Nosocomial *Stenotrophomonas maltophilia* cross-infection: Three cases in newborns

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Background: Increased nosocomial *Stenotrophomonas maltophilia* infection rates in newborns, especially in recent years, are a significant cause for concern. These cases are the second case group in the literature to have been identified as nosocomial cross-infection with *S maltophilia* in neonates.

Objective: To investigate the clinical, microbiological, and epidemiologic features of the outbreak caused by *S maltophilia* in the neonatal intensive care unit within a period of 7 days.

Methods: Three cases with nosocomial *S maltophilia* infection considered to be the result of cross-transmission were prospectively analyzed. Arbitrarily primed polymerase chain reaction (AP-PCR) performed with M13 primer and pulsed-field gel electrophoresis (PFGE) of genomic DNA after digestion with *XbaI* were used to determine clonal relationship among the isolates.

Results: *S maltophilia* was isolated from the blood cultures of all 3 patients. Molecular typing confirmed that the 3 cases were epidemiologically linked.

Conclusions: Opportunistic pathogens such as *S maltophila* can lead to major problems in neonates. Molecular typing is helpful to improve effective control programs for preventing the spread of the infection. (Am J Infect Control 2004;32:365-8.)

Stenotrophomonas maltophilia is an aerobic, nonfermentative, Gram-negative bacillus that can cause severe nosocomial infections.[1] It most often affects the respiratory system, but this agent can also manifest as bacteremia, endocarditis, and infections of the central nervous system, urinary tract, gastrointestinal system, eye, skin, soft tissue, bone, and joint in hospitalized patients.[1-5] The frequency of nosocomial infection with *S maltophilia* is rising, so there is an urgency to learn more about this bacterium. Unfortunately, the current literatures contain very little information related to paediatric patient group.[4,6-8]

The aim of this study was to analyze epidemiologic, clinical, and microbiological features of 3 *S maltophila* infections observed in a neonatal intensive care unit (NICU) over a 7-day period.

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0196-6553/$30.00

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doi:10.1016/j.ajic.2004.07.003

METHODS

Patients

Three cases of nosocomial *S maltophilia* infection were observed in an NICU with a 14-patient capacity, where each nurse had to care for 7 patients. One of the patients was admitted to the NICU due to meconium aspiration syndrome, and the other 2 were admitted for prematurity and respiratory distress syndrome. The first patient's treatment with ampicillin sulbactam (225 mg/kg/day parenterally) and cefotaxime (150 mg/kg/day parenterally) was initiated because of possible nosocomial sepsis. The other 2 patients received empirical parenteral treatment with ampicillin sulbactam (150 mg/kg/day) and amikacin (18 mg/kg every 36 hours). None of the 3 patients had a central venous catheter placed, but they had intravenous peripheral catheters. All of them required mechanical ventilation for respiratory distress syndrome. Nosocomial pneumoniae was diagnosed in the first patient and in one of the 2 premature infants according to clinical and radiologic findings. Tracheal aspirate and blood samples were collected for cultures, and then treatments were changed to a combination of meropenem

