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A Case of Streptococcus Constellatus Bacteremia Secondary to Respiratory Syncytial Virus Bronchiolitis in a Neonate

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Abstract

Common causes of bacteremia in the neonatal period include group B streptococcus, listeria, and E. coli. We report a rare case of neonatal bacteremia with culture-positive *Streptococcus constellatus*. *Streptococcus constellatus* is part of the normal flora of the orogenital regions of the body; when found elsewhere, it causes pyogenic abscesses in the brain and digestive tract. In this case, the *Streptococcus constellatus* bacteremia was secondary to prolonged hospitalization in a patient with respiratory syncytial virus (RSV) bronchiolitis. This report serves to make physicians aware of and to define treatment options for *Streptococcus constellatus* as a rarely isolated organism that can cause asymptomatic bacteremia in a neonate while demonstrating the treatment strategy successfully employed.

Keywords

RSV, bacteremia, constellatus, streptococcus constellatus, neonatal sepsis

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Conflict of Interest Statement

The authors disclose no conflict of interest.

Cover Page Footnote

We thank the patient and their family for allowing us to share this clinical case. Lott III and Lavertue should be considered co-first authors of this publication.

CASE REPORT

A Case of *Streptococcus Constellatus* Bacteremia Secondary to Respiratory Syncytial Virus Bronchiolitis in a Neonate

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Abstract

Common causes of bacteremia in the neonatal period include group *B streptococcus*, *listeria*, and *E. coli*. We report a rare case of neonatal bacteremia with culture-positive *Streptococcus constellatus*. *Streptococcus constellatus* is part of the normal flora of the orogenital regions of the body; when found elsewhere, it causes pyogenic abscesses in the brain and digestive tract. In this case, the *Streptococcus constellatus* bacteremia was secondary to prolonged hospitalization in a patient with respiratory syncytial virus (RSV) bronchiolitis. This report serves to make physicians aware of and to define treatment options for *Streptococcus constellatus* as a rarely isolated organism that can cause asymptomatic bacteremia in a neonate while demonstrating the treatment strategy successfully employed.

Keywords: RSV, Bacteremia, Constellatus, *Streptococcus constellatus*, Neonatal sepsis

1. Introduction

Streptococcus constellatus is a member of the *Streptococcus anginosus* group (SAG) of gram-positive streptococci. Typically, it colonizes the upper respiratory, digestive, and reproductive tracts. While being normal flora, the *Streptococcus anginosus* group doesn't typically cause infection. However, there is a growing incidence of *Streptococcus anginosus* group infections with an even higher rate of occurrence in combination with systemic diseases. *Streptococcus anginosus* group infections commonly lead to brain, abdominal, and soft tissue abscesses as well as empyema. Often, *Streptococcus anginosus* group infections lead to bacteremia.¹ There are underlying comorbid factors such as advanced age, diabetes, and presence of a solid tumor. The primary location of invasion is most commonly the oral cavity, with gingivitis, tooth abscess, or periodontitis. There is a paucity of literature and case reports of *Streptococcus anginosus* group bacteremia, particularly in the

pediatrics population. We present a case of *Streptococcus constellatus* bacteremia in the setting of a neonate with respiratory syncytial virus bronchiolitis.

2. Case presentation

We present a case of a 1-month-old female who presented to the emergency department with a five-day history of cough, nasal congestion, rhinorrhea, and difficulty breathing. A rapid swab testing was positive for respiratory syncytial virus (RSV) in the emergency room. At this time the patient was found to be tachycardic at 170 beats per minute and was saturating 85 % on room air. Consequently, the patient was admitted and placed on 21 % high velocity oxygen deliver, given a one-time dose of levalbuterol, and placed on maintenance fluids for dehydration. During the initial course of treatment, the patient was treated with continued supportive therapy, levalbuterol as needed, and acetaminophen as needed for fever.

