

Medications

Albuterol sulfate 2.5mg/3mL nebulizer solution via nebulization every 3 hours
Pharmacological class: Adrenergic (Jones & Bartlett Learning, 2023)
Therapeutic class: Bronchodilator (Jones & Bartlett Learning, 2023)
Reason for taking: To help treat and prevent the bronchoconstriction occurring in this patient due to rhinovirus and asthma (Jones & Bartlett Learning, 2023).
Key nursing assessments: Ensure the patient is breathing in the medication properly. Monitor the patient's serum potassium levels as this medication can cause hypokalemia. Educate the family on proper use of a nebulizer and to clean it once a week with water (Jones & Bartlett Learning, 2023).

Budesonide (Pulmicort) 0.5mg nebulizer suspension via nebulization 2 times daily
Pharmacological class: Corticosteroid (Jones & Bartlett Learning, 2023)
Therapeutic class: Anti-asthmatic, anti-inflammatory (Jones & Bartlett Learning, 2023)
Reason for taking: This medication is given to provide maintenance therapy for this patient's asthma by helping to calm inflammation in the airway (Jones & Bartlett Learning, 2023).
Key nursing assessments: Ensure the patient is breathing in the medication properly. Monitor child's growth patterns as this medication can stunt growth. The nurse should also educate the family to have the patient rinse his mouth out after each use of this medication to prevent thrush in the oral cavity (Jones & Bartlett Learning, 2023).

Methylprednisolone sodium succinate (Solu-Medrol) 19.5mg in sodium chloride 19.5mL given intravenously at a rate of 19.5mL an hour administered every 12 hours
Pharmacological class: Glucocorticoid (Jones & Bartlett Learning, 2023)
Therapeutic class: Corticosteroid (Jones & Bartlett Learning, 2023)
Reason for taking: This medication is being used to help treat the respiratory inflammation in this patient caused by asthma and rhinovirus (Jones & Bartlett Learning, 2023).
Key nursing assessments: This medication can cause mood changes and increased blood pressure so frequent assessments should be made. Monitor electrolytes closely as this drug can cause hypokalemia and hypocalcemia (Jones & Bartlett Learning, 2023).

Acetaminophen 291.2mg oral liquid every 4 hours as needed OR rectal suppository 162.5mg every 4 hours as needed.
Pharmacological class: Nonsalicylate, para-aminophenol derivative (Jones & Bartlett Learning, 2023)
Therapeutic class: Antipyretic, non-opioid analgesic (Jones & Bartlett Learning, 2023)
Reason for taking: This is prescribed PRN to address mild pain or to bring down a fever if the patient spikes a temperature of 100.4°F or greater.
Key nursing assessments: Carefully read provider orders to ensure the correct dose is given to pediatric patients and ensure no more than 1,200 mg are given in a day. Monitor liver labs (Jones & Bartlett Learning, 2023).

Ibuprofen oral suspension 196mg every 6 hours as needed
Pharmacological class: NSAID (Jones & Bartlett Learning, 2023)
Therapeutic class: Analgesic, anti-inflammatory, antipyretic (Jones & Bartlett Learning, 2023)
Reason for taking: This medication is prescribed as needed to address mild pain or to help bring down a fever of 100.4°F or greater.
Key nursing assessments: Monitor for signs of bleeding such as melena as this medication increases bleeding risk. Carefully read provider orders to ensure the correct dose is given and ensure no more than 50mg/kg is given a day (Jones & Bartlett Learning, 2023).

Montelukast (Singular) 4mg chewable tablet orally once a day at bedtime.
Pharmacological class: Leukotriene receptor antagonist (Jones & Bartlett Learning, 2023)
Therapeutic class: Antiallergen, anti-asthmatic (Jones & Bartlett Learning, 2023)
Reason for taking: This medication is helping to treat and prevent this patient's asthma and it also helps to treat his seasonal allergies (Jones & Bartlett Learning, 2023).
Key nursing assessments: Monitor for any signs of bleeding as this medication can cause increased bleeding tendency. It can also cause atopic dermatitis so frequent skin assessments should be performed. Also educate the patient that this medication is not for acute asthma attacks (Jones & Bartlett Learning, 2023).

