Case Report

Sphingomonas paucimobilis meningitis in a neonate First case report

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Abstract

Neonatal meningitis caused by *Sphingomonas paucimobilis,* is an exceedingly rare occurrence, with only one documented case in the paediatric population as of 2019. Typically associated with nosocomial infections, we report a unique case of community-acquired *S. paucimobilis* meningitis in a neonate. A 25-day-old female neonate presented with poor feeding, lethargy, fever, and a maculopapular rash. A diagnostic workup revealed features suggestive of meningitis, with cerebrospinal fluid analysis confirming the presence of *S. paucimobilis*. The neonate responded positively to antibiotic therapy and recovered without complications.

Keywords: *Sphingomonas paucimobilis*, *Gram Negative, Sepsis, NICU*

Introduction

There is no documented instance of *Sphingomonas paucimobilis* causing neonatal meningitis in the present body of medical literature. In fact, in 2019 there has only been one occurrence documented of a toddler with *S paucimobilis* meningitis. In neonates, *S paucimobilis* has been reported to cause nosocomial infections, but in our case it appeared to be a community acquired infection.[1,2]

Case report

A 25-day old female baby born as term, small for gestational age, weighing 2.17 kg to a diabetic mother was admitted for a brief period of 24 hours to the Intensive Care Unit (ICU) in view of him having a transient tachypnoea and was later discharged on day 3 of life.

The baby was doing well until around three weeks post discharge following which the parents noted some abnormalities. The baby was brought to the emergency unit on her 25th day of life with complaints of poor feeding, lethargy, and fever for one day. At the time of presentation, the baby had a temperature of 100.4 °C with other vitals being stable, apart from relative

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tachycardia. The baby was lethargic and had a maculopapular rash over her face, chest, and extremities. Other system examinations were unremarkable. In view of the clinical features, the baby was subjected to screening for late onset neonatal sepsis and as the screen was positive with leukopenia of 8700 cells/mm^3 (normal range: 9000-34000 cells/mm^3) and elevated C Reactive Protein (CRP) of 1.3mg/L (normal: 0.1-1.0 mg/dL), blood culture and lumbar puncture were done, and the baby started on cefotaxime and amikacin as per our NICU protocol for late onset sepsis.

Analysis of cerebrospinal fluid (CSF) showed feature suggestive of meningitis: 25 polymorphs/mm^3 (normal <10) microprotein -55mg/dL (normal: 10-50 mg/dL) and glucose-19 mg/dL (normal >34 mg/dL). One ml of CSF was sent to the microbiology laboratory in a BACTEC PF bottle and was incubated in BACT/ALERT 3D (BioMerieux) blood culture system. The CSF sample flagged positive after 72 hours and was subjected to Gram stain and subcultured on blood agar and MacConkey agar plates for 24 to 48 hrs. at 37 °C. Gram negative bacilli were seen on Gram stain and tiny non-lactose fermenting (NLF) colonies grew after incubation for 24 hours. After 48 hours, small, circular, smooth, convex NLF colonies were seen which were processed using VITEK 2 (BioMerieux) systems using the Gram negative (GN) card for identification and GNB oxidase positive AST card for susceptibility. The isolate was identified as *Sphingomonas paucimobilis,* susceptible to cefotaxime, ciprofloxacin, gentamicin, amikacin, and piperacillin-tazobactam.[3,4] The blood culture taken at admission was sterile.

As the organism was sensitive to cefotaxime and amikacin, and there was clinical improvement, the same antibiotics were continued. A repeat lumbar puncture done on day four had no growth on culture and a 14 day course of antibiotics was therefore given. The baby had complete resolution of all the symptoms, had good activity and was haemodynamically stable at the time of discharge. The baby was taken home after completion of the antibiotic course in a sound condition. The baby was doing well when seen at the outpatient clinic after two weeks.

Timeline of the course of the infection is shown in Figure 1.

