

A case of newborn with community acquired pneumonia caused by *Cupriavidus pauculus*

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ÖZET

Cupriavidus pauculus'a bağlı toplum kökenli pnömoni gelişen bir yenidoğan olgu

Cupriavidus pauculus gram-negatif, aerobik, spor oluşturmeyen, nonfermentatif hareketli bir basildir. Basil sulardan, şişelenmiş sulardan ve hastanelerdeki ultrafiltrasyon sistemlerindeki sulardan izole edilebilir. *C. pauculus* insanda nadiren enfeksiyona yol açar, ancak özellikle immünyetmezlikli kişilerde enfeksiyon etkeni olabilir. Bu yazıda daha önce sağlıklı iken postnatal 16. gününde solunum sıkıntısı nedeniyle yenidoğan yoğun bakım ünitesine yatırılan ve *C. pauculus*'a bağlı toplum kökenli pnömoni tanımlanan ilk yenidoğan olguyu sunuyoruz.

Anahtar Kelimeler: *Cupriavidus pauculus*, yenidoğan, pnömoni.

SUMMARY

A case of newborn with community acquired pneumonia caused by Cupriavidus pauculus

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Cupriavidus pauculus is a gram-negative, aerobic, non-spore forming, non-fermentative motile bacillus. The bacillus can be isolated from water, bottled mineral water, and water from ultrafiltration systems in hospital setting. *C. pauculus* rarely causes human infections, however it may be an infectious agent especially in immunocompromised individuals. In this report, we present the first case of community acquired pneumonia caused by *C. pauculus* in a previously healthy newborn who was hospitalized in neonatal intensive care unit on postnatal day 16 because of respiratory distress.

Key Words: *Cupriavidus pauculus*, newborn, pneumonia.

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INTRODUCTION

Cupriavidus pauculus (formerly CDC group IV c-2) is a gram-negative, aerobic, non-spore forming, non-fermentative motile bacillus. The bacillus may be isolated from water, bottled mineral water, and water from ultra-filtration systems in both hospital setting and environment. Although it rarely causes human infections, the bacillus may be an infectious agent especially in immunocompromised individuals. It may occur as an opportunistic pathogen both in the hospital and in the environment, causing to outbreaks especially in the intensive care units. Hydrotherapy pools, nebulization solutions, tap water, and even bottled mineral water have been recognized as potential sources of contamination (1,2). Although there have been many case reports of airway infection, blood stream infection, peritonitis, abscess, and tenosynovitis in adults, a few cases have been reported in children (1-5). The available literature revealed lack of data on *C. pauculus* infections in newborns.

CASE REPORT

A 2690 g male baby was born at term to a gravida 4, para 2, abortus 2 37 years old woman by vaginal delivery. He discharged home without any problems within 48 hours. On 16th day of life, he was brought to the hospital with complaints of fever, nasal discharge, cough and respiratory distress. Mother has a history of upper respiratory system infection. On physical examination, the baby was active. His fever was 37.5°C with a heart rate of 148/minute, respiratory rate of 52/minute, and blood pressure of 62/28 mmHg. Tachypnea, retraction, and cyanosis were not noted. Bilateral rales were heard. The baby was hospitalized to the NICU with suspect of pneumonia. At hospitalization, blood was drawn from vein with a sterile needle and placed in BacT/Alert P/F culture bottle (bioMérieux, France). Whole blood count showed normal leukocyte (9700/mm³), hematocrit (40.6%), hemoglobin (13.9 g/dL), and thrombocyte levels (440.000/mm³). C-reactive protein (CRP) level was slightly high (7 mg/L). Chest X-ray showed minimal bilateral interstitial infiltration. Antibiotic was not started and supportive treatment including enteral feeding with breastmilk, intravenous fluid, and free oxygen support were administered. On the 3rd of hospitalization, his condition deteriorated and he needed more oxygen support. On the same day incubator sounded an alarm, indicating a positive (growth of bacteria) blood culture. Ampicilline and gentamicin treatment was started until receipt of the antibiogram. The specimens were plated onto blood agar (Salubris, Turkey), and Eosin Methylene Blue

