Streptococcus Infection in a Newborn

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ABSTRACT

Streptococcus salivarius is an uncommon cause of infection in neonates. Normally present in the oral flora of humans, *S salivarius* is the least pathogenic member of the viridans group streptococci and is often considered a contaminant when detected on blood culture. While rare, it has been shown in the literature to cause clinically relevant bacteremia and other invasive infections typically in the immunocompromised. We report the case of a well-appearing 1-day-old female with sequential positive blood cultures for *S salivarius.* This case has important implications as it demonstrates that *S salivarius* should not be automatically ruled out as a contaminant when isolated on blood culture.

INTRODUCTION

Neonatal bacterial infections can be life-threatening, making proper diagnosis and timely treatment of these infections essential. Most bacterial infections are contracted during or immediately after birth and bacteremia/septicemia has been found to be one of the leading causes of morbidity and mortality in infants.[1] Neonates' immunoimmaturity increases their risk for acquiring serious bacterial infections. Common sources of neonatal bacterial infections include Group B streptococcus (GBS), *E coli, Listeria* and *Staphylococcus aureus.* Numerous reports have shown the ability of these bacteria to cause bacteremia, septicemia, and meningitis.

There are several less commonly known sources of neonatal bacterial infection that also have been reported. The viridans group streptococci (VGS) represent a group of bacteria that colonize humans most notably in the oral cavity, although some species inhabit very discrete niches. While *S salivarius* shows a predilection for the dorsum of the tongue, its close relative *Streptococcus bovis* inhabits the gut.[2] Clinically, the organisms behave similiarly.[3] While bacteria of this group generally are considered to be of low virulence, studies have shown they can cause life-threatening disease in neonates, children, and adults.[4,5]

As the virdans streptococci colonize the human oral cavity immediately after birth, they are commonly considered a contaminant when isolated on blood culture. While isolation is infrequent, reported at 2.6% of positive blood cultures, they should not automatically be considered a contaminant.[5] As many as 32% of isolates have indicated clinically relevant bacteremia.[6] Moreover, with isolation of a single organism of the virdans streptococci (such as *S salivarius*) or when a repeat blood culture is positive for a single organism, the significance of isolation increases. In the following description, *S salivarius* was isolated on 2 serial blood cultures, increasing the suspicion that this was not a contaminant but a clinically significant finding.

CASE HISTORY

The patient was a full-term, white female newborn delivered to a 19-year-old gravida 2, para 1 (now 2) single, unemployed mother at 40 2/7 weeks gestation via normal spontaneous vaginal delivery after an uncomplicated pregnancy. The infant had Apgar scores of 8 and 9 at 1 and 5 minutes respectively and birthweight of 3180 grams.

Maternal lab results were significant for being GBS positive. She received 2 doses of intrapartum clindamycin. Despite the infant being clinically well and afebrile at admission to the newborn nursery, a complete blood cell count (CBC) with manual differential and blood culture were obtained; maternal intrapartum antibiotic prophylaxis with clindamycin and the lack of sensitivity data on her isolate was considered inadequate by GBS guidelines at that time.[7] While the initial CBC was normal (white blood cell = 16.7, hemoglobin = 17.4, hematocrit = 52, platelets = 327, band cells = 3%, segmented neutrophils = 63%, lymphocytes = 24%, monocytes = 9%) the blood culture showed gram positive cocci in chains. Lumbar puncture (LP) was performed and found to be normal. The blood culture later identi-

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fied the gram-positive species as *S salivarius,* and a repeat blood culture confirmed this finding. A chest x-ray also was performed and interpreted as negative for pathology.

Our initial examination was unremarkable. The infant was well appearing, demonstrating no signs or symptoms of infection and was feeding well. She was afebrile and all vital signs were stable and normal. Physical examination of all systems was normal. The patient was treated for 10 days on intravenous penicillin. An echocardiogram was performed due to risk of endocarditis with this particular species. The patient was monitored on the unit for the 10-day course of IV antibiotics. Throughout this course, the patient demonstrated no signs or symptoms of infection. The repeat blood culture after the antibiotic regimen was started was negative, and the LP culture was also negative. The echocardiogram was negative for endocarditis. The patient fed well and gained weight and had a discharge weight that surpassed birth weight. The patient's condition on discharge was excellent.

DISCUSSION

Streptococcus salivarius is a relatively rare cause of invasive infections in neonates and is commonly considered a contaminant when isolated as it is part of the human oral flora.[6] When it has been recognized as a cause of life-threatening infection such as infective endocarditis and septicemia, it is most commonly in the context of a patient who is immunocompromised.[3]

There are reports in the literature that show infection can occur in the context of immunocompetent individuals. Ferrier et al examined the features of infective endocarditis (IE) in childhood. While most cases of IE occur in the setting of structural heart disease or congenital heart defect, the authors report that 8% to 10% of cases of IE were in structurally normal hearts. The bacteria causing these infections were most commonly the viridans streptococci and *Staphylococcus aureus*.[8]

Cheung et al reported a case of a 4-week-old neonate with late-onset *S bovis* meningitis. *S bovis* is an uncommon cause of neonatal meningitis. When it does cause neonatal infection, it is often in the context of an individual with prior gastrointestinal disease or possible immunosuppression. The neonate in their case report was previously healthy.[9] Gavin et al reported a case of *S bovis* sepsis in a 3-day-old neonate. The infant had no predisposing medical conditions.[10] Like *S bovis, S salivariu*s is an uncommon cause of invasive disease in neonates. Most reports in the literature have shown it to cause serious infection in the setting of immunocompromised hosts. Ruoff et al reported 6 cases of sepsis due to *S salivarius* in children with underlying malignant disease.[11]

Here we report a case of neonatal *S salivarius* bacteremia in an infant with no significant medical disease. And while the bacteremia in our case was not picked up because the infant was symptomatic, it is entirely possible that the infant would have decompensated without early identification and treatment. The worst case scenario would have been one in which this neonate was discharged after 2 days with her mother and then developed sepsis, meningitis, or endocarditis at home. The infant's risk was heightened given the young age of the mother and limited financial resources and support. This is especially important as *S salivarius* is commonly considered a contaminant on isolation and ignored. These findings have direct implications for the rapid identification, proper treatment, and optimal care of neonatal infections.

Funding/Support: None declared.

Financial Disclosures: None declared.

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