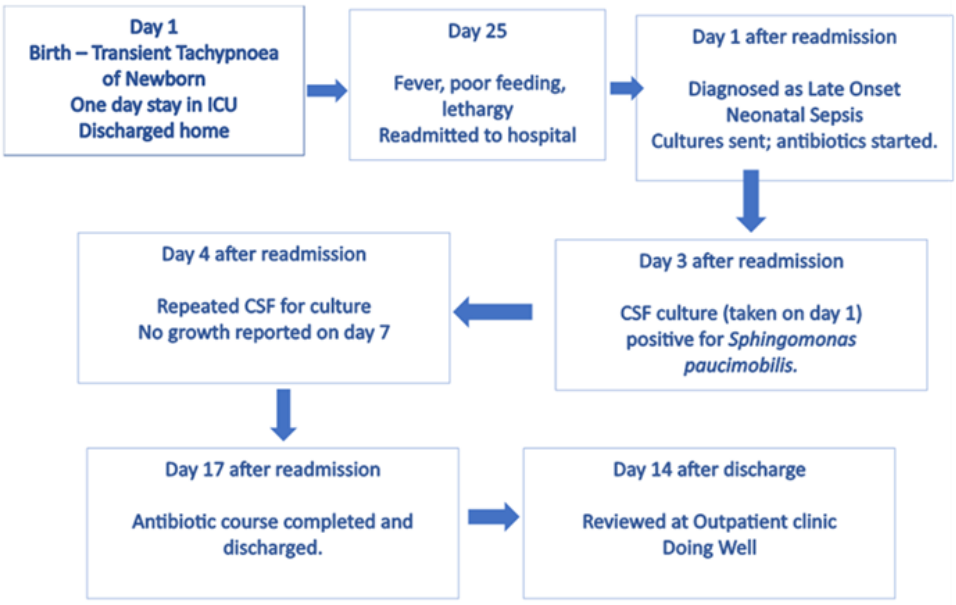

Figure 1: Timeline of the infection

Discussion

The genus *Sphingomonas* was described by Yabuchi et al in 1900. *S. paucimobilis* is an occasional human pathogen, formerly known as CDC group IIk, biotype 1, then later named as *Pseudomonas paucimobilis* in 1977. *S. paucimobilis* is an oxidase and catalase positive Gram-negative rod with a single polar flagellum. It is motile when incubated at 18 to 22 °C and non-motile at 37 °C - hence it is named paucimobilis due to difficulty in demonstrating motility in the laboratory. On sheep blood agar it grows as deep yellow colonies with optimum growth at 30-37 °C. It does not grow on MacConkey agar (90% does not grow, 10% grow as NLFs). It utilises glucose, xylose, and sucrose oxidatively, is DNase and esculin hydrolysis positive, and urease and indole negative. It produces a zone A inhibition around vancomycin disk placed on a blood agar plate.[3] It is susceptible to polymyxin B, which differentiates it from *Sphingobacterium*.[3,4]

S. paucimobilis can cause both nosocomial and community-acquired infections.[7,9] Although described as causing a wide range of infections[7], there are only five cases of meningitis caused by *S. paucimobilis* in the published literature of which the first case of meningitis in the paediatric population was described in 2019.[5-9] There are no reports of meningitis caused by *S. paucimobilis* in neonates.

Given the initial presentation of our case, there was a significant likelihood of late-onset sepsis. A weak sensorium and fever indicated a possibility of meningitis. The microbiology team's initial communication was of a Gram-negative bacteria suggestive of *S. paucimobilis*. As this organism is a rare cause of neonatal infection and was a possible contaminant, thorough scrutiny of the technique of sample collection, and the instruments used for sample collection and processing was done. However, there was no breach noted in the sterile chain.

After a brief hospital stay after birth, the infant spent the next three weeks at home before exhibiting the symptoms mentioned above. This lag/time at home increased the likelihood that the infection was acquired in the community. As reported recently[2], most of the *S. paucimobilis* infections in neonates are nosocomial in nature.

Conclusion

The case we described above is special since it is the first report of *S. paucimobilis* meningitis documented in a neonate. *S. paucimobilis* can cause significant sickness in neonates even though central nervous system infections are uncommon. Early diagnosis and the use of the appropriate antibiotics will enable satisfactory management in such cases.

Declarations

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Authors' contributions: All the authors contributed equally to prepare this manuscript.

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