Case Report

Elizabethkingia meningoseptica –An emerging infection: A case report

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ABSTRACT

Elizabethkingia meningoseptica are Gram-negative rod bacteria that are commonly found in the environment. The bacteria have also been associated with nosocomial infections, having been isolated on contaminated medical equipment, especially in neonatal wards. Rapid diagnosis and early institution of appropriate therapy for prolonged period are essential for the management of such infections. Here, we report a case of bacteremia due to *E. meningoseptica* in a neonate who was presented with respiratory distress and seizure episodes. A diagnosis of bacterial meningitis was made based on clinical findings and examination of cerebrospinal fluid. The baby was treated with antibiotics and other supportive measures, that helped to improve the condition. During follow-up, the baby showed developmental delay with hydrocephalus. *E. meningoseptica* can cause severe infection, with high risk of mortality and neurological sequelae in neonates. Intensive care and multidisciplinary interventions are crucial for the case management. Awareness among clinicians along with correct diagnosis in microbiology laboratory is required to minimize the fatal outcome associated with this infection.

Key words: Bacteraemia, *Elizabethkingia meningoseptica*, Multidrug resistance

Elizabethkingia meningoseptica (previously known as *Chryseobacterium meningosepticum*) is a ubiquitous Gram-negative bacillus, widely distributed in nature, particularly in soil and water [1]. Although infections caused by this bacterium are common among immunocompromised hosts, only few case reports are available even among the immunocompetent hosts. Moreover, available clinical data from India are limited. It is associated with neonatal meningitis with higher mortality rate (≈57%). *E. meningoseptica* is less commonly associated with nosocomial pneumonia and sepsis both in immunocompromised neonates and adults [2].

E. meningoseptica is also considered among the hospital emergent infections related to contaminated medical equipment, especially in neonatal wards [3]. The bacteria is commonly found in saline solutions used for the reconstitution of antibiotics as well as in the water sinks and tanks in healthcare settings. Immunosuppression, underlying comorbid medical conditions, prolonged hospital stay, indwelling central venous catheter, or other invasive devices are some of the risk factors associated with the acquisition of this infection [3,4]. Another major contributing factor is the prolonged use of broad-spectrum antibiotics.

E. meningoseptica has a unique antibiotic susceptibility pattern. It is resistant to many antibiotics commonly used to treat infections caused by Gram-negative bacteria such as aminoglycosides, beta-lactam antibiotics, tetracycline, and chloramphenicol. However, they are highly susceptible to clindamycin, erythromycin, cotrimoxazole, and quinolones, generally used to treat Gram-positive bacterial infections [5]. This often leads to inappropriate selection of antibiotics for initial empirical therapy posing a challenge to the clinicians and often leading to treatment failures. Early and accurate identification with appropriate susceptibility testing is mandatory to reduce morbidity and mortality in patients with *E. meningoseptica* infections.

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CASE PRESENTATION

A preterm out-born male infant, born at 32 weeks gestational age was admitted to MES medical college, having been referred from a secondary hospital when he was 5 days of age.

The preterm baby was born to G2P1L1 mother with antenatal history of leaking polycythemia vera for 10 h with fetal distress and preterm labor pain, with delivery by emergency lower segment cesarian section.

Baby cried soon after birth. Apgar and resuscitation details were not known. Baby developed respiratory distress soon after birth and was admitted to the *neonatal intensive care unit* (NICU). Urine and meconium passed within 24 h of life. Baby was initially started on intravenous (IV) fluids and later progressed to orogastric feeds on day 2, paladai feed on day 3, and direct breast

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feed on day 4. Baby had mild to moderate suck with moderate cry and activity. Hence, baby was continued paladai feed and direct breastfeeding occasionally. On day 5 baby got discharged.

The next day baby developed respiratory distress with poor feeding and abnormal jerky movements of all limbs and then the baby was referred to MES medical college from a nearby hospital.

On admission baby was very irritable, abnormal jerky movements of all limbs, abnormal moro reflex with cold peripheries with prolonged capillary refill time (Fig. 1 and Video 1).

The following parameters were recorded; pulse rate: 190/min, respiratory rate: 68/min, blood pressure: 78/40 mmHg, general random blood sugar: 74mg/dl, blood saturation: 71%.

On examination of the respiratory system, baby had increased work of breathing with RR of 68/min, audible grunt, subcostal retraction, intercostal retraction, and suprasternal notching with DOWNE-6.

Cardio-vascular examination revealed pan systolic murmur best heard over the left lower sternal border. Significant biological findings revealed neutrophilic leucocytosis with positive sepsis screen, anemia. Blood gas analysis showed severe metabolic acidosis. Chest X-ray was suggestive of bilateral heterogeneous opacities with adequate expansion. Echocardiography revealed congenital heart disease (atrial septal defect, ventricular septal defect with patent ductus arteriosus). Clinical suspicion of neonatal sepsis with meningoencephalitis was confirmed by the biochemical and cytological finding of cerebrospinal fluid (CSF), but culture showed no growth. A strain of *E. meningoseptica* was isolated in the blood culture by an automated blood culture system. Baby was started on IV antibiotics (piperacillin-tazobactam) and oral rifampicin which was hiked later according to blood culture sensitivity pattern and continued for 6 weeks. He was also started with paracetamol for medical closure of patent ductus arteriosus and anticongestive therapy was administered. Neonatal seizures were controlled with multiple anticonvulsive drugs. The Baby showed an apparent clinical and CSF improvement during the entire course of the hospital stay. Repeated CSF sample showed regression of pathological changes. Neurosonogram done showed echogenic leptomeningeal thickening, mild lateral and third ventriculomegaly and were confirmed by magnetic resonance imaging which also showed cerebral venous thrombosis (Figs. 2-3). Neurosurgery consultation was kept in view of neurodevelopmental monitoring for late complications and their orders were carried out. Additional specific intensive care interventions that contributed to case management, include, mechanical ventilator, IV anti-epileptics, fluid and electrolyte therapy, albumin therapy, packed red blood cells transfusion, ionotropes, diuretics. During 6 weeks' hospital stay, baby's general condition was improved and CSF values were normalized. At the time of discharge, baby was active with good cry and tone with good suck. In successive follow-ups the child showed developmental delay with hydrocephalus.