(EMB) agar (Salubris, Turkey), per routine procedure. Bacteria grown at blood agar and EMB agar after 48 hours of incubation were stained as gram-negative bacilli and identified as *C. pauculus* by Phoenix 100 ID/AST system (Becton Dickinson Co., Sparks, MD). The strain was non-fermenting and catalase and oxidase positive and hydrolyze urea. Antimicrobial susceptibility was determined according to Clinical and Laboratory Standards Institute (CLSI) guidelines. The strain was susceptible to gentamicin, amikacin, piperacillin, ceftriaxone, aztreonam, ceftazidime, ciprofloxacin, imipenem, colistin, and trimetoprim-sulphamethoxazole. The case was considered as *C. pauculus* sepsis. Gentamicin was stopped and ceftazidime (150 mg/kg per day) was added to treatment. Clinical and microbiological response was achieved by 14 days of the treatment. No grew was detected on the 3rd and 5th day blood cultures following the treatment. The patient was discharged in good health after full enteral feeding was regained.

DISCUSSION

Cupriavidus species which cause human infections include *Ralstonia pickettii*, *Ralstonia gilardii*, *Ralstonia mannitolilytica* and *C. pauculus* (formerly CDC group IV c-2), although rarely. *C. pauculus* is the species most likely to be isolated (6). In 1999, *C. pauculus* was firstly described as *Ralstonia paucula*; the description was identical to the one given by Vaneechoutte et al. in 2004 as *Wautersia paucula*, and it was finally renamed *C. pauculus*. *C. pauculus* is an oxidase, catalase, citrate, and urea positive motile and non-fermentatile bacillus (7,8). This bacillus can be distinguished from *R. pickettii*, *R. gilardii*, and *R. mannitolilytica* by biochemical tests (nitrate reduction, carbohydrate acidification, urease, and fatty acid profile) and conclusively by DNA sequencing. *C. pauculus* resembles to *Bordetella bronchiseptica* and *Oligella ureolytica*, especially with its ability to hydrolyze urea and production alkali from carbohydrates. Nitrate and nitrite reduction and phenylalanine deamination are the most helpful tests in differentiation of *O. ureolytica* from *C. pauculus*, whereas *B. bronchiseptica* grows on Salmonella Shigella (SS) agar and reduce nitrates (1). *C. pauculus* usually grows on blood agar and EMB within 72 hours. It has been suggested that identification of *Cupriavidus* species based on conventional methods should be confirmed with molecular (PCR-based) assays (5). In our case, blood culture yielded growth of non-fermentative gram-negative bacilli on blood agar and EMB. *C. pauculus* was identified by using Phoenix 100 ID/AST system. We could not perform PCR assay due to technical problems.

In *C. pauculus* sepsis, hydrotherapy pools, nebulization solutions, tap water, and even bottled mineral water have been recognized as potential sources of contamination (1,2). In our case, the source of the infection could not be identified. We thought that distilled water used in incubator of the patient might be a potential source of *C. pauculus*, but bacteria did not grow in environmental cultures. Besides, *C. pauculus* grew at first blood culture taken just after hospitalization. It can be speculated that breastmilk may be the source of the infection. However, we did not perform any studies by this way.

Historically, *C. pauculus* has rarely been identified in human infections. Stovall et al. present the first known report of nosocomial infection with *C. pauculus* attributable to contamination from Extra Corporeal Membrane Oxygenation (ECMO) equipment (9). Recently, Taşbakan et al. reported a case of *C. pauculus* ventilator-associated pneumonia in a 47 years-old female with breast cancer (10). Our patient was hospitalized in NICU with community acquired pneumonia. To our knowledge, this is the first case of pneumonia caused by *C. pauculus* in a newborn.

As shown, *C. pauculus* generally causes infection in immunocompromised patients (5,10). There are only two reports of *C. pauculus* infection in previously healthy patients. The first one is a 73 years old woman with tenosynovitis after cat bite (3), and a six months old infant presented with fever, vomiting and diarrhea (4). Our patient was brought to outpatient polyclinics with complaints of cough, noisy breathing and nasal discharge. He was hospitalized in NICU with suspect of pneumonia and first blood culture showed *C. pauculus* bacteremia. This infant was born at term via vaginal delivery, discharged home within 48 hours, fed with breastmilk and has no any complaints until postnatal 16th day.

By this report, we want to emphasize that rare pathogens like *C. pauculus* may also cause community acquired pneumonia in newborns and be successfully treated with appropriate antibiotic regimen.

CONFLICT of INTEREST

None declared.

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