Reducing Hospital Length of Stay for Patients With Bronchiolitis

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A. Study Purpose and Rationale

As a front line provider I have noted variation in practice for our patients hospitalized with acute bronchiolitis. Areas including when to start feeding a patient who has been on CPAP, when to discontinue the pulse oximeter, and frequency of suctioning vary from attending to attending and between resident teams. Standardizing clinical practices has been associated with decreased resource utilization and decreased variation in treatment provided to patients. The AAP recognized the importance of standardizing care in Bronchiolitis when they released the Clinical Practice Guideline: The Diagnosis, Management, and Prevention of Bronchiolitis. Many large children hospitals have utilized this guideline as a starting point to develop their own hospital Clinical Pathway that is tailored to the type of patients they treat in the setting that they treat them in. CHONY at this time does not have such a pathway.

B. Study Design and Statistical Analysis

Study Design

The primary aim of the study is to decrease length of stay for our patients hospitalized with bronchiolitis. The secondary outcomes is duration of CPAP therapy. A clinical pathway designed with the hospitalist group will be the primary intervention. Residents, attendings, nursing staff and respiratory therapists will be educated on the pathway. The clinical pathway is meant to be an additional tool for the provider to use to help manage these patients, it is not to be used as a replacement for clinical judgement. For the purposes of this study, LOS will be defined as the length of time from the documentation of bed assignment in the Emergency Department to the placement of the discharge order in the electronic medical record. Secondary outcomes will include duration of CPAP therapy. This measure will be defined as when the CPAP order was placed in the electronic medical record to when the order was discontinued. Inclusion criteria includes previously healthy children 40 weeks corrected gestational age to 2 years that require CPAP while admitted for bronchiolitis. Exclusion criteria include any preexisting medical condition, history of prematurity prior to 34 weeks of age or previous hospitalizations requiring respiratory support. Data will be collected from October 2018 to March 2019 and compared to historical data of October 2016 to March 2017 and October 2017 to March 2018. Other interventions will be explored during the study period and separate PDSA cycles will be performed with each intervention.

To account for changes both in the hospital system and in the viral strains between the prospective year of data and the retrospective years of data, LOS for asthmatic patients will also be collected and compared to act as a negative control. Rational for choosing asthmatic patients as the negative control is explained by the fact that their presentations are influenced viral strains from year to year and they are a similar type of patient that will be effected by other changes in the hospital such as an increase in respiratory therapists.

To ensure that decreasing the LOS does not place our patients at greater risk for adverse outcomes, data will be collected on the readmission rate to the Emergency Department or hospital within 7 days of the original discharge.

Statistical Analysis

The average length of stay in the baseline and intervention groups will be compared using unpaired t-tests or Wilcoxon rank-sum tests, as appropriate. Similarly the average duration of supplemental oxygen needed will be compared between the baseline and intervention groups with unpaired t-tests or Wilcoxon rank-sum tests.

The proportion of patients readmitted, diagnosed with a serious bacterial infection, or started on antibiotics after discharge will be compared in the baseline and follow up periods using chi square tests.

Sample Size Determination and Power Analysis

Based on previous reviews of our institutional data, our hospital treats about 700 children during the 6 month study period that meet our inclusion criteria. For our primary outcome LOS, we will be able to detect a difference in LOS of 3 hours with a type 1 error of 5% and a power of 80%. Secondary outcome measure of duration of respiratory support, we will be able to detect a difference of 2.6 hours with a type 1 error of 5% and a power of 80%.

C. Study Procedure

Prior to the start of our PDSA cycles, LOS information and duration of CPAP therapy will be taken from the electronic medical from October 2016 to March 2017 and October 2017 to March 2018 and compared to the data collected during the PDSA cycles between October 2018 to March 2019; the data will not be associated with any one provider.

The main study procedure is the introduction of a clinical pathway to the residents and hospitalists to help guide clinical decision making. For residents, this introduction will take place during an educational conference, while for the hospitalists the score will be

discussed during one of the hospitalist group meetings. The sessions should take about one hour.

Hospital providers will be performing their usual clinical duties during these periods and will not be involved in any dedicated study procedures.

D. Study Drugs

No study drugs, approved or investigational, will be used.

E. Medical Device

No medical devices are being employed in this study.

F. Study Questionnaires

No questionnaires will be utilized in this study.

G. Study Subjects

All Morgan Stanley-Children's Hospital of New York (MS-CHONY) pediatric residents and pediatric hospitalists will be encouraged to participate in the educational sessions but will not be mandated.

H. Recruitment of Subjects

No resident or hospitalist will be actively recruited. The clinical pathway will be introduced to the resident teams each month over the 6 month study period. The session will not be required for residents to attend the. The pathway will be developed with the hospitalist team, however the final pathway will be discussed during a group meeting, again participation is not required.

The clinical pathway also will be distributed by email to reach residents and hospitalists who may not have been able to attend the in person educational sessions.

I. Confidentiality of Study Data

Study data (LOS information) will be stored in a secure database located on NYP/CUMC hospital computers. Data will be accessed only by study investigators who have completed the appropriate HIPPA and clinical research training. Any unneeded identifying information (such as hospital MRN, birth date) will be removed from the database once data collection is complete.

No specific data will be collected from the pediatric residents and hospitalists.

J. Potential Conflict of Interest

None of the investigators have any conflicts of interest to report.

K. Location of the Study

The study will take place at Morgan Stanley Children's Hospital.

L. Potential Risks

No significant risks are anticipated for the residents and hospitalists. For the patients, there is the possibility of loss of confidentiality. However, this risk will be minimized by limiting access to the database to qualified study personnel; maintaining the data on secure hospital workstations; limiting the identifying data abstracted from the medical record; and removing any unnecessary identifying information from the database as soon as possible.

M. Potential Benefits

There are no direct benefits from the study to the provider team. The hospital stands to benefit the most from the study as shorter length of stays lead to increased productivity, decreased costs and increased bed availability.

N. Alternative Therapies

There will be no experimental therapies employed in this study.

O. Compensation to Subjects

No compensation will be provided to the providers or to families participating in the study.

P. Costs to Subjects

We do not anticipate there to be any costs to the subjects or providing teams. We will follow the balancing measures closely to ensure that patients are not being adversely effected.

Q. Minors as Research Subjects

The primary subjects of this study are the members of the provider team, all of whom are adults. However, data will be collected both retrospectively and prospectively from the electronic medical record on patients admitted with bronchiolitis; a waiver of consent will be sought, and numerous precautions will be taken to protect the data, as detailed above.

R. Radiation or Radioactive Substances

This study will not employ radiation or radioactive substances.

References

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Sandweiss DR, Corneli HM, Kadish HA. Barriers to discharge from a 24-hour observation unit for children with bronchiolitis
2. Sinha IP, McBride AK, Smith R, et al. CPAP and High-Flow Nasal Cannula Oxygen in Bronchiolitis. Chest. 2015;148(3): 810-823.
3. Ralston S L, Lieberthal A S, Meissner HC Clinical Practice Guideline: The Diagnosis Management, and Prevention of Bronchiolitis.Oct 2014, peds.2014-2742