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Case Report

Late-onset *Streptococcus pasteurianus* sepsis in a preterm baby in a neonatal intensive care unit

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Abstract

Apnea, cyanosis, lethargy and prolongation in capillary filling time developed on the postnatal 37th day in a preterm baby who was born at the 30th gestational week with a birth weight of 1 300 g. Acute phase reactants and immature/total neutrophil count ratio were found to be high. The patient who was diagnosed with sepsis was successfully treated with meropenem which was started empirically. In his blood culture *Streptococcus pasteurianus* grew. *S. pasteurianus* is in the subgroup of streptococcus bovis which is one of the D group streptococci and its previous name is S. *bovis type II/2*. In the literature, there are very few cases of neonatal infection related with this bacterium. As far as we know, this is first case of neonatal sepsis caused by *S. pasteurianus* in Turkey. In addition, we tried to determine the clinical properties of neonatal infections arising from *S. pasteurianus* by reviewing the literature. (Türk Ped Arş 2014; 49: 157-9)

Key words: Meningitis, sepsis, *Streptoccus bovis biotype II/2, Streptococcus pasteurianus*, newborn

Introduction

Streptococcus gallolyticus subsp. pasteurianus or *S. pasteurianus* Lancefield according to the last nomenclature is a D group streptococcus. Although D group streptococci which include Enterococ and *S. bovis* rarely cause to neonatal sepsis and meningitis, most of the cases arise from enterococci (1, 2). In the literature, there is a limited number of case presentations in which *S. bovis* has been reported as the agent of neonatal sepsis and meningitis. Here, a case of neonatal sepsis caused by *S. pasteurianus* which is in the *S. bovis* subgroup was presented and the literature was reviewed.

Case

A twin mate male baby who was delivered by cesarean section in the 30th gestational week because of preeclampsia with a birth weight of 1 300 g was hospitalized in the neonatal intensive care unit because of respiratory distress, groaning and cyanosis. Nasal continuous positive airway pressure (CPAP) was inititated with a diagnosis of respiratory distress syndrome and one dose of surfactant was administered. After obtaining samples directed to sepsis, penicillin plus gentamycin treatment was started. Aminophylline was started because of his apneas and fluconazole was started for prophylaxis. Leukocyte count, hemoglobin, platelets and C-reactive protein (CRP) values were found to be normal. No growth occured in the blood culture. Enteral feeding was initiated together with total parenteral nutrition. On the postnatal 7th day, his general status deteriorated markedly, frequent apnea attacks and enteral feeding intolerance developed. Therefore, his antibiotic treatment was switched

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to meropenem, vancomycin and amikacin after obtaining samples directed to sepsis. Hemogram and CRP level were found to be normal. Although no growth occured in blood culture, antibiotic treatment was continued, because the case was accepted as clinical sepsis. The antibiotics were discontinued at the end of 14 days (on the postnatal 21st day). On the postnatal 35th day, nursing efforts were inititated with the aim of switching from orogastric feeding to breastfeeding. Two days later (postnatal 37th day), the baby's general status deteriorated suddenly and sepsis was considered when superficial respiration, apnea, lethagy, cyanosis and prolongation of capillary filling time were found on physical examination. Hemogram was as follows: WBC 12 000/mm^3, hemoglobin 6.9 g/dL, platelets 474 000/mm^3. CRP was found to be 30.5 mg/L and procalcitonin was found to be 19.1 ng/mL. On peripheral blood smear, the immature/total neutrophil ratio was found to be 0.36. Lung and abdominal graphy at a standing position were found to be normal. Biochemical values including blood glucose were found to be normal. Lumbar puncture was not performed, since his general status was poor and he had recurrent apneas and superficial respiration. Empricial meropenem and amikacin treatment was initiated after obtaining blood and urine samples for culture. 10 mL/kg erythrocyte suspension was transfused. When a marked decrease in CRP and procalcitonin levels was found on the 48th hour of treatment, the antibiotic treatment was continued. The result of the blood culture which was obtained before treatment was reported as *S. pasteurianus*. The microorganism was found to be sensitive to penicillin G, cefotaxim, meropenem, linezolid and vancomycin and resistant to erythromycine, clindamycine and levofloxcacine (Minimal inhibitor concentration with E-test method=MIC values; penicillin G <0.12 mcg/mL, meropenem 0.04 mcg/mL). Amikacin treatment was discontinued in accordance with the culture result. On the fifth day of treatment, his clinical findings improved with elimination of the apneas and increased activity and no growth occured in the follow-up blood culture. The patient was discharged with cure after meropenem treatment was completed to two weeks.

Discussion

Group D streptococci fall far behind in the etiology of neonatal sepsis and/or meningitis. In large case series, it has been demonstrated that group D streptococci are the responsible agent only in 5-6% of the cases and most of these cases arise from enterococci (3-6). There is a small number of case presentations where S.bovis which is one of Group D streptococci is the agent of neonatal sepsis and/or meningitis. However, the real incidence may be higher than known, because *S. bovis* was erroneously defined as enterococcus or *S. viridans* in previous years (1, 5). In addition, multiple taxonomic transformation of *S. bovis* has caused to uncertainity and confusion. Some laboratories can not make subgroup differentiation of *S. bovis* and most clinicians are not aware of new strains and the clinical properties of these strains. *S. bovis* strains which ferment mannitol are classified as type I and *S. bovis* strains which can not ferment mannitol are classified as type II (old name: *S. bovis* variant). They were classified as type II/1 and II/2 according to the Rapid Strep System. According to the latest nomenclature, type I was named as *S. gallolyticus*, type II/1was named as *S. infantarius* ve tip II/2 was named as *S. pasteurianus* (*S. pasteurianus* was reported as *S. bovis* type II/2 in previous publications).

