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The Impact of Streptococcus pneumoniae Colonization on Viral Bronchiolitis

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Abstract : Introductory Statement: The results of this retrospective chart review suggest the effects of bacterial colonization in critically ill children with viral bronchiolitis, currently unproven, are clinically insignificant. Background: Viral bronchiolitis is one of the most prevalent causes of illness requiring hospitalization among children worldwide and one of the most common reasons for admission to pediatric intensive care. It has been hypothesized that co-infection with bacteria results in more severe clinical outcomes. Conversely, the effects of bacterial colonization in critically ill patients with bronchiolitis are poorly defined. Current clinical management of colonized patients consists primarily of supportive therapies with the role of antibiotics remaining controversial. Methods: A retrospective review of all critically ill children admitted to the BC Children's Hospital Pediatric Intensive Care Unit (PICU) from 2014-2017 with a diagnosis of bronchiolitis was performed. Routine testing in this time frame consisted of complete pathogen testing, including PCR for Streptococcus pneumoniae. Analyses were performed to determine the impact of bacterial colonization and antibiotic use on a primary outcome of PICU length-of-stay, with secondary outcomes of hospital length-of-stay and duration of ventilation. Results: There were 92 patients with complete pathogen testing performed during the assessed timeframe. A comparison between children with detected Streptococcus pneumoniae (n=22) and those without (n=70) revealed no significant (p=0.20) differences in severity of illness on presentation as per Pediatric Risk of Mortality III scores (mean=3.0). Patients colonized with S. pneumoniae had significantly shorter PICU stays (p=0.002), hospital stays (p=0.0001) and duration of non-invasive ventilation (p=0.002). Multivariate analyses revealed that these effects on length of PICU stay and duration of ventilation do not persist after controlling for antibiotic use, presence of radiographic consolidation, age, and severity of illness (p=0.15, p=0.32). The relationship between colonization and duration of hospital stay persists after controlling for these variables (p=0.008). Conclusions: Children with viral bronchiolitis colonized with S. pneumoniae do not appear to have significantly different PICU length-of-stays or duration of ventilation compared to children who are not colonized. Colonized children appear to have shorter hospital stays. The results of this study suggest bacterial colonization is not associated with increased severity of presenting illness or negative clinical outcomes.

Keywords : bronchiolitis, colonization, critical care, pediatrics, pneumococcal, infection
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