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On hospital day four, despite supportive therapy for RSV, the patient remained febrile with poor oxygen saturation as low as 75 % and poor oral intake. A chest x-ray at this time demonstrated a superimposed secondary right upper lobe pneumonia. An initial round of blood cultures was drawn as a concern for sepsis. Hospital protocol documents two cultures drawn at a time as a sepsis order set, and additional cultures are drawn at 48 h. The patient was started on empiric antibiotic therapy with ampicillin 95 mg every 6 h and gentamicin 15 mg every 24 h for treatment of suspected bacterial pneumonia.

The first set of blood cultures were both positive for growth of gram-positive cocci in clusters and chains found to be *Streptococcus constellatus* sensitive to vancomycin, levofloxacin, and clindamycin. Pediatric infectious disease was consulted for antibiotic choice. At 48 h, after the administration of antibiotics, the second set of blood cultures taken while on antibiotic therapy was found to have no growth. The pediatric infectious disease team recommended continuing ampicillin 95 mg every 6 h for a total of seven days with seven additional days of oral amoxicillin or clindamycin on discharge.

The patient continued to improve clinically and no longer required oxygen by hospital day five. The patient remained admitted to the pediatric floor to finish seven days of IV antibiotics prior to discharge. On hospital day 10, the patient was discharged on oral clindamycin suspension for continued treatment of suspected *Streptococcus constellatus* bacteremia. The patient's parents were instructed to follow up with her primary care provider three to five days after discharge.

3. Discussion

The incidence of *Streptococcus anginosus* bacteremia as a whole is increasing with some estimates as low as 0.93 cases per 100,000² and as high as 3.7 per 100,000.³ This patient failed to improve after supportive RSV therapy and was continuing to exhibit signs of poor oral intake, decreased oxygen saturation, and fever suggesting systemic infection. Blood cultures were only ordered after an occurrence of fever after being treated with supportive care for RSV bronchiolitis. *Streptococcus constellatus* is an opportunistic bacterium and has been found to be associated with bacteremia as well as respiratory tract infections.⁴ In the case of this patient, her initial RSV infection may have predisposed her to a superimposed *Streptococcus constellatus* bacterial pneumonia with subsequent invasion and bacteremia. The Johns Hopkins guide to antibiotic

therapies reports that *Streptococcus constellatus* is very rarely a contaminant in blood cultures.⁵

No associated findings of pyogenic abscesses were located in this patient. This finding is unique because when *Streptococcus anginosus* species lead to bacteremia in patients, it is commonly in conjunction with intra-abdominal abscesses.⁵ However, an Israeli retrospective cohort study from 2009 to 2015 studying SAG infections determined that *Streptococcus constellatus* infections were often associated with bacteremia without any abscess or empyema formation.⁶ This study result indicates that this bacterium is capable of producing varying presentations, and the presence or absence of abscesses should not deter a clinician from considering bacteremia when patients are exhibiting signs of infection.

Standard practice in treating neonatal sepsis is a broad-spectrum antibiotic approach with ampicillin in combination with an aminoglycoside, usually gentamicin.⁷ Typical treatment of *Streptococcus constellatus* includes penicillin derivatives given it is a member of *Streptococcus* genus. The use of ampicillin in this case was an appropriate antibiotic choice; however, most strains of *Streptococcus anginosus* species are resistant to aminoglycosides, making gentamicin an inappropriate antibiotic selection which should be discontinued following positive blood culture results.

A limitation of this case is that the repeat cultures at 48 h revealed no growth. Although this was after the administration of antibiotics, it is possible that the patient's condition improved due to antibiotic therapy adequately covering the right upper lobe pneumonia and that the positive blood culture was an incidental contamination, though research deems contamination a rare occurrence. Additionally, no sputum culture was collected which could have confirmed if the right upper lobe pneumonia was indeed *Streptococcus constellatus*.

This patient provided an interesting case of *Streptococcus constellatus* in the setting of RSV and has remained healthy and without complications since her discharge. Her case helps clarify the appropriate diagnosis and treatment options for *Streptococcus constellatus* bacteremia.

Conflicts of interest

The authors declare there are no conflicts of interest.

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