DOI: 10.7860/NJLM/2018/32067:2267

Case Report

Microbiology Section

A Rare Causative Agent of Neonatal Sepsis: *Pseudomonas Mendocina*

NADIRE SEVAL GÜNDEM, NURIYE TARAKÇI, TURAN ÇETINER

ABSTRACT

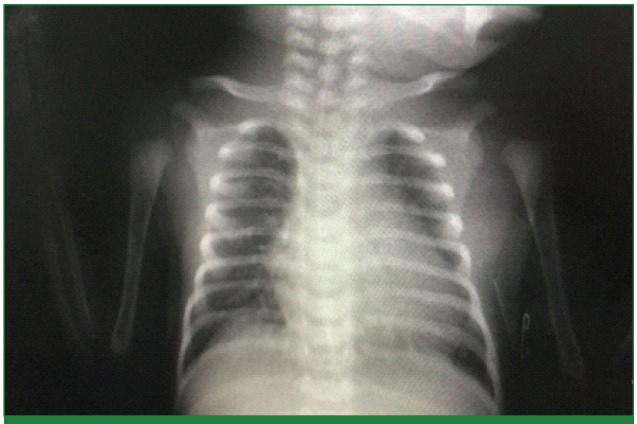
Pseudomonas mendocina was discovered in 1970 in Mendoza, Argentina, is a Gram negative, non-fermentative bacillus and commonly found in soil and water. A little is known about its pathogenicity or virulence factors. It was rarely reported as a human pathogen in clinical specimens. Until now, there have been only nine *P.mendocina* documented cases. We report the first case of *P.mendocina* causing neonatal sepsis in a term male infant from Turkey. *P.mendocina* was isolated from blood cultures of infant diagnosed with meconium aspiration syndrome. Mother's vagina may be the exact source of bacterium with acquisition during parturition. Infant had early onset sepsis which occured within 72 hours of birth. Respiratory distress, temperature instability and poor feeding were clinical signs of early onset sepsis. Also, abnormal laboratory and radiological findings were consistent with bacterial sepsis. Infant's condition improved after being treated with appropriate antibiotics because micro-organism was susceptible to many antibiotics such as aminoglycosides, antipseudomonal penicillins, third generation cephalosporins and carbapenems. *P.mendocina* should be kept in mind as a a rare cause of neonatal sepsis in infants whenever a laboratory or clinic encounter to a case like this. This report may help microbiologists to be vigilant about such unusual bacteria.

Keywords: Early onset sepsis, Gram negative bacilli, Meconium aspiration syndrome

CASE REPORT

A male infant with a birth weight of 3330 g was born at 37th week of gestation by normal spontaneous vaginal vertex delivery from the fourth pregnancy of a 38-year-old woman. Her prenatal history and screening tests were unremarkable. Infant's APGAR scores were 6 and 7 at delivery. As infant born with meconium stained amniotic fluid, he had tachypnoea and intercostal retractions. Physical examination revealed a pulse rate of 152/min, respiration rate 54/min, BP 80/50 mmHg, temperature 37.9°C, oxygen saturation >92%. Ral, roncus and wheezing were heard on pulmonary auscultation. Patch like infiltrations were detected on chest radiograph [Table/Fig-1]. Arterial hypoxaemia in blood gases was obvious. He was diagnosed as meconium aspiration syndrome. Investigations, including blood tests and blood cultures were performed. C-reactive protein increased to 52 mg/L (normal 0-8 mg/L). Full blood count showed raised white blood cell of 30.1 K/µL (normal 5-20 K/µL). Neutrophil count was 20.7 K/µL (normal 1.8-5.4 K/µL) with a mild increase in band forms in peripheral smears. Abnormal results of other investigations carried out were direct bilirubin 0.6 mg/dL (normal 0-0.3 mg/dL), glucose 85 mg/dL (normal 40-60 mg/dL), aspartate aminotransferase (179 U/L) (normal 25-75 U/L) and alanine aminotransferase 59 U/L (normal 13-45 U/L).

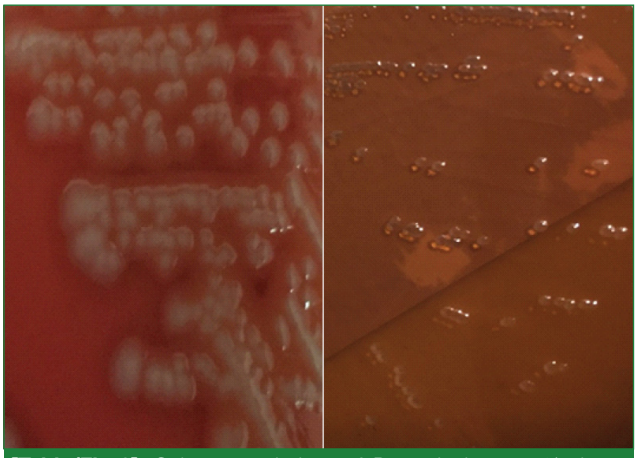
Using aseptic technique, 2-5 mL of blood for blood culture was collected from each arm and inoculated directly into each of two bottles containing tryptone soy broth. Bottles were incubated in BacT/ALERT 3D (bioMérieux, France) blood culture system for five days. Aerobic conditions were provided by the analyser and incubator. After 24 hours from incubation, analyzer indicated growth in both bottles. Gram stain was done from both positive signaling bottles and revealed presence of Gram negative bacilli. A subculture was done by inoculating directly on 5% sheep blood agar and eosin methylene blue agar. The micro-organism grew well as yellow brownish pigmented colonies with smooth surface on 5% sheep blood agar while there were non lactose



