



Hospital Admissions After Standard Versus Positive Pressure Nebulization in Patients with Bronchiolitis

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ABSTRACT

In the US, bronchiolitis is the most common diagnosis causing hospitalization in infants under a year of age in the US. Despite its prevalence, the utility of available treatments has not been demonstrated to be effective. This study determines whether positive pressure nebulization (PPN) is more effective than standard nebulization (SN) in reducing admission rate through a retrospective study of infants 2-24 months of age with moderate to severe bronchiolitis treated at a tertiary care children’s hospital. We investigate whether PPN causes a change in Bronchiolitis Score, PICU admission rate, length of stay (LOS), and returns to the ED. An association between hospital admission rate with PPN or SN was not able to be determined, due to a shortage of patients who received PPN leading to indeterminate statistical significance.

INTRODUCTION

- Each year in the US, \$700 million goes into treating bronchiolitis in these infants
- Current AAP guidelines (2014): bronchodilators should not be routinely used; supplemental oxygen not recommended unless SpO₂ levels < 90%
- Our study seeks to answer:
 - 1) Whether PPN is more effective than SN in reducing admission rate in infants with bronchiolitis
 - 2) Whether use of PPN causes a change in: Bronchiolitis Score, PICU admission rate, length of stay (LOS), and returns to the pediatric ED

METHODS

- **PRELIMINARY INFORMATION** Patients were evaluated using an objective scoring system in Figure 1. Infants with higher respiratory distress scores were treated in a step-wise manner beginning with suctioning, albuterol, and/or racemic epinephrine.
- **APPROACH** Treatment outcomes in the PPN versus the SN groups were compared, tracking admission rate, bronchiolitis score, LOS, and returns to the ED
- **EXCLUSIONS** Any patients under 2 months and any with comorbid respiratory conditions such as home oxygen use, tracheostomy, and cyanotic heart disease
- **STUDY POPULATION** Infants 2-24 months of age diagnosed with moderate or severe bronchiolitis were given suctioning and inhalational therapy

Figure 1:

Patient classification system to determine severity of illness and monitor response to therapies

Scores	Trial: Albuterol		Trial: Rac Epinephrine	
	Pre SVN	Post SVN	Pre SVN	Post SVN
Respiratory Rate				
SaO ₂				
General Appearance				
Retractions				
Auscultation				
Total Score				
Responder (Yes / No)				

RESULTS

- 12 of 19 PPN patients (63%) admitted to the pediatric ward, 4 of 19 (21%) admitted to PICU.
- 35 of 57 SN patients (61%) admitted to the pediatric ward, 5 of 57 (9%) admitted to PICU.
- Reasons for admission:
 - 11 of 19 PPN patients (58%) for persistent hypoxia, 4 of 19 (21%) for dehydration, 4 of 19 (21%) for persistent respiratory distress
 - 17 of 57 SN patients (30%) for persistent hypoxia, 12 of 57 (21%) for respiratory distress, 17 of 57 (30%) for both reasons. 11 of 57 (19%) admitted for unspecified reasons
 - Only one patient (in PPN group) returned to the pediatric ED within 7 days of discharge
- With an assumed baseline admission rate of 40%, we aimed to achieve a change of 20% in admission rate. Using a 2-tailed chi-square analysis, estimated minimum 'n' required in each group was 252 patients. The 19 patients in the PPN group was not enough for statistical significance

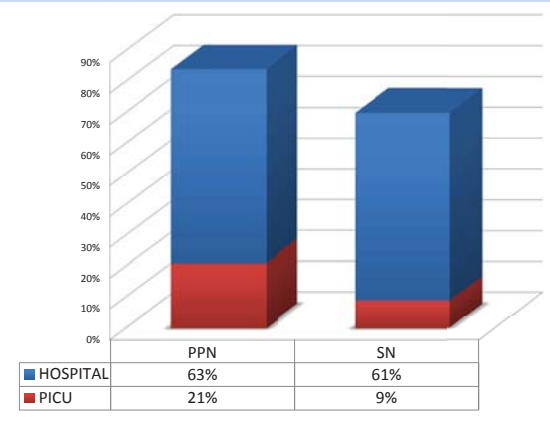


Figure 2: Hospital/PICU Admission Rates in 2 Treatment Groups

DISCUSSION & CONCLUSIONS

- No study has yet been investigated that compares PPN to SN with regard to hospital admission rates
- Studies show that children hospitalized for bronchiolitis before age 2 are at higher risk of developing asthma later in childhood
- Our hope with the study was to show that PPN would help to improve the V/Q mismatch and atelectasis that caused the hypoxia leading to hospitalization
- Admission rate to the floor was nearly equal in both groups. A smaller percentage of patients was admitted to the PICU from the SN group. However, results were not statistically significant

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