

# Early-onset Neonatal Septicemia Caused by *Staphylococcus lentus*: A Rare Case Report with Literature Review

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## ABSTRACT

Coagulase-negative *Staphylococci*, previously considered harmless, are now recognized as significant pathogens in neonatal sepsis. *Staphylococcus lentus*, part of the *Staphylococcus sciuri* group, is predominantly found in animals but can colonize humans and cause severe infections. These microorganisms are known for their high antibiotic resistance, with methicillin resistance rates exceeding 70%. Vancomycin is the preferred treatment for neonatal sepsis caused by these pathogens. This case report aims to present a rare case of early-onset neonatal sepsis caused by *Staphylococcus lentus*, a pathogen not commonly associated with humans.

**Keywords:** Newborn, septicemia, *Staphylococcus lentus*

## INTRODUCTION

Neonatal sepsis refers to a severe illness in newborns caused by bacterial, viral, or fungal infections, leading to significant morbidity and mortality. It is predicted that around 3.0 million instances of sepsis occur in newborns, while approximately 1.2 million cases affect children [1]. These findings validate the widespread occurrence and high mortality rate associated with sepsis in neonates and children worldwide. It is the third leading cause of neonatal deaths, following complications related to preterm birth and intrapartum issues [2]. In cases of early-onset neonatal sepsis, where symptoms emerge within the first 72 hours after birth, the main pathogens responsible for infection are typically transmitted from the mother to the newborn. The main pathogens in this context are group B *Streptococcus* and *Escherichia coli* (*E. coli*), while coagulase-negative *Staphylococci* (CoNS) are not frequently implicated but still have an influence on this condition. Furthermore, various bacteria, including *Streptococcus pneumoniae*, *Streptococcus viridans*, *Listeria monocytogenes*, *Haemophilus influenzae*, *Staphylococcus aureus*, and *Klebsiella* species, can play a role in the development of early-onset neonatal sepsis. In developing countries, early-onset neonatal sepsis is frequently caused by Gram-negative bacteria like *Klebsiella*, *Enterobacter*, *Acinetobacter* species, and *E. coli* [3]. This case report presents a case of early-onset neonatal sepsis associated with *Staphylococcus lentus*. There is

a lack of literature describing this microorganism as a cause of neonatal sepsis.

## CASE PRESENTATION

The female infant, born to a 22-year-old mother who is gravida 1 and para 1, was delivered via cesarean section at 37 weeks of gestational age. The baby weighted 3100 grams at birth and there was a blood group incompatibility issue. On the second day of life, during a routine physical examination, the baby was found to have dark blueish skin discoloration and sclerema neonatorum on legs (Figure 1). However, the baby was active with good muscle tone, and her vital signs were stable. The infant was breastfed and did not show any signs of respiratory distress or dysfunction in other organ systems. The mother had a medical history of multiple urogenital infections that had been inadequately treated due to anaphylactic reactions to antibiotics. In the neonatal intensive care unit (NICU), the complete blood count (CBC) showed a leukocyte count of  $5.600 \times 10^9/L$ , platelet count of  $158.000 \times 10^9/L$ , hemoglobin level of 17.2 g/dL, absolute neutrophil count of 3696, immature to total neutrophil ratio of 0.24, and an elevated C-reactive protein (CRP) level of 19.08 mg/L (Figure 2). In the initial CBC taken at 6 hours of life, the platelet count was  $320.000 \times 10^9/L$ , leukocyte count was  $14.780 \times 10^9/L$ , and the direct Coombs test was positive. A peripheral hemoculture was obtained



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before starting vancomycin and amikacin for suspected early-onset neonatal sepsis, considering the mother's penicillin allergy. On the second day of life, the baby developed bloody stool and severe thrombocytopenia (platelet count of