Relevant Lab Values/Diagnostics

-This patient had no labs drawn. This is normal for pediatric patients.
 -This patient had a chest x-ray done at SarahBush before being admitted to Carle and this procedure showed a reactive airway process. This means that the lungs showed areas of inflammation. Inflammatory responses such as this are seen with infections like rhinovirus and the child's history of asthma also exacerbates the reactive airway inflammation (Capriotti, 2020).

Demographic Data

Admitting diagnosis: Respiratory distress due to asthma exacerbation From rhinovirus on 9/4/2024.

Age of client: 4 years and 8 months DOB: 12/10/2019

Sex: Male

Weight in kgs: 19.5 kg

Allergies: Seasonal

Date of admission: 9/4/24

Psychosocial Developmental Stage: According to Erikson's theory of Psychosocial development, this patient is at the stage of initiative vs guilt when children learn the concept of right from wrong and begin to develop a conscience (Rudd & Kocisko, 2023).

Cognitive Development Stage: According to Piaget's theory of cognitive development, this patient is in the preoperational stage because he is between the ages of 2-7. At this stage children are oriented to the present, have vivid imaginations and can use language (Rudd & Kocisko, 2023). However, this child's speech appeared to be delayed for his age as his sentences often did not make sense and his speech was very garbled.

History of hospitalizations: Born at home but became hospitalized at times with asthma

Admission History

This patient presented to a convenient clinic with his mother on 9/4/24 with complaints of wheezing. The mom stated that his symptoms began two nights prior with coughing and sounding hoarse. He then began to feel warm and started wheezing. The parents administered 2 puffs of albuterol at home, but this did not help. Due to a low O2 saturation and labored breathing at the clinic, he was brought to SarahBush ER. At the ER he was given duonebs, albuterol, and prednisone and was also found to be positive for rhinovirus. It was determined he should be transported to Carle due to his severe respiratory distress. The mom stated that this has been his first "big flare" of asthma and that he only uses the albuterol inhaler at home when he is sick. He also takes fluticasone propionate and montelukast at home to manage his asthma and allergies.

Medical History

Previous Medical History: This patient has a history of asthma and seasonal allergies.

Prior Hospitalizations: This patient has no prior hospitalizations though he was born at 36 weeks and spent 2 weeks in the NICU.

Past Surgical History: This patient has no surgical history.

Social needs: This patient suffers from asthma and his father is a cigarette smoker. The secondhand smoke from his father could lead to exacerbation of this patient's asthma. Therefore, education should be given to the family to smoke outside of the house to try and prevent exposure of the child to the smoke.

Pathophysiology

Disease process: This patient was admitted to the hospital with respiratory distress due to an infection of rhinovirus. Rhinovirus is a highly contagious, RNA virus that is a very frequent cause of respiratory illnesses such as the "common cold" (Centers for Disease Control and Prevention, 2024). It is also the leading cause of bronchitis in children (Capriotti, 2020). The virus is primarily spread via respiratory droplets in the air (Biagi et al., 2020). The virus invades the respiratory tract and alters the function of epithelial cells in the lungs, which in turn, causes inflammation and an immune response in the body (Biagi et al., 2020). Rhinovirus has a particularly bad effect on people who have asthma as an underlying health condition as this patient does. It has been found that the damage done to the lungs epithelial cells from rhinovirus allows the absorption of more allergens which leads to the development of wheezing and exacerbated asthma (Biagi et al., 2020). In short, rhinovirus causes a person's airway to be extra reactive and therefore making it more difficult for appropriate gas exchange of O2 and CO2 to occur and this can cause severe respiratory distress (Biagi et al., 2020). Because of this patient's underlying condition of asthma, the rhinovirus did indeed cause severe respiratory distress leading to hospitalization.

S/S of disease: Signs and symptoms of rhinovirus include cough, sore throat, runny or stuffy nose, fever, headache, body aches, wheezing, and difficulty breathing (Centers for Disease Control and Prevention, 2024). This patient's signs and symptoms began with a cough and hoarse voice likely due to a sore throat. Then as the illness progressed, the child started to wheeze and had difficulty breathing as demonstrated by his use of accessory muscles and respiratory rate.

