

# Neonatal Herpes Simplex Virus (HSV) Infection: Is It the Only Pathogen?

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## Abstract

**Background.** Neonatal HSV infection is associated with substantial morbidity and mortality. Therefore, prompt identification and treatment of infected neonates is paramount. At Nationwide Children's Hospital (NCH), Columbus, OH, all neonates admitted in the first 2 weeks (up to 2010) and 4 weeks (since 2010) of age are evaluated for HSV infection in addition to routine bacterial and other viral infections. The frequency of co-infection with HSV and other potential pathogens is not fully known.

**Methods.** Retrospective review of the medical records of infants admitted to NCH with a diagnosis of neonatal HSV infection from 2001 to 2019. Patients less than 6 weeks of age were identified by review of the NCH Virology and Molecular Laboratory results for all positive HSV PCRs obtained from any body site as well as by discharge ICD-9 and ICD-10 codes for HSV infection. Medical records were reviewed for demographic, clinical, laboratory, outcome data, and maternal history of genital HSV lesions at or before delivery. Occurrence of positive bacterial and/or viral co-detection were identified. The data were managed using REDCap electronic data capture tools hosted at NCH. **Results.** There were 93 infants with neonatal HSV infection (mean age, 9.5 days [IQR, 7-15]; 42%, HSV1; 53%, HSV-2). 32 infants had central nervous system infection (CNS) while 31 had Skin-Eye-Mouth (SEM) infection and 30 had Disseminated Disease. Mortality was 15% (n=14). Only 3 mothers had active genital HSV lesions at delivery. Of the 93 infants, 5 (5%) had bacterial (n=2) or viral (n=3) co-infections. All of the infants only had mucosal sites positive for HSV 1 (n=4) or 2 (n=1). Of the 2 infants with bacterial infection, 1 had bacteremia due to viridans streptococci while the other one had necrotizing enterocolitis and a positive blood culture for *Clostridium butyricum*. The 3 infants with viral co-detection also were full term and all had positive enterovirus PCR tests (1, blood, throat; 1, blood and cerebrospinal fluid (CSF); 1, CSF). **Conclusion.** 5% of infants with neonatal HSV infection had bacterial or enteroviral co-infection. These findings have important implications in the management of neonates evaluated for possible sepsis.

## Background

- Neonatal HSV infection is associated with substantial morbidity and mortality. Therefore, prompt identification and treatment of infected neonates is paramount.
- At Nationwide Children's Hospital (NCH), Columbus, OH, all neonates admitted in the first 2 weeks (up to 2010) and 4 weeks (since 2010) of age are evaluated for HSV infection in addition to routine bacterial and other viral infections.
- The frequency of co-infection with HSV and other potential pathogens is not fully known.

## Objective

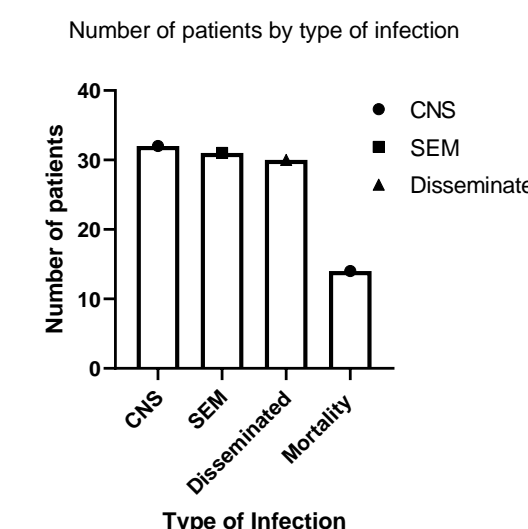
- To determine the frequency of co-infection with HSV and other pathogens among neonates evaluated for possible sepsis

## Method

- Retrospective review of the medical records of infants admitted to NCH with a diagnosis of neonatal HSV infection from 2001 to 2019.
- Infants <6 weeks of age were identified by review of the NCH Virology and Molecular Laboratory results for all positive HSV PCRs obtained from any body site as well as by discharge ICD-9 and ICD-10 codes for HSV infection.
- Medical records were reviewed for demographic, clinical, laboratory, outcome data, and maternal history of genital HSV lesions at or before delivery. Occurrence of positive bacterial and/or viral co-detection were identified.
- The data were managed using REDCap electronic data capture tools hosted at NCH.