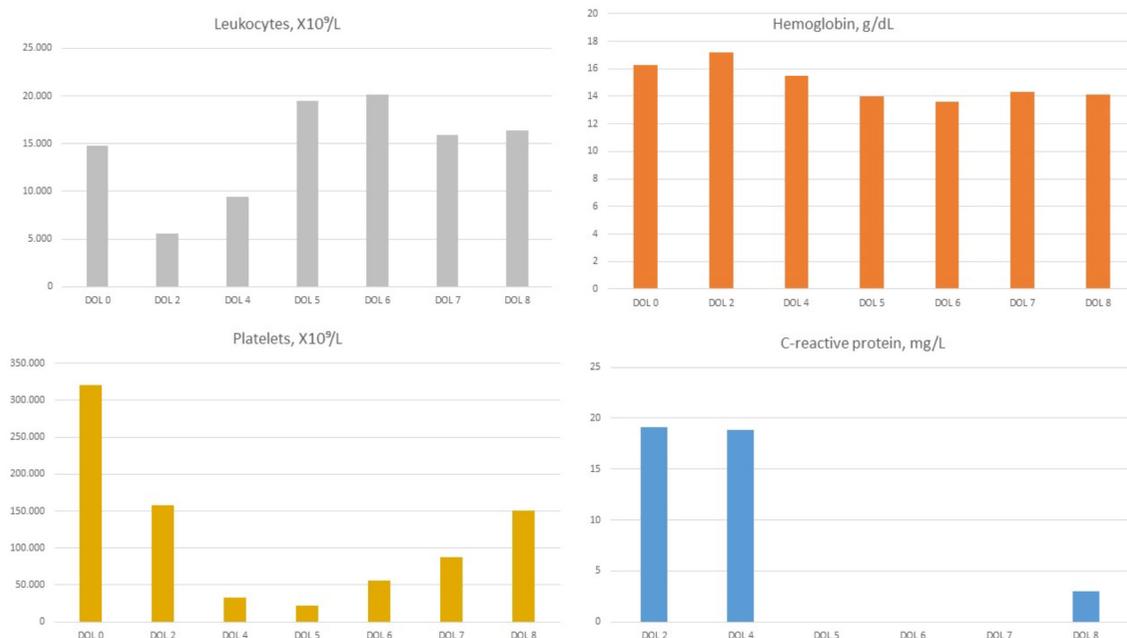
$22.000 \times 10^9/L$ ), and meropenem was added to the treatment regimen. Phototherapy was administered to the neonate with the purpose of treating indirect hyperbilirubinemia. On the fourth day of life, *Staphylococcus lentus* was identified in the peripheral hemoculture drawn upon admission to the NICU. The antibiogram analysis revealed resistance to ceftioxin, indicating that this pathogen is classified as resistant to beta-lactam antibiotics. From the fourth day of the baby's life onwards, there was a gradual increase in platelet count, while CRP levels steadily declined to 3.0 mg/L. The administration of antibiotics was maintained for a duration of seven days. As a result of positive clinical progress, normalization of the platelet count, and eradication of bacteria in the blood culture, the infant was discharged on the eighth day of life.

## DISCUSSION

CoNS, previously considered harmless and non-pathogenic, are now recognized as one of the leading pathogens responsible for infections in this vulnerable population [4]. Due to the low occurrence of antibiotic-resistant CoNS in the general population, it is commonly assumed that neonates acquire colonization with antibiotic-sensitive CoNS after birth. However, the mechanisms behind the development of skin and gut colonization with resistant CoNS during NICU hospitalization remain unknown [5]. Neonates have been found to have qualitative and quantitative deficiencies in complement factor C3 and immunoglobulin G. These deficiencies directly contribute to the increased risk of CoNS sepsis in neonates [6]. Although neonatal CoNS infections are seldom fatal, they



**Figure 1.** Skin appearances before and after antibiotic treatment



**Figure 2.** Laboratory investigations of the newborn

can lead to considerable morbidity, particularly in extremely low birth weight infants [7]. The *Staphylococcus sciuri* group, consisting of *S. sciuri*, *S. lentus*, *S. vitulinus*, and *S. pulvereri*, are primarily found in animals. However, they can also colonize humans, and their presence in various human clinical samples has been documented. Notably, *S. sciuri* has been linked to severe infections in humans, including endocarditis, peritonitis, septic shock, and wound infections [8]. Several researchers have reported the isolation of *S. sciuri* and *S. lentus* from urine samples [9]. These microorganisms are widely recognized for their high antibiotic resistance, with methicillin resistance rates surpassing 70% in many medical centers. Consequently, vancomycin has emerged as the preferred antimicrobial therapy for targeted or empirical treatment of neonatal sepsis caused by these pathogens [10]. *Staphylococcus lentus* is one of Gram-positive, coagulase-negative bacteria which is rare in neonatal population. *Staphylococcus lentus* is predominantly an animal pathogen and has been isolated from wild and farm animals, especially food-producing animals. It is rarely pathogenic in human being, but has been associated with a variety of infections, such as endocarditis, peritonitis, septic shock, urinary tract infection, sinusitis, splenic abscess and wound infections [11-14]. It is considered that *S. lentus* to be a genuine pathogen that should be taken seriously. However, we believe that determining the clinical significance of an *S. lentus* infection requires a case-by-case analysis and clinical judgment.

An early neonatal sepsis caused by *Staphylococcus lentus* as a pathogen has never been reported before. This pathogen is often resistant to multiple antibiotics and vancomycin therapy should be effective especially in those neonates with maternal penicillin allergy history. This case shows that even rare microorganism which mostly seen in animals could be isolated in neonates.

### Ethics

**Informed Consent:** Written informed consent was obtained from the parents for the publication of this report.

**Peer-review:** Externally peer-reviewed.

### Authorship Contributions

Surgical and Medical Practices: N.R., S.M., S.E., Concept: S.E., Design: S.M., Data Collection or Processing: N.R., Analysis or Interpretation: S.E., Literature Search: S.M., Writing: N.R., S.E.

**Conflict of Interest:** No conflict of interest was declared by the authors.

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