Method of Diagnosis: Physicians typically do not test specifically for rhinovirus, but a respiratory pathogen panel can be done to determine specifically what pathogen is causing the illness (Centers for Disease Control and Prevention, 2024). Mostly this illness is diagnosed via physical exam based on the patient's presenting symptoms. Other tests such as chest x-rays can be helpful in confirming infection of the lungs, but only the respiratory pathogen panel can definitively diagnose the cause of the illness as rhinovirus (Centers for Disease Control and Prevention, 2024). Because this patient was so ill upon arrival to the ED, a respiratory pathogen panel was given to him as well as a chest x-ray. The respiratory pathogen panel came back positive for rhinovirus and his chest x-ray showed a reactive airway process.

Treatment of disease: Because this is not a bacterial illness there are not antibiotics that can be given to address this disease process. Instead, bronchodilators, anti-inflammatories, and steroids are given to help relax the airway and decrease the reactive, inflammatory response caused by the virus (Rudd & Kocisko, 2023). Maintenance fluids may also be administered to keep the patient well hydrated and bed rest should be maintained until symptoms subside (Rudd & Kocisko, 2023). Supplemental oxygen therapy may be necessary as well if the illness is severe enough (Rudd & Kocisko, 2023). There are no immunizations to protect specifically against rhinovirus (Centers for Disease Control and Prevention, 2024). This patient had a severe case and was therefore prescribed several bronchodilators such as albuterol, anti-inflammatories like ibuprofen, and steroids including methylprednisolone. He was also on optiflow nasal cannula for supplemental oxygen.

Active Orders

-Contact/droplet precautions: this isolation precaution is because the child tested positive for rhinovirus.

-Complete nursing assessment upon arrival: a very thorough head to toe should be done on every patient upon admission to see what their current baseline status is. Nursing assessments should occur several times a shift as well to monitor for changes in patient condition.

-Vitals every 4 hours and blood pressure every 8 hours while awake: it is important to take routine vitals to assess this patient's respiratory status and make note of any trends in patient condition.

-Respiratory Therapy assess high flow nasal cannula every 4 hours: it is important to try and give the lowest amount of oxygen necessary to maintain a good O2 saturation so that oxygen toxicity can be avoided. Therefore, RT should frequently assess respiratory status and adjust the flow rate of the nasal cannula as needed.

-Supplemental oxygen for O2 saturation less than 92%: it is crucial that patients maintain an oxygen saturation greater than 92% so that they have sufficient perfusion to all of the tissues in the body. Because of this child's respiratory distress and low O2 saturation, supplemental O2 is necessary.

-Regular diet: This child does not have a medical need to restrict their diet in any way and therefore should be encouraged to eat and drink fluids as normal because adequate food and fluid intake is crucial for recovering.

-Measure intake and output: It is important to track intake and output so that the healthcare team can evaluate if the patient is taking in enough food and liquid and if his kidneys and bowels are working properly to eliminate his intake. Changes in I/O can signal complications with the patient.

-Assess respiratory score per pediatric asthma pathway: This was done due to the patient's history of asthma and it helps establish the need for albuterol treatments and how frequently it should be given.

