Case Report

Neonatal Septicemia due to Pasteurella Multocida: The First Case Report in Thailand

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Neonatal septicemia acquired by vertical transmission of Pasteurella multocida is very rare. The authors report a case of Pasteurella multocida septicemia in a 2-day-old male infant. His mother had a history of prolonged premature rupture of membranes and subsequently developed fever. The patient had fever and lethargy at 36 hours of age, then developed severe pneumonia, sepsis, persistent pulmonary hypertension, renal failure and liver failure. Although the appropriate antibiotics were given, he continued to deteriorate and eventually died.

Keywords: *Pasteurella multocida, Newborn, Sepsis*

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Pasteurella multocida is a gram negative coccobacilli that are found in the oral flora of domestic animals such as cats and dogs. Human transmission occurs by being bitten or scratched by a cat or dog or, less commonly, from other animals. Respiratory tract spread from animals to humans is another route of transmission[1].

The most common manifestation in children is cellulitis at the site of the scratch or bite. Less common manifestations include septicemia, meningitis, respiratory tract infection, appendicitis, hepatic abscess, peritonitis, urinary tract and ocular infection. However, neonatal septicemia acquired by vertical transmission of *P.multocida* is very rare. The following is the first case report of neonatal septicemia as a result of *P. multocida* infection in Thailand.

Case Report

A 2-day-old male infant was referred to the authors' university medical center, Songklanagarind Hospital, with a 36-hour history of fever and lethargy. The baby was born from a 25-year-old mother with gravida 3, para 1 and spontaneous abortion at 40 weeks gestation. The mother had an uneventful pregnancy. The mother's membranes spontaneously ruptured 24 hours before delivery with a foul smell amniotic fluid. She subsequently developed fever and labor pain.The baby was born at a community hospital by uncomplicated vaginal delivery with a birth weight of 3,220 gm. The Apgar scores were 9 at 1 minute and 10 at 5 minutes. He presented with poor feeding at the first hour of life followed by fever and lethargy 36 hours later. The baby's condition deteriorated at 44 hours of age when he developed respiratory distress and jaundice. He required intubation and was immediately referred to our hospital.

On admission, the physical examination revealed the following findings: temperature, 37.6°C; blood pressure, 41/32 mmHg; pulse rate, 148/min; respiratory rate, 52/min; weight, 2,970 gm; length, 51 cm and head circumference, 31 cm. He looked lethargic and jaundice, bilateral lung crackle was noted, the liver edge was 4 cm below the right costal margin and his skin showed sclerema.

The laboratory investigation revealed the following findings: Hct 49%; WBC 2,500 cells/mm^3 (10 % polymorphic neutrophils, 2 % bands, 8% eosinophils, 66% lymphocytes, 12% monocytes and 2% atypical lymphocytes); platelets 129,000 cells/mm^3; BUN 33.9 mg/dL; Cr 1.94 mg/dL; direct bilirubin 1.13 mg/dL; total

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bilirubin 4.89 mg/dL; SGOT 153 U/L; SGPT 74 U/L; ALP 129 U/L; total protein 5 g/dL; and albumin 3.3 g/dL. The chest radiographic showed patchy infiltration in the right lung and predominantly in the right lower lung (Fig. 1). The Cerebro Spinal Fluid (CSF) showed a serosanguinous color; the cell count was 22,220 red blood cells and 12 white blood cells/mm^3 with 100% mononuclear cells; the Gram stain of CSF revealed no organism; glucose was 50 mg/dL with a blood glucose of 60 mg/dL; and the protein concentration was 84 mg/dL.

Blood culture and CSF culture were obtainted, and therapy was started with intravenous ampicillin (150 mg/kg/day divided every 12 hours) and amikacin (15 mg/kg/day once daily). Nevertheless, the baby had Persistent Pulmonary Hypertension of the Newborn (PPHN), renal failure, liver failure and bloody diarrhea with mucous. The blood culture grew gram negative bacilli at the age of 64 hours. The ampicillin was changed to cefotaxime (50 mg/kg/day divided every 12 hours). He continued to deteriorate and eventually died at the age of 77 hours. The blood culture was identified later as *Pasteurella multocida* susceptible to ampicillin, amikacin and cefotaxime. The CSF culture revealed no organisms and the stool culture grew nonenteropathogenic bacteria.

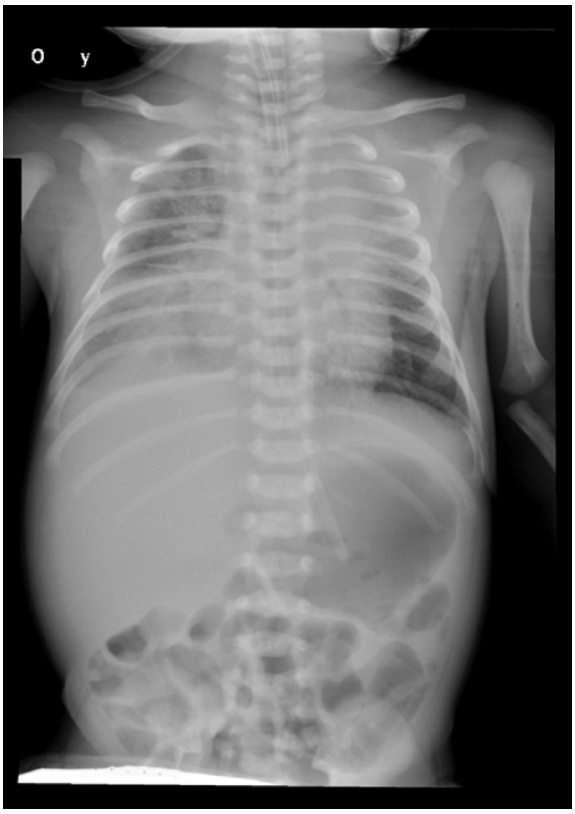

Fig. 1 Chest X-ray on admission showed patchy infiltration in the right lung and predominantly in the right lower lung

At the postmortem, the baby's autopsy findings revealed bilateral severe bronchopneumonia, pulmonary congestion and edema, pulmonary hemorrhage, lymphoid depletion in the thymus gland, congestion of visceral organs and moderate fatty change in the liver.