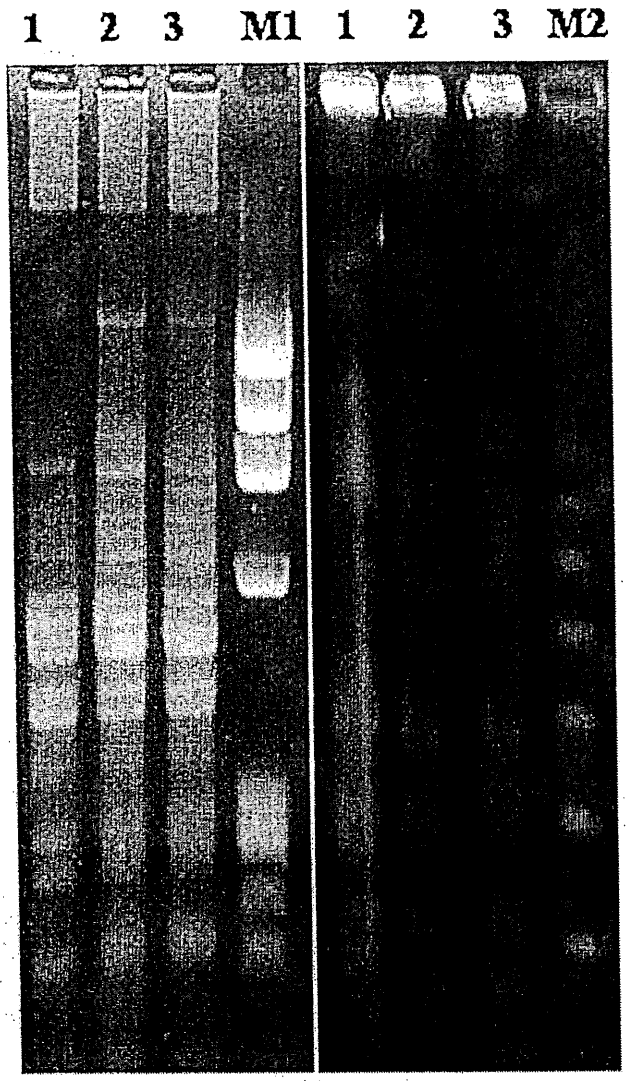


Fig 1. The results of AP-PCR (left) and PFGE (right) techniques. Lane M1 is a molecular weight marker (QX174 DNA/HaeIII); Lane M2 containes a concatemer of lamda DNA (Sigma).

DISCUSSION

Today, *S maltophilia* is being isolated more and more frequently as a nosocomial pathogen. Frequent use of broad-spectrum antibiotics such as carbapenems in intensive care units is one of the main reasons for the high rate of *S maltophilia* isolation.[1,2,5,13] In agreement with the literature, there was a history of carbapenem antibiotic use in all our cases. Other risk factors for *S maltophilia* colonization/infection are prolonged hospitalization, a stay in the intensive care unit, mechanical ventilation, indwelling catheters, and prematurity.[2,3] All of our patients were on mechanical ventilation and 2 were premature.

Although *S maltophilia* is known to be highly resistant to most antibiotics, it was indicated that SXT, ticarcillin-clavulanic acid, gatifloxacin, and trovafloxacin, either alone or combined, are the most effective agents.[5] The outcome in our Case 3 is in line with this. Based on the courses of the previous 2 cases and sensitivity testing, we decided to add ciprofloxacin and ticarcillin-clavulanic acid to this baby's antibiotic regimen very early on. As a result of this early and appropriate treatment, the child survived and was discharged from the hospital in healthy condition.

A previous study revealed that an unexpected rise in *S maltophilia* infections in one NICU was due to nosocomial cross-infection.[3] Unfortunately all our attempts regarding to identify an environmental source and the mode of transmission, were negative. However, we speculate that endotracheal tubes and/ or peripheral intravenous catheters applied to all 3 patients and hands of health-care staff who cared for the 3 babies may be responsible for entry and cross-transmission of the infection, respectively.

Molecular typing is able to identify clonal relationships among isolates and provides useful information to prove cross-transmission. AP-PCR and PFGE are 2 approaches most commonly used for this purpose.[3,6,10,11] In the current study, both procedures showed that 3 isolates tested were clonally related, which supported cross-transmission. These procedures were reproducible, and complete concordance was observed between the AP-PCR and PFGE results, suggesting that since AP-PCR is easy, rapid, and inexpensive, it may be preferable to confirm the epidemiologic relationship among the outbreak *S maltophilia* isolates.

These cases are important because they are evidence of the rising incidence of potentially lethal *S maltophilia* infection in infants, and the high risk of transmission in the NICU. Early identification of this agent and molecular typing enable the clinician to plan treatment and take precautions that prevent cross-infection. Hand washing between patient contacts is critical for prevention of transmission. Following these infections, we reviewed standard infection control measures, especially hand-washing practices and proper cleaning and disinfection of room surfaces and equipment. In the 11 months since this outbreak, there have been no further problems with cross-infection of this bacterium in our unit.

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