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Case Report

Empedobacter brevis causing early onset sepsis and pneumonia in a neonate: case report and review of literature

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ABSTRACT

Empedobacter brevis, a gram negative non-motile bacillus that belongs to the family Flavobacteriaceae rarely causes infection in adults and is exceptionally rare in neonates. *E. brevis* is ubiquitous in the environment, causing nosocomial infections especially in debilitated and immuno-compromised patients with only one case being reported in a neonate. We report a case of early onset sepsis and pneumonia in a term neonate caused by *E. brevis* that was successfully treated in our unit. Awareness regarding this uncommon pathogen and initiation of appropriate antibiotic therapy improves the outcome and prevents mortality. To the best of our knowledge, this is the second case of *E. brevis* sepsis reported in a neonate.

Keywords: *Empedobacter brevis*, Neonate, Sepsis

INTRODUCTION

Empedobacter brevis is a gram negative non motile bacillus and an obligate aerobe which rarely causes infection in humans.[1-4] In 2002, the first outbreak of nosocomial *E. brevis* endophthalmitis following cataract surgery was reported in adults and the source of infection was attributed to inadequate sterilization process.[5] In 2012, Raman et al reported the first case of *E. brevis* bacteremia in a human adult.[6] Compared to adult population, infections due to *E. brevis* are exceptionally rare in neonates. In 2016, *E. brevis* infection was reported for the first time in neonates in a 3-day old baby with sepsis and meningitis.[7] We report a case of early onset sepsis with pneumonia in a term neonate caused by *E. brevis* that was successfully treated in our unit. We also reviewed the literature for previously reported cases of infections caused by *E. brevis*. Till to date, only 17 cases of *E. brevis* associated infections were reported in humans. To the best of our knowledge, this is the second case of *E. brevis* sepsis reported in a neonate.

CASE REPORT

A term male baby weighing 3100 grams was born to a 23-year-old primigravida mother by elective cesarean section at 39 weeks of gestation. There was no history of maternal fever or prolonged rupture of membranes. Liquor was clear. Apgar scores were 8 and 9 at 1 and 5 minutes of age. Baby developed respiratory distress on the 2nd day of life and was referred to our unit for further care.

On examination, baby was febrile, sick looking with cold extremities, poor perfusion and in respiratory distress. Baby's temperature was 100.8°F, heart rate 162/minute, respiratory rate 74/ minute with subcostal retractions and SpO_2 of 88% in room air. Laboratory investigations showed Hb of 15.4 gm/dl, leucocytosis (WBC: 22700/cu.mm), thrombocytopenia (platelets: 1.34 Lakhs/cu.mm) and elevated C-reactive protein (CRP: 23.2 mg/L). Chest X-ray showed patchy opacities and air bronchograms in upper and lower zones of right lung

suggestive of pneumonia. Blood culture was taken and IV antibiotics (piperacillin and amikacin) were started. Prothrombin time and activated partial thromboplastin time were normal. Baby required ionotropic support for 2 days. Cerebrospinal fluid (CSF) examination was normal.

Blood culture done on Bactec 9050 (BD Diagnostic Systems, USA) was positive at 12 hours. Gram stain showed presence of Gram negative bacilli. Subculture on Mac Conkey's agar showed growth of glucose fermenting colonies that was catalase positive and oxidase negative. Automated bacterial identification and antimicrobial susceptibility testing were done using Microscan Autoscan 4 (Siemens, Germany). Isolate was identified as *Empedobacter brevis*, which is sensitive to piperacillin-tazobactum, fluoroquinolones, tigecycline, cefoperazone, cefepime and resistant to gentamicin, amikacin, ampicillin, amoxicillin, cefotaxime, ceftrioxone, and carbapenems.

Baby was treated with piperacillin-tazobactum and levofloxacin for 2 weeks and has recovered completely. Baby had normal growth and development at follow-up.

DISCUSSION

Empedobacter brevis, a Gram negative non-motile bacillus and an obligate aerobe that belongs to the family Flavobacteriaceae is rarely associated with infection in adults and is exceptionally rare in the neonatal period.

