Case report

Pseudomonas stutzeri: a rare cause of neonatal septicaemia

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Introduction

Gram-negative sepsis is a life-threatening disease especially in an already debilitated patient. The presence of Enterobacteriaceae or any Gram-negative bacteria in the bloodstream may lead to endotoxic shock, systemic disease and multiple organ failure.

The pseudomonads are among the most common organisms causing nosocomial infections [*1*]. Although *Pseudomonas aeruginosa* is by far the most commonly isolated species, several other species are occasionally isolated from clinical human specimens as opportunistic pathogens, such as *P. stutzeri* [*2*]. *P. stutzeri* was recently isolated in a newborn pre-term baby in our hospital. This is the first time this organism has been isolated in our laboratory over the past few years. The organism was almost discarded as a plate contaminant, but for its unusual features. It is being reported here in order to alert microbiologists to be vigilant concerning such unusual organisms so that they are not missed and that prompt and appropriate antibiotic therapy can be instituted.

Case report

T.B. was a male twin delivered in our hospital by emergency caesarean section on 16th December, 2004. The mother was 34 weeks pregnant and had had pre-eclampsia and premature rupture of the membranes for 8 hours before she underwent caesarean section. The babies' presentation was breach.

At delivery, baby T.B. weighed 1.8 kg. On examination, he was pink and cried normally. His Apgar scores were 6/1 and 8/5. He had mild tachypnea. His heart sounds I and II were normal and there were no murmurs. No abnormality was found in his chest, his abdomen was soft, not distended, and there was no organomegaly. His hip joints were normal. The second twin, a female, was normal. Because of the baby's tachypnea, neonatal sepsis was suspected.

The following investigations were carried out: complete blood count (CBC), chest X-ray, erythrocyte sedimentation rate, blood and urine culture, electrolytes, C-reactive protein, TORCH (*Toxoplasma gondii*, other microorganisms, rubella virus, cytomegalovirus and herpes simplex virus) and occult blood. The baby was then started on intravenous ampicillin 45 mg every 12 hours (which was increased to 90 mg every 12 hours after 48 hours) and intravenous amikacin 13.5 mg every 12 hours.

Blood culture was performed in the BACTEC 9240 blood culture system. After 48 hours, the machine indicated a growth, which on Gram stain showed Gram-negative bacilli. A subculture was done as well as direct sensitivity testing using the

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disc-diffusion technique. The organism was sensitive to all routine antibiotics for Enterobacteriaceae. It grew well on blood agar, Mueller–Hinton agar and on MacConkey agar as a non-lactose fermenter. It was motile and oxidase positive. It grew at 42 °C but not at 4 °C. The colonies were dry, wrinkled and brownish in appearance. If not for the good growth on MacConkey agar, it could pass for a contaminant, such as aerobic spore-bearers. When attempts were made to make new smears and suspension for biochemical tests, removing the colonies from the plates proved difficult. This aroused further suspicion. After much difficulty, a few colonies were removed for Gram-stain, oxidase test and biochemical tests with the API system (bioMérieux, France). The next day, API reactions were all negative. It was thought that this might be due to insufficient organisms in the suspension used.

A repeat API was done and the result came out the same as before. Meanwhile, a preliminary report was sent to the nursery as Gram-negative bacilli, possibly *Pseudomonas* species, sensitive to both amikacin and ampicillin, which the baby was being treated with. After 3 unsuccessful attempts at identification using the API system, the isolate was sent to the Aseer Central Hospital for identification using the Microscan system (Dade Behring, West Sacramento, USA). After 48 hours the organism was identified as *P. stutzeri*, sensitive to a large number of antibiotics.

The results of the other investigations carried out were as follows: blood urea nitrogen 3 mg/dL (low) (normal 6–20); sodium 135.3 mmol/L (low) (normal 136–145); total bilirubin 9.38 mg/dL (high) (normal 0.00–1.00); direct bilirubin 0.39 mg/dL (high) (normal 0.00–0.30). The results of the remaining tests were normal.

The baby was continued on amikacin plus ampicillin since the organism was sensitive to both agents. He made rapid progress and the results of the repeat tests were all normal within 2 weeks. The antibiotics were discontinued after 10 days of therapy. Repeat blood cultures were carried out on days 13 and 15 and were both negative. The baby was discharged home 1 week thereafter. Before discharge, the electrolytes became normal, haemoglobin was 13.4 g/dL, white blood cell count was $9.1 \times 10^3/\mu L$ and platelets $411 \times 10^3/\mu L$.

Discussion

P. stutzeri group of pseudomonads consists of 3 organisms: *P. stutzeri*, CDC group Vb-3 and *P. mendocina* [*3*]. Among this group, *P. stutzeri* is the most frequently encountered in clinical specimens. A review of the literature shows that *P. stutzeri* is most frequently isolated from blood, wounds, the respiratory tract and urine [*4*]. *P. stutzeri* has distinctive features. On sheep blood agar, strains appear buff to brown in colour with dry, wrinkled, tough and adherent colonies. The adherence of *P. stutzeri* makes the removal of colonies from agar medium difficult. Because of the difficulty in making suspensions of specific turbidity, identification and susceptibility systems do not work well with this organism [*3*]. However, *P. stutzeri* may be identified using the following criteria: presence of oxidase, ability to oxidize but not ferment dextrose, growth on MacConkey agar and demonstration of motility by polar flagella [*5*].

P. stutzeri is a ubiquitous organism found in soil, water and the hospital environments [*5*]. It is a saprophytic microorganism that rarely causes severe infections [*6*]. Isolation of *P. stutzeri* indicates contamination or

colonization in hospitalized patients. However, patients with *P. stutzeri* infections have generally been found to have serious underlying diseases or predisposing risk factors such as haemodialysis [*1*], meningomyelocele [*6*], human immunodeficiency virus infection [*7*] and chronic obstructive pulmonary disease [*8*]. All isolates to date have responded well to a wide range of antibiotics including the aminoglycosides, the antipseudomonal penicillins, trimethoprim–sulfamethoxazole and the third generation cephalosporins [*4,5*]. The isolate from our patient was sensitive to all of these drugs.

Whenever a laboratory encounters an unusual organism such as this, every effort should be made to identify it, including sending it to the nearest reference centre. Besides, every clinical isolate must be correlated with the patient's symptoms before arriving at a decision.

Samples were taken from the baby's intravenous fluid and line, suction machine, cot, surrounding floor and walls, the sink, and attending physicians and nurses but none of these grew *P. stutzeri*. The mother however was not sampled due to cultural practices in our area. However, the twin sister who was also admitted into the nursery at about the same time for observation was free of the organism. Although we were unable to identify the exact source of the organism, the probability of the organism coming from the mother's vagina cannot be excluded, with acquisition by the baby during parturition. This view is supported by an earlier report from this hospital by Asindi et al. [*9*] on neonatal sepsis in pre-labour rupture of membranes.

At the same time, given that *P. stutzeri* is an environmental organism, attending healthcare workers should be reminded to observe strictly infection control guidelines, especially scrupulous washing of hands.

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Infant and meonatal health and development

A healthy start in life is important to every newborn baby. The first 28 days, the neonatal period, is critical. It is during this time that fundamental health and feeding practices are established. It is also during this time that the child is at highest risk for death.

One of the aims of the Infant and Neonatal Health (HNI) team within the WHO Department of Child and Adolescent Health and Development (CAH) is to reduce infant mortality and to ensure that newborns and infants have the opportunity for a healthy start in life. Further information about the work of the team can be found at: http://www.who.int/child-adolescent-health/OVERVIEW/HNI/neonatal.htm