## Results

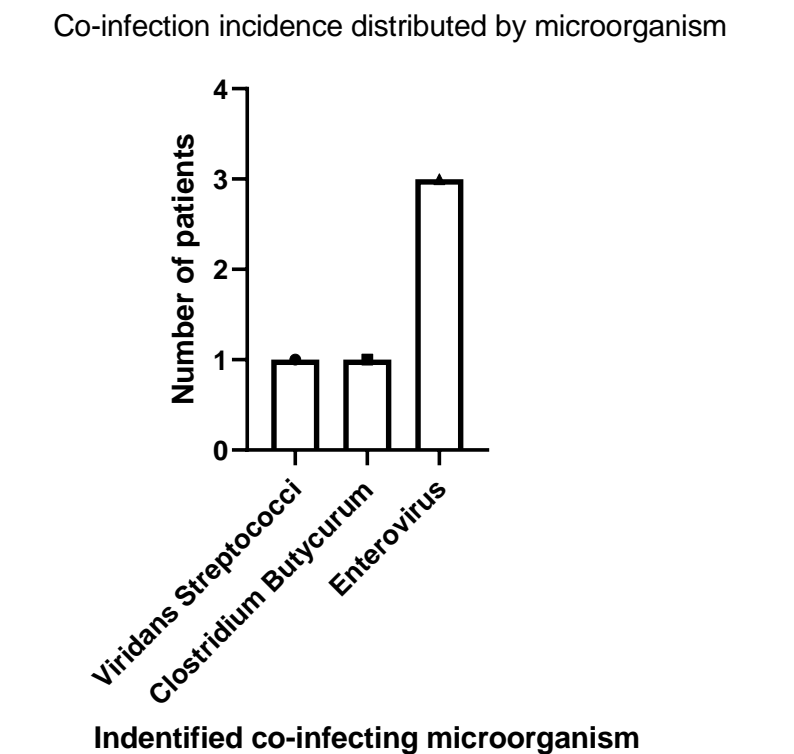
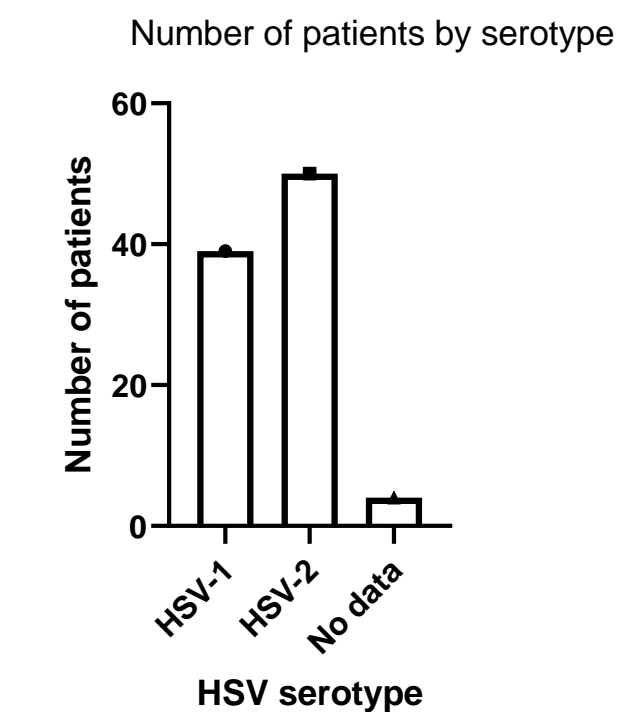
- 93 infants identified with neonatal HSV infection
- Mean age, 9.5 days [IQR, 7-15]
- 42%, HSV1; 53%, HSV-2
- 32 (34%) infants had central nervous system infection (CNS)
- 31 (33%) had Skin-Eye-Mouth (SEM) infection
- 30 (32%) had Disseminated Disease



- Mortality was 15% (n=14)
- 3 mothers had active genital HSV lesions at delivery.

## Results

- Of the 93 infants, 5 (5%) had bacterial (n=2) or viral (n=3) co-infections.
- All of the infants only had mucosal sites positive for HSV-1 (n=4) or HSV-2 (n=1).
- Of the 2 infants with bacterial infection, 1 had bacteremia due to viridans streptococci while the other one had necrotizing enterocolitis and a positive blood culture for *Clostridium butyricum*. The 3 infants with viral co-detection also were full term and all had positive enterovirus PCR tests (1, blood, throat; 1, blood and cerebrospinal fluid (CSF); 1, CSF).



## Conclusions

- 5% of infants with neonatal HSV infection had bacterial or enteroviral co-infection.
- These findings have important implications in the management of neonates evaluated for possible sepsis.