In the literature written in English, there are about 20 publications as single case or 2-6-case presentations where *S. bovis* was the causative agent for neonatal sepsis and/or meningitis. In most of these publications, *S. bovis* typing was not done and/or reported (1).

The number of publications where the causative agent was reported to be *S. bovis* type II/2 or *S. pasteurianus* was seven and the total number of cases was 14 (one publication included five cases, one publication included four cases and the other publications included single cases) (1, 5, 7-11). When these cases were examined, it was noted that term and preterm babies were affected equally, early and late infection rates were similar, but early infection was observed in term babies and late infection was observed in preterm babies, no risk factor was present for early and late sepsis, meningitis accompanied 64% of the cases and meningitis was mostly observed in the patients in whom early infection was developed and was manifested with clinical findings similar to group B sterptococci and *E. coli* infections. Infection occured as late infection on the postnatal 37th day in our patient who had no risk factor including arterial, venous catheterization or urine catheter and meningitis could not be demonstrated or excluded, since lumbar puncture could not be performed because of apnea and respiratory distress.

The patients were treated successfully mostly with cefotaxim and with ampicillin, penicilin, penicilin-gentamycin combination with a lower rate. One patient was treated successfuly with carbapenem. It is observed that *S. pasteurianus* is sensitive to penicillin, ampicillin, cefotaxim, vankomycin and carbapenem and resistant to macrolides and tetracycline. In our patients, treatment was completed with meropenem which was inititated empirically. It is observed that the prognosis is good in sepsis and meningitis caused by *S. pasteurianus* including severe cases of septic shock.

S. bovis strains can be found normally in human and animal intestines and sometimes in the mouth as a part of the normal flora. Although it is not known how the agent leads to systemic infection in sepsis/meningitis cases caused by S. *pasteurianus*, it was thought that transfer by bacterial translocation from the intestines due to diarrhea or abdominal distention or immune failure might have caused to systemic infection (9).

Conclusively, *S. pasteurianus* can very rarely be the causative agent in neonatal sepsis and/or meningitis in the early or late period in term or preterm babies without any risk factor. The clinical findings can not be differentiated from the ones of other neonatal sepsis agents. Penicilin treatment alone is sufficient. Response to treatment and prognosis is very good. Colonization of the pathogen and transmission ways will be recognized better with increased awareness of clinicians and widespread use of appropriate typing methods in microbiology laboratories.

Informed Consent: Written informed consent was obtained from the parents of the patient who participated in this case.

Peer-review: Externally peer-reviewed.

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References

1. Gavin PJ, Thomson RB Jr, Horng SJ, Yogev R. Neonatal sepsis caused by Streptococcus bovis variant (biotype II/2): report of a case and review. J Clin Microbiol 2003; 41: 3433-5. [CrossRef]
2. Grant RJ, Whitehead TR, Orr JE. Streptococcus bovis meningitis in an infant. J Clin Microbiol 2000; 38: 462-3.
3. Hyde TB, Hilger TM, Reingold A, Farley MM, O'Brien KL, Schuchat A. Active bacterial core surveillance (ABCs) of the emerging infections program network. Trends in incidence and antimicrobial resistance of early-onset sepsis: population-based surveillance in San Francisco and Atlanta. Pediatrics 2002; 110: 690-5. [CrossRef]
4. Stoll BJ, Hansen NI, Sánchez PJ, et al. Eunice Kennedy Shriver National Institute of child health and human development neonatal research network. Early onset neonatal sepsis: the burden of group B Streptococcal and E. coli disease continues. Pediatrics 2011; 127: 817-26. [CrossRef]
5. Cheung M, Pelot M, Nadarajah R, Kohl S. Neonate with late onset Streptococcus bovis meningitis: case report and review of the literature. Pediatr Infect Dis J 2000; 19: 891-3. [CrossRef]
6. Edwards MS, Baker CJ. Sepsis in the newborn. In: Gershon AA, Hotez PJ, Katz SL (eds). Krugman's ınfectious diseases of children. St Louis: Mosby, 2004: 545-61.
7. Khan A. Relative penicillin resistance in Streptococcus bovis. A case of neonatal meningitis. J Paediatr Child Health 2009; 45: 474-5.
8. Onoyama S, Ogata R, Wada A, Saito M, Okada K, Harada T. Neonatal bacterial meningitis caused by Streptococcus gallolyticus subsp. pasteurianus. J Med Microbiol 2009; 58: 1252-4. [CrossRef]
9. Floret N, Bailly P, Thouverez M, et al. A cluster of bloodstream infections caused by Streptococcus gallolyticus subspecies pasteurianus that involved 5 preterm neonates in a university hospital during a 2-month period. Infect Control Hosp Epidemiol 2010; 31: 194-6. [CrossRef]
10. Nagamatsu M, Takagi T, Ohyanagi T, et al. Neonatal meningitis caused by Streptococcus gallolyticus subsp. pasteurianus. J Infect Chemother 2012; 18: 265-8. [CrossRef]
11. Klatte JM, Clarridge JE 3rd, Bratcher D, Selvarangan R. A longitudinal case series description of meningitis due to Streptococcus gallolyticus subsp. pasteurianus in infants. J Clin Microbiol 2012; 50: 57-60. [CrossRef]