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Case Report

Fulminant meningococcemia with meningococcal meningitis in the neonate: a case report

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ABSTRACT

Although meningococcal meningitis is fairly common in children, in neonate, it is rare with systemic involvement presumably because of transplacental passage of protective maternal antibodies. The diagnosis depends on a combination of clinical examination, including fever, refusal to feed, convulsions and the typical rash, and pathological and microbiological confirmation of the disease. Outcome of the disease may be fatal if timely intervention not done. In the literature, very few cases of neonatal meningococcal disease have been reported in the India. We are reporting a 14-day-old neonate who developed meningococcemia with meningococcal meningitis on the 9th day of life, evolving to septic shock. The blood and the cerebrospinal fluid cultures were positive for *Neisseria meningitidis*. The meningococcemia should be suspected as a cause of cutaneous petechiae and purpura in neonates having signs of septicemia as early identification and management of meningococcemia with meningitis in the neonate can be life-saving.

Keywords: Meningococcemia, Meningitis, Neonate, Septicemia, Petechiae

INTRODUCTION

Neisseria meningitidis is one of the main causes of meningitis in children and adolescents and is associated with a high morbidity and mortality.[1,2] However, meningococcal infection is rare in the neonatal period, possibly due to the passage of passive protective antibodies through the placenta.[3]

CASE REPORT

A 14-day-old female neonate was admitted with a 5 days history of fever, lethargy and poor feeding and 2 days history of rash, refusal to feed, excessive cry, and convulsions with no loss of consciousness. The baby was born at home by normal vaginal delivery conducted by relatives to a 28-year-old woman with two previous pregnancies resulting in a live birth. This was her third pregnancy at term, weighing 3010 g. Baby was fed with cow milk soon after birth then breastfeeding was initiated within 4 hours of birth. The immediate postnatal period was uneventful.

At first examination in hospital, the neonate was poorly responsive with signs of decreased perfusion, pallor and a temperature of 39°C. Macular erythematous rash of different size were present over face, abdomen, and lower limbs with decreased peripheral perfusion. Central nervous system examination revealed excessive cry, decreased tone, and a full fontanelle but no focal neurological signs.

Lumbar puncture was performed, and other tests on admission including complete blood count, serum urea and electrolytes, liver function tests, blood culture sensitivity, and C-reactive protein was sent to the lab. Random blood sugar was 76 mg/dl.

The neonate was started empirically on intravenous ceftriaxone 150 mg I/V 12 hourly and amikacin 30 mg I/V 12 hourly with vasoactive drugs. The seizures were managed with diazepam and phenobarbitone. On the second day of admission, the erythematous rash advanced to petechiae and purpura but convulsions were controlled (Figure 1).

The whole blood count showed: hematocrit of 43.5%, hemoglobin of 13.8 g/dL, 16,600/mm^3 leukocytes (32% of neutrophils, 13% of segmented neutrophils, 32% of lymphocytes, 8% of monocytes and 1% of eosinophils), and platelet count of 68,300/mm^3. The C-reactive protein was 112 mg/dL. Serum electrolytes, serum urea, and liver function tests were within normal limit. The newborn was transferred to the neonatal intensive care unit (NICU), with a diagnosis of sepsis with neonatal meningitis.

After 48 h, the blood and the cerebrospinal fluid cultures showed to be positive for *N. meningitidis*. The newborn evolved with clinical improvement, with the withdrawal of the vasoactive drugs. Nasogastric feeding was started with expressed breast milk. Following the protocol for neonatal meningitis treatment, antibiotic therapy was continued for 21 days, despite the clinical improvement (Table 1).

The cranial ultrasonography and computed tomography were normal; the C-reactive protein levels after 10 days of treatment were 1.2 mg/dL and 0.33 mg/dL at the hospital discharge. The complete blood count at discharge showed moderate anemia (9.6 g/dL of hemoglobin). The newborn infant had evolved well and was discharged receiving exclusively breast milk, with additional vitamins, A and D.

DISCUSSION

The most common forms of diseases caused by *N. meningitidis* are the meningitis and the meningococcemia. The time from onset of fever until death in severe meningococcemia is often as short as 12 h.[4] Meningitis may initially present with fever, irritability, poor feeding, or poor activity with or without meningeal signs. Although the maculopapular rash is the distinctive sign of meningococcal infection, it is seen in only 7% of cases.[5] The rash may rapidly evolve into prominent petechiae and purpura and may progress to purpura fulminans, a necrosis of the skin and underlying tissues due to thrombosis. Meningococcemia is a fulminant form of sepsis characterized by severe septic shock, acidosis, and DIC. Despite rapid diagnostic testing, antibiotic treatment, and general support care in the NICU, mortality rates remain high.

Meningitis is the most common clinical presentation of invasive meningococcal disease in neonates, but hemorrhagic skin lesions with petechiae and purpura may present in 28-77% of patients and some present with severe persistent shock lasting for more than 24 h as in this case or until death.[6]

Despite the favorable evolution of this case, the literature shows in the few existing reports a high probability of neurological sequelae, and also the risk of neonatal death, regardless of the correct treatment.[7-9] Moreover, there have been reports of cerebral abscesses caused by meningococcal infection in the neonatal period.[10]

Sequelae occur in approximately 10% of patients with meningococcal meningitis, and permanent neurological deficits include hearing loss,[5] hydrocephalus, seizure disorders, speech disorders, and mental and motor disabilities. Hence, the patient should be followed for long-term complications with developmental, neurological, and hearing evaluations.

CONCLUSION

Meningococcal septicemia should be suspected in the differential diagnosis of petechial and purpuric rash in the neonate, especially when rash is accompanied by other signs of illness such as fever, refusal to feed, vacant look, and convulsions. Progression of the disease is rapider than in other types of meningitis.

Table 1: CSF findings on day of admission and 14th day.

CSF	On day of admission	14th day
Appearance	Turbid	Clear
Microscopy (Gram stain)	Gram-negative diplococci	No organism
RBCs	12	310
Polymorphs	310	32
Lymphocytes	43	73
Culture	*N. meningitidis*	No growth
Protein	312	95
Glucose	32	67

CSF: Cerebrospinal fluid, RBCs: Red blood cells, *N. meningitidis: Neisseria meningitidis*

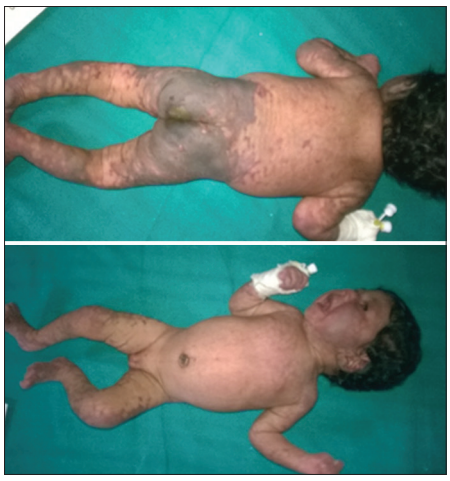

Figure 1: Neonate with meningococcal rash.

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