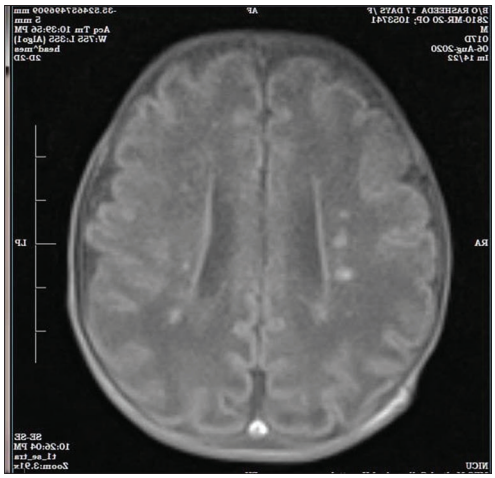

Figure 1: Bilateral diffusely increasing leptomeningeal enhancement

DISCUSSION

Most of the reported cases of *E. meningoseptica* infections are hospital-acquired and mainly documented in immunocompromised patients. In the present case, the infection was presumed to be nosocomial in origin, probably acquired from the hospital environment, where delivery was

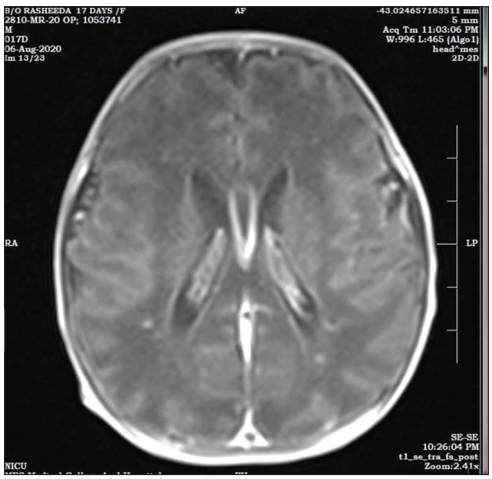

Figure 2: Bilateral diffusely increasing leptomeningeal enhancement and cerebral venous sinus thrombosis

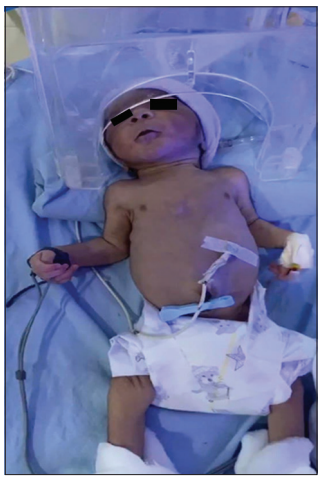

Figure 3: Abnormal jerky movements of upper limbs and lower limbs

conducted. Some of the common sources of *E. meningoseptica* infections are contaminated hospital water supply, saline, disinfectants, antibiotic solutions, water sinks, and respirators as reported earlier [5]. As this child was outborn, no source could be traced.

E. meningoseptica has generally been reported as a causative agent of outbreaks of meningitis mainly in premature newborns and infants in NICUs. According to a review of medical literature, vancomycin has been recommended for the treatment of meningitis with E. meningoseptica, but the efficacy has been questioned in several recent studies, with regards to the high minimum inhibitory concentration [6,7]. In addition, successful use of piperacillin/tazobactam was documented by clinical reports [6]. Considering these arguments, we decided to escalate the antibiotic treatment by adding rifampicin and piperacillin/tazobactam, although Piperacillin was not considered in our antibiotic testing. The latest studies demonstrated the benefit of fluoroquinolone, which can be explained by the superior pharmacokinetics as compared to hydrophilic antimicrobials, such as beta-lactams [8]. The fluoroquinolones are lipophilic agents, with better penetration through the blood-brain barrier, and are not as significantly affected by the variation of volume distribution during sepsis [8,9]. The antibiotic profile of E. meningoseptica is different from other Gram-negative rods since it shows inherent resistance to aminoglycosides, β-lactam agents, chloramphenicol, and carbapenems, but is susceptible to rifampicin, ciprofloxacin, vancomycin, and trimethoprim–sulfamethoxazole [1]. The present study showed similar susceptibility results, except for resistance observed to piperacillin/tazobactam. Upon follow-up visits post-discharge, the infant showed developmental delay with hydrocephalus however literature has reported variable outcome such as 57% mortality rate and 69% hydrocephaly rate in survivors [1,10,11].

Infection with this pathogen is potentially fatal unless diagnosed and treated early. Difficulty in identifying the bacterium in laboratory often limit the choice of correct and effective drug for the empiric treatment of E. meningoseptica infections. Awareness among clinicians about this organism along with correct identification and sensitivity testing by the diagnostic laboratories is required to reduce the morbidity and mortality associated with this infection.

CONCLUSION

E. meningoseptica infections are emerging, especially among premature newborns, immunocompromised or critically ill patients. A high degree of suspicion, rapid diagnosis, and prompt institution of appropriate therapy for prolonged period (about 3–4 weeks) are key factors for the management of such infections.

Video 1: Seizure activity https://youtu.be/IM4Hzgu1JFE

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