Oxygen saturation: 95%

Oxygen needs: Supplemental oxygen with **optiflow nasal cannula set at 12L**

<p>Pain and Pain Scale Used</p>	<p>Pain was a 0 using the FLACC pain scale</p>	
<p>Nursing Diagnosis 1</p> <p>Impaired gas exchange related to rhinovirus and asthma as evidenced by low O2 saturation, need for supplemental oxygen, and tachypnea with accessory muscle use (Phelps, 2023).</p>	<p>Nursing Diagnosis 2</p> <p>Risk for decreased activity tolerance related to airway constriction from rhinovirus and asthma as evidenced by poor oxygen saturation and impaired sleep due to dyspnea (Phelps, 2023).</p>	<p>Nursing Diagnosis 3</p> <p>Risk for secondary infection related to asthma as evidenced by the use of steroids and exposure to pathogens at pre-k (Phelps, 2023).</p>
<p>Rationale</p> <p>This nursing diagnosis was chosen and prioritized first because this patient’s combination of both rhinovirus and asthma put him at extra risk for severe respiratory distress due to his already extra reactive airway. A low oxygen saturation and difficulty breathing can lead to respiratory failure and therefore inadequate oxygen going to body tissues, which is a life-threatening event. This patient needed to be treated with supplemental oxygen at a high flow rate in order to maintain a sufficient oxygen saturation and even then, he was still tachypneic at times and demonstrated labored breathing efforts. Therefore, his gas exchange must be vigilantly monitored in order to maintain his perfusion and ventilation.</p>	<p>Rationale</p> <p>This nursing diagnosis was chosen and prioritized second because having both rhinovirus and asthma greatly decreased this patient’s oxygen saturation, especially at night when he was noted to have increased difficulty breathing. Poor tissue perfusion due to low O2 saturation can have a profound effect on a child’s energy level and ability to complete tasks and play like a normal child. Therefore, it is very important to maintain a sufficient oxygen saturation and assess the child’s activity tolerance frequently. A consistently low activity tolerance can lead to social delays in children compared to their peers.</p>	<p>Rationale</p> <p>This nursing diagnosis was chosen because having asthma means this patient has a very reactive airway and this in turn puts him at an increased risk of contracting respiratory infections. This risk is also increased because he is taking a steroid and steroid medications can weaken the immune system making it easier for secondary infections to occur. He is also attending pre-k and children are not well known for good hygiene practices so all of this combined, puts him at a great risk of contracting another infection.</p>
<p>Interventions</p> <p>Intervention 1: Perform frequent respiratory assessments paying close attention to respiratory rate, rhythm and overall effort of breathing (Phelps, 2023). Intervention 2: Apply and maintain supplemental oxygen to assist in adequate tissue perfusion and oxygen saturation, being sure to adjust the flow rate as necessary to avoid oxygen toxicity (Phelps, 2023).</p>	<p>Interventions</p> <p>Intervention 1: Encourage the patient to eat adequate amounts of food and drink to help maintain health and energy levels and be sure to assess oxygen saturation and need for supplemental oxygen frequently (Phelps, 2023). Intervention 2: Assess for and educate the family about triggers that can worsen this patient’s asthma and therefore decrease his activity tolerance such as smoking cigarettes outside of the house (Phelps, 2023).</p>	<p>Interventions</p> <p>Intervention 1: Monitor vital signs every 4 hours especially, temperature, to assess for fever which could indicate possible secondary infections (Phelps, 2023). Intervention 2: Educate parents on standard precautions such as good hand hygiene for their child and on how to properly use maintenance medications for asthma such as his albuterol inhaler (Phelps, 2023).</p>
<p>Evaluation of Interventions</p> <p>The patient tolerated the nursing interventions well and was cooperative. He allowed the nurses to check on him frequently and listen to his lungs without complaint. He was also good about keeping his nasal cannula in place, though at times he would accidentally disconnect the O2 tubing so it had to be routinely monitored. His oxygen saturation was variable, at times going up to 99% and other times falling lower than 95%, but he did not show signs of oxygen toxicity.</p>	<p>Evaluation of Interventions</p> <p>The patient tolerated these interventions well. He ate all of his breakfast and was drinking plenty of fluids. His energy levels appeared to be increasing as his viral illness was getting better thanks to medication and O2 therapy. His parents were educated about triggers of asthma such as second hand smoke and they were asked if they smoke in the house and they denied that they do. Though their clothes did smell of smoke and they appeared unwilling to continue the conversation.</p>	<p>Evaluation of Interventions</p> <p>The patient tolerated Q4 vitals well. He allowed his temperature to be taken at the axillary site without fussing and even liked to see the temperature value on the screen after it was done. The parents were also open to hearing education on helping to prevent infections for their child as they knew cold and flu season is right around the corner. They also had some questions about maintenance medications for asthma such as how often he should be using his albuterol inhaler that the nurse was able to answer.</p>

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