[Table/Fig-1]: Chest X-ray demonstrating patch-like infiltrations.

fermenting colonies on eosin methylene blue agar [Table/Fig-2]. Oxidase test positivitiy was determined from the colonies. Further, identification and antibiotic susceptibility tests of the bacterium were performed by VITEK® analyzer (bioMérieux, France). The micro-organism was identified as *P.mendocina*. Results revealed its susceptible to following antibiotics and had following MIC values: ceftazidime (MIC:2 mg/L), piperacillin (MIC:<=4 mg/L), piperacillin/tazobactam (MIC:<=4 mg/L), imipenem (MIC:<=0.25 mg/L),gentamicin (MIC:<=1 mg/L), meropenem (MIC:0.5 mg/L), cefepime (MIC:0.5 mg/L), netilmycin (MIC:<=1 mg/L), tobramycin (MIC:<=1 mg/L), colistin (MIC:<=0.5 mg/L), amikacin (MIC:<=2 mg/L). *P.mendocina* was only resistant to aztreonam (MIC:32 mg/L).

After receiving results of antibiotic susceptibility tests, gentamicin was added to empirical antibiotic therapy of ampicillin. Antibiotic treatment was continued for 10 days. Repeat blood cultures were negative after treatment. Results of repeat tests were all normal within two weeks and infant was discharged from hospital in healthy condition.



[Table/Fig-2]: Colony morphology of *P.mendocina* on 5% sheep blood agar and eosin methylene blue agar, respectively.

DISCUSSION

Gram negative bacteria have become increasing causes of sepsis in neonatal intensive care units [1]. The genus Pseudomonas contains Gram negative micro-organisms with more than 100 species. The most frequent species is *P.aeruginosa*, which is responsible for 70% of infections of this genus [2]. Unlike this, *P.mendocina* is a rare one isolated from clinical samples [3-6]. In our study, *P.mendocina* was isolated from blood samples of a newborn diagnosed with meconium aspiration syndrome and was causative agent of neonatal sepsis consistent with clinical symptoms, laboratory and radiological findings. The isolate was susceptible to many antibiotics such as aminoglycosides, antipseudomonal penicillins, third generation cephalosporins and carbapenems.

P.mendocina, is a member of *P. stutzeri* group of pseudo-monads consisting of three micro-organisms: *P.stutzeri*, CDC group Vb-3 and *P.mendocina*. Review of literatures demonstrates that *P.stutzeri* is more frequently isolated from clinical samples than *P.mendocina* [6]. A study from Saudi Arabia reported *P.stutzeri* as a rare causative agent of neonatal sepsis in a preterm baby and the isolate was found to be susceptible to antibiotics including aminoglycosides, antipseudomonal penicillins and third generation cephalosporins as consistent to data reported in our study [6].

In a study from Poland, *P.mendocina* was isolated from blood sample as the same as our study [3]. Rapsinski GJ et al., from USA reported the ninth case of human *P.mendocina* infection in a patient with infective endocarditis and isolated the micro-organism from blood sample. So, there were only nine *P.mendocina* documented cases until now [4]. Five of these previous cases involved patients with endocarditis, one with spondylodiscitis, one with femur osteomyelitis, one with wound infection and one had not suspected any such disease. In six of these cases, the bacterium was isolated from blood samples. The other three cases were non-bacteremic and associated with bone and soft tissue infections [3,4].

In another study from Denmark, *P.mendocina* is reported as a causative agent of infective endocarditis in a patient with situs inversus [7]. Nseir W et al., isolated *P.mendocina* as an ethylogical agent of sepsis from blood sample of a healthy adult suffering from chills, fatigue, headache and muscle cramps and revealed the possible source of acquisition of the infection as his strange habit of sharing the bird's drinking water. *P.mendocina* was isolated both from the tap water and bird's drinking water [5]. To the best of our knowledge, our study is the first case report of *P.mendocina* causing early onset neonatal sepsis in a term infant from Turkey.

In various studies, *P.mendocina* isolated from blood samples was susceptible to tested antibiotics like ampicillin, piperacillin, carbapenems, aminoglycosides, piperacillin-tazobactam and third generation cephalosporins [3,4,7]. These findings are in accordance with data obtained in our study. Although, it is a relatively susceptible pathogen, Nseir W et al., detected ceftriaxone and aztreonam resistance in their isolate [5].