E. brevis is ubiquitous in the environment, causing infections in debilitated and immuno-compromised patients with only one case being reported in neonates.

E. brevis is found in environmental habitats such as surface water, soil, sewage and survives in moist areas of the hospital environment and in parenteral fluids.[1-4] First described by Holmes et al, the genus *Empedobacter* belongs to the emended family of Flavobacteriaceae, which comprises of 10 genera.[4] In 1994, Vandamme et al. proposed the name *Empedobacter* and *Flavobacterium breve* was named as *Empedobacter brevis*.[8]

Literature search of Pubmed, Embase, Medline and Google scholar were done using the words: infection, sepsis and *Empedobacter brevis*. Recent reports suggest that it is a rare but significant pathogen causing nosocomial and opportunistic infections in man. Till to date, 17 cases of *E. brevis* associated infections were reported in humans, of which only one case was a neonate (Table 1). In 2016, first case of E. brevis infection in neonates was reported by Sharma et al in a 3 day old term baby with sepsis and meningitis.[7] In 2002, Janknecht et al reported a nosocomial outbreak of *E. brevis* endophthalmitis in 11 adults following cataract surgery and the source of infection was attributed to inadequate sterilization of equipment.[5] In 2010, *E. brevis* was cultured from ventriculostomy drain in an elderly patient.[9] Subsequently, two cases of cellulitis due to *E. brevis* were reported.[6,10] In 2015, 2 cases of *E. brevis* infections were reported in adults causing septicemia, shock, multi organ dysfunction and disseminated intravascular coagulation (DIC).[3,11] *E. brevis*, though considered rarely pathogenic is reported to cause cellulitis, meningitis, pneumonia, septicemia, endophthalmitis and DIC (Table 1). The bacteremia is often associated with implanted devices, contaminated parenteral solutions, ventriculostomy drains and vascular catheters.

Table 1: Characteristics of *E. brevi* infections reported in literature.

Author	No. of cases	Age at presentation	Presentation	Isolated from	Source of infection	Treatment
Janknecht P[5]	11	75 years*	endophthalmitis	Intraocular	Inadequate sterilization process	Vancomycin + amikacin
Chi H[9]	1	60.8 years*	Infection	Ventriculostomy drain	NI	NA
Nishio E[10]	1	83 years	cellulitis	Cellulitis wound	NI	Minocycline
Raman S[6]	1	65 years	cellulitis	Blood	NI	Levofloxacin
Schroeder J[11]	1	60 years	Septic shock, MOD	Blood	Saline solution	Ciprofloxacin
Bokhari S[11]	1	69 years	Sepsis, DIC	Blood	NI	Piperacillin-Tazobactum, ciprofloxacin
Sharma D[7]	1	3 days	Sepsis, meningitis	Blood, CSF	NI	Cefoperazone Sulbactam

Though still uncommon in neonatal intensive care units, infection with *E. brevis* is worrisome because of intrinsic resistance to commonly used antibiotics including ampicillin, aminoglycosides, first generation cephalosporins and carbapenems. It is usually susceptible to III generation cephalosporins and quinolones but resistance to these antibiotics is reported due to β-lactamases.[12]

Our case presented on the 2nd day of life with respiratory distress and it was presumed that infection is acquired either from mother or postnatally in the referral hospital. Maternal swabs, blood culture and environmental sampling were not done, and the source of infection was not identified.

E. brevis infection is usually associated with surgical procedures, irrigation of surgical wounds, presence of implanted devices and central venous catheters.[6,9] None of these risk factors were present in our case.

CONCLUSION

This case report highlights that *E. brevis* is isolated for the second time in India and there is a need for epidemiological surveillance in hospitals to identify the source of this uncommon pathogen. *E. brevis* infection, though uncommon can cause nosocomial outbreaks with high mortality because of innate resistance to ampicillin and first generation cephalosporins. Use of aseptic precautions by health care personnel and proper sterilization of equipment prevents nosocomial outbreaks. Awareness regarding this uncommon pathogen and initiation of appropriate antibiotic therapy improves the outcome and prevents mortality.

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