted to neonatal intensive care unit (NICU) with a suspected diagnosis of congenital tuberculosis. In subsequent days, baby developed swelling in right thigh and knee region with paucity of movements, however ultrasonography failed to detect any pathology. Blood culture revealed methicillin resistant staphylococcus aureus (MRSA), after which injection vancomycin was started. In the next week, fever subsided and the baby's general condition improved clinically. In the meanwhile, restricted movements of left upper limb and right lower limb were noticed. Ultrasonography was suggestive of effusion in left shoulder and right knee, probably of infective etiology. Serial radiographs of the neonate are as described in the figure. Leucocyte count and CRP came down to 19000/cumm and 32.9 mg/dl respectively. Drainage and decompression with arthrotomy helped us evacuate sero-sanguinous turbid fluid and granulation tissue, which were sent for histopathological examination. No sequestrum was noticed after arthrotomy. Histopathological examination was suggestive of pyogenic synovitis. On 40th day of life the patient was discharged healthy. Few weeks after NICU discharge, the family reported that the infant was doing well, with no restriction in range of movement of extremities.



DISCUSSION

The most common route of infection for neonatal osteomyelitis is haematogenous spread of microorganisms, and in preterm infants, it can occur secondary to premature rupture of membranes and transplacental infection, or invasive procedures like venipuncture, umbilical catheterization etc as well [4]. Staphylococcus aureus (SA) is the most common pathogen causing neonatal osteomyelitis. In recent years, methicillin-resistant staphylococcus aureus (MRSA) has become increasingly common and is often preceded by colonization of the anterior nares, axillae, perianal area, or other sites [5]. Staphylococcus aureus has been shown to express molecules that bind to components of bone matrix and cartilaginous structures. This adherence to bone helps staphylococcus aureus to surround themselves with an extracellular matrix, which protects them from the immune system and antibiotic attack. Neonatal osteomyelitis often presents with non-specific signs of illness, which makes it challenging to diagnose. Initial clinical presentation may include fever, feeding intolerance, irritability and reduced movement, which is very nonspecific. Its only after the disease progresses, more specific signs may become apparent, like local swelling, erythema and tenderness over bone. In addition, there is no specific laboratory investigation for osteomyelitis, as neonates may have normal leukocyte counts and ESR in the initial days [6]. Although, CRP is a prompt indicator of systemic inflammation, it is not specific for bone infection. Nonetheless, CRP and ESR can help monitor response to treatment. Some authors have described procalcitonin as a potential marker in the diagnosis of osteomyelitis in children. However, its role in diagnosing neonates with osteomyelitis is unclear [7].

Plain radiography, being quick to perform and inexpensive, is the first imaging modality for diagnosing neonatal osteomyelitis. Ultrasonography and radionuclide bone scans, although helpful, may not be specific for neonatal osteomyelitis and are thus unreliable. Ultrasonography can help in evaluating the surrounding soft tissues and cortical bone and may

provide guidance for diagnostic or therapeutic aspiration, drainage, or tissue biopsy. Computed tomography (CT) and MRI can provide accurate information regarding the extent of the infectious process, osseous erosion or presence of sequestra. Although CT and MRI are highly helpful in visualizing osteomyelitis, false-positive results have also been reported in the past [8]. Good clinical outcome of neonatal osteomyelitis depend on a quick and accurate diagnosis, followed by treatment for 6-8 weeks. Empiric antibiotic treatment should cover staphylococcus aureus, group B streptococcus and enteric gram-negative bacteria. Use of vancomycin is required in patients at risk for hospital-acquired infection, like in our patient. Isolating and sensitivity testing the organism will help in adjusting the regime. Intravenous antibiotics are administered for two to three weeks, after which oral medication should be continued [9]. Surgical intervention is indicated to drain an abscess or when antibiotic treatment results in no clinical improvement.

Despite early diagnosis and management, many patients have reported poor outcome and permanent sequelae, which may not be clinically apparent until the child reaches the age of 9 or 10 years [10]. Permanent joint disabilities, damage to the cartilaginous growth plate, limb length discrepancies, arthritis, decreased range of motion and pathologic fractures are some of the long term sequelae reported [11].

CONCLUSION

In this report, we described a neonate with MRSA osteomyelitis presenting with fever, anaemia, irritability and restricted movement of affected extremities. It is essential to diagnose and treat such cases early so as to minimize long-term sequelae. Moreover, all patients should be followed up for orthopaedic sequelae.

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