Neonatal sepsis is classified as either early onset sepsis which occurs within 72 hours of birth or late onset sepsis which occurs through 8-28 days of the infant's age [8]. A study carried out in Saudi Arabia detected Coagulase-negative staphylococci and *Klebsiella* sp. as the most common agents causing late onset sepsis and reported rates of micro-organisms as 34.6% and 22.8%, respectively [9]. Thapa B et al., from Nepal, detected that early onset neonatal sepsis was common in their neonatal intensive care unit and coagulase negative *Staphylococcus* sp. was the most common micro-organism of neonatal sepsis with the rate of 41.1% [10]. In our study, the newborn had early onset neonatal sepsis as it occured within 24 hours. *P.mendocina* is accepted as an opportunistic pathogen because infant had meconium aspiration syndrome and respiratory failure as a predisposing factor. Mother's vagina may be exact source of bacterium with acquisition during parturition.

CONCLUSION

We reported the first case of *P.mendocina* causing early onset neonatal sepsis in a term infant from Turkey. *P.mendocina* should be kept in mind as a rare cause of neonatal sepsis in newborns whenever a laboratory or clinic encounter to a case like this. This report may help microbiologists to be vigilant about such unusual bacteria. Microbiological diagnostic tests such as blood cultures, identification and antibiotic susceptibility tests play an important role for determinating appropriate treatment.

REFERENCES

[1] Crivaro V, Di Popolo A, Caprio A, Lambiase A, Di Resta M, Borriello T, et al. *Pseudomonas aeruginosa* in a neonatal intensive care unit: Molecular epidemiology and infection control measures. BMC Infect Dis. 2009; 9(70):01-07.

[2] Moraes FS, Antonio AG, Almeida MLPW, Castro RAL, Vianna R. *Pseudomonas aeruginosa* in the early childhood: A Case Report. Clin Med Case Rep. 2008;1:25-28.

[3] Kiryszewska A, Szczerba I, Grzegorczyk JL, Gaszyński W. *Pseudomonas mendocina* as an agent of bacteremia, case study and literature review. J Clin Case Rep. 2015;5(9):01-03.

[4] Rapsinski GJ, Makadia J, Bhanot N, Min Z. *Pseudomonas mendocina* native valve infective endocarditis: A case report. J Med Case Rep. 2016;10:275:01-05.

[5] Nseir W, Hussein T, Abid A, Khateeb J. *Pseudomonas mendocina* sepsis in a healthy man. Isr Med Assoc J. 2011;13:375-76.

[6] Bello CSS. *Pseudomonas stutzeri*: A rare cause of neonatal sepsis. East Mediterr Health J. 2007;13(3):731-34.

[7] Johansen HK, Kjeldsen K, Høiby N. *Pseudomonas mendocina* as a cause of chronic infective endocarditis in a patient with situs inversus. Clin Microbiol Infect. 2001;7(11): 650-52.

[8] Naher HS and Khamael AB. Neonatal sepsis; the bacterial causes and the risk factors. Int Res J Medical Sci. 2013;1(6):19-22.

[9] Hammoud MS, Al-Taiar A, Al-Abdi SY, Bozaid H, Khan A, Al Muhairi LM, et al. Late-onset neonatal sepsis in Arab states in the Gulf region: Two-year prospective study. Int J Infect Dis. 2017; 55:125-30.

[10] Thapa B, Thapa A, Aryal DR, Thapa K, Pun A, Khanal S, et al. Neonatal sepsis as a major cause of morbidity in a tertiary center in Kathmandu. J Nepal Med Assoc. 2013;52(192):549-56.

AUTHOR(S):

1. Dr. Nadire Seval Gündem
2. Dr. Nuriye Tarakçı
3. Dr. Turan Çetiner

PARTICULARS OF CONTRIBUTORS:

1. Faculty, Department of Medical Microbiology, Dr. Ali Kemal Belviranlı Gynaecology, Obstetrics and Children Hospital, Konya, Turkey.
2. Faculty, Department of Paediatrics and Neonatal Unit, Dr. Ali Kemal Belviranlı Gynaecology, Obstetrics and Children Hospital, Konya, Turkey.
3. Faculty, Department of Paediatrics, Dr. Ali Kemal Belviranlı Gynaecology, Obstetrics and Children Hospital, Konya, Turkey.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Nadire Seval Gündem,
Faculty, Department of Medical Microbiology,
Dr. Ali Kemal Belviranlı Gynaecology, Obstetrics and Children Hospital, Selçuklu-42285, Konya, Turkey.
E-mail: sevalgndem@yahoo.com

FINANCIAL OR OTHER COMPETING INTERESTS: None.

Date of Publishing: **Jan 01, 2018**