For the maternal history, during postpartum at the community hospital, his mother still had a high grade fever. Unfortunately, blood culture was not obtained. She was treated with intravenous ampicillin, gentamicin and metronidazole for 5 days. She was discharged on the 5th day of postpartum with a low grade fever and her symptoms improved by the 7th day of postpartum. Her vaginal and endocervical swab culture were obtained at 4 months after delivery. Both of them grew *Staphylococcus epidermidis* and *Gardnerella vaginalis*.

According to additional information from the patient's mother, she denied any history of bites, licks or scratches from an animal during pregnancy and she did not keep any pets at home. However, there were some cats and dogs near her home and she recalled swimming in a canal nearby her home during pregnancy, two and four weeks before delivery.

Discussion

Pasteurella multocida is found in the oral flora of domestic animals and usually causes infection in human as a result of a bite or a scratch. However, this rarely occurs in the neonatal period. Only 23 cases were reported between 1953-1999[2-11]. This infection is very important because it can cause serious complications and has a high mortality rate. There were six deaths from a total of twenty-three cases with this infection[11].

P. multocida septicemia is characterized by a high incidence of maternal obstetric complications, including premature onset of labor, premature rupture of membranes and early postpartum fever. The presented patient's mother had the last two obstetric complications.

Common manifestations in neonates include fever, tachycardia, respiratory distress, irritability, lethargy, feeding difficulty, jaundice, hepatomegaly and seizure. The infected patient frequently has leukocytosis or leukopenia with predominant PMN. When

meningitis is present, CSF profile shows pleocytosis with predominant PMN, low glucose concentration and high protein concentration. This is similar to other forms of acute bacterial meningitis.

P. multocida infection may be acquired either in utero or during passage through the colonized birth canal. The authors believe that the presented patient was infected during intrapartum as a result of transplacental infection from maternal bacteremia or from ascending chorioamnionitis caused by a prolonged rupture of membranes because the baby's onset occurred rapidly, within 48 hours after delivery. In particular, the mother's condition was poor before and after delivery, the amniotic fluid had a foul smell and she had a fever and clinical signs of systemic infection.

The maternal genital tract is the definite source of infection in neonates. Vaginal and cervical colonization with *P. multocida* is rare but has been reported [7,11]. However, there was no evidence of *P. multocida* infection in this baby's mother because blood culture had not been obtained. In addition, the mother received antibiotics at postpartum. Vaginal and endocervical swab cultures were obtained at 4 months after delivery. At that this, the organism may have disappeared.

Penicillin is the drug of choice for the treatment of *P. multocida* infection because of its high efficacy, safety and low cost[11]. The duration of therapy ranges from 10-19 days, with a mean of 14 days[7]. Although, in the presented patient, *P.multocida* were sensitive to the antibiotics the authors prescribed, the outcome was not satisfactory. This may be due to overwhelming infection that led to multiorgan dysfunction and death.

A history of animal exposure was found in 19 cases of the previous reports[3-11]. In the present case, the mother could not recall any animal bites or scratches by the animal preceding delivery. The authors, therefore, hypothesized that her *P. multocida* infection was probably acquired via exposure to animal secretions from the canal where she had swum during pregnancy.

In summary, *P. multocida* infection in neonates can be a consequence of direct or maternal exposure to household pets. Vertical transmission is very unusual but can cause serious infection and death in the neonate. Pregnant women should be warned to take the usual hygienic and sanitary precautions. Early detection and appropriate treatment are also necessary for a good outcome.

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การติดเชื้อ Pasteurella multocida ในกระแสเลือดในทารกแรกเกิด: รายงานผู้ป่วยรายแรกในประเทศไทย

มณีรัตน์ ภูวนันท์, ประสิน จันทร์วิทัน

ทารกแรกเกิดที่มีการติดเชื้อในกระแสเลือดจากเชื้อ Pasteurella multocida จากมารดาสู่ทารกระหว่างตั้งครรภ์พบได้น้อยมาก รายงานนี้ได้นำเสนอผู้ป่วยทารกเพศชาย อายุ 2 วัน ที่มีการติดเชื้อ Pasteurella multocida ในกระแสเลือด โดยมารดามีประวัติถุงน้ำคร่ำแตกก่อนคลอดนาน และมีไข้ก่อนคลอด ทารกมีไข้และซึมลงเมื่ออายุ 36 ชั่วโมง หลังจากนั้นอาการรุนแรงขึ้นจากภาวะปอดอักเสบรุนแรง, ภาวะติดเชื้อในกระแสเลือด, ภาวะแรงดันเลือดของปอดสูง, ไตวาย และตับวาย แม้ทารกได้รับยาปฏิชีวนะที่เหมาะสม แต่อาการไม่ดีขึ้น และเสียชีวิตในที่สุด