

Medications

D5 1/5 NS c 20 mEq KCl @ 65 mL/hr

- Electrolyte cation/electrolyte replacement
- The fluids are used to rehydrate the patient and the potassium chloride is used to maintain balanced electrolytes. Albuterol use can cause hypokalemia, so this will prevent electrolyte imbalance (*Nurse's Drug Handbook, 2021*)
- Monitor electrolytes, specifically potassium; monitor for arrhythmias, fatigue, dyspnea, weakness, confusion, paresthesia, and fluid status (*Nurse's Drug Handbook, 2021*)

Albuterol 2.5mg/3mL Neb q2h, q1h PRN shortness of breath, wheezing

- Adrenergic/bronchodilator
- Patient taking to improve airway clearance with bronchodilation
- Assess pulmonary function and monitor serum potassium (*Nurse's Drug Handbook, 2021*)

Prednisolone 23 mg (2mg/kg/day) PO BID (Available: 15mg/5mL)

- Glucocorticoid/immunosuppressant
- Patient taking to reduce inflammatory response and bronchoconstriction related to acute asthma exacerbation
- Monitor I&O, daily weight, and adverse reactions (*Nurse's Drug Handbook, 2021*)

Acetaminophen 320 mg PO q6h PRN pain, fever >101

- Nonsalicylate, para-aminophenol derivative/antipyretic, non-opioid analgesic
- Patient taking to reduce inflammation related to acute asthma exacerbation and to reduce chest pain associated with acute asthma exacerbation, also used to control fever >101
- Assess temperature and pain scale

Ibuprofen 200 mg PO q8h PRN pain, fever >101

- NSAID/Analgesic, anti-inflammatory, antipyretic
- Pt taking to reduce inflammation and chest pain related to acute asthma exacerbation, also used to control fever >101 F
- Assess temperature and pain scale

Demographic Data

Admitting diagnosis: Status asthmaticus

Psychosocial Developmental Stage: Industry vs. Inferiority

Age of client: 10/02/2015 (6 years)

Sex: Male

Weight in kgs: 22.9 kg

Cognitive Development Stage: Preoperational

Allergies: PCN (rash), Strawberries (rash)

Date of admission: 02/16/2022

Admission History

A 6-year-old male patient with a history of restrictive airway disease arrived in the emergency room on 02/16/2022 experiencing what his mother stated as "difficulty breathing, wheezing, and shortness of breath." These symptoms onset 24 hours ago and have been continuous since. The patient also complains of chest pain related to the shortness of breath. Over the past 24 hours, the patient has used his albuterol nebulizer every four hours. The Patient has experienced little to no relief with these treatments. No aggravating or relieving factors were listed. Additionally, the patient has a recent history (02/02/2022) of Influenza B and has completed the full course of the treatment.

Pathophysiology

Disease process: Status asthmaticus is a complication that develops when an asthma exacerbation cannot be appropriately controlled with attempted intervention, specifically bronchodilators (Capriotti, 2020). When someone has an asthma exacerbation, the bronchioles constrict and obstruct the airways. Along with bronchoconstriction, there is also an abnormality called ventilation-perfusion mismatching, in which some areas of the lung ventilate fully but do not have adequate circulation to oxygenate the arterial blood (Capriotti, 2020). The opposite also occurs. This means that the parts of the lung that have adequate circulation do not ventilate, so perfusion does not occur there either (Capriotti, 2020). The effects of this condition can compound and become severe and potentially fatal. If the condition persists, the patient can experience exhaustion, dehydration, and total alveolar ventilation failure that progresses to cyanosis and carbon dioxide retention (Capriotti, 2020).

S/S of disease: Early symptoms of an asthma exacerbation are cough, dyspnea, wheezing, chest tightness, and labored breathing (Hinkle & Cheever, 2018). Untreated symptoms progress and can become more systemic. The next stage of symptoms includes tachycardia, diaphoresis, and a widened pulse pressure (Hinkle & Cheever, 2018). Further progression becomes more dangerous. This is when complications can become fatal. The late symptoms are hypoxia, hypoxemia, and cyanosis; each of which are signs of poor oxygenation (Hinkle & Cheever, 2018). My patient was presented with wheezing, shortness of breath, difficulty breathing, a decreased oxygen saturation, hyper expansion of the chest wall, labored breathing, signs of anaerobic metabolism (lactate), metabolic acidosis, and dehydration (elevated Hct).

Method of Diagnosis: One of the best methods of diagnosis asthma and severity of exacerbations is through pulmonary function tests. During an exacerbation, forced expiratory volume, or the maximum amount of air you can forcefully exhale in one breath, will be significantly decreased (Hinkle & Cheever, 2018). The decrease in the volume of air exhaled is due to the amount of bronchoconstriction present. The severity of bronchoconstriction and airway obstruction is what the pulmonary function test focuses on.

Treatment of disease: The priority when it comes to treating asthma exacerbations is to administer a short-acting-beta-agonist that works as a bronchodilator (Capriotti, 2020). This should provide rapid relief of bronchoconstriction and make the airways more patent. In more severe cases, epinephrine and oral corticosteroid use may be necessary to further facilitate bronchodilation (Capriotti, 2020). Treatment can also be preventative. Long-acting-beta-agonists and inhaled corticosteroids play a role in maintenance by counteracting bronchospasms and inflammation, preventing the need for the rapid relief drugs (Capriotti, 2020).

Assessment

General	Integument	HEENT	Cardiovascular	Medical History	Neurological	Most recent VS (highlight if abnormal)	Pain and Pain Scale Used
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- A&Ox4 - IV site	- Appropriate color for	- Head and neck	- rhy	Previous Medical History: Reactive Airway Disease; hx of Respiratory syncytial virus (RSV) and bronchiolitis, immunizations are all up to date Prior Hospitalizations: RSV (2016), Reactive Airway Disease (2017), born at 35 weeks - 2 weeks in NICU, myringotomy (2016) Chronic Medical Issues: Reactive Airway Disease Social needs: N/A	- A&Ox4 - speech is	Time: 1000	2/10 chest pain
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Relevant Lab Values/Diagnostics

- 0800 VS: SaO2 = 92% 3L NC (95%-100%); Pain 2/10 faces scale (chest tightness)
 - A low SaO2 indicates perfusion is being impaired
 - Chest tightness is likely related to hyperinflation and dyspnea
- 1000 VS: SaO2 = 93% 3L NC (95%-100%); Pain 2/10 faces scale (chest tightness)
 - The SaO2 has minimally improved over the last two hours, so this patient may need a more concentrated flow of O2
 - The chest tightness has not improved, so the treatments so far has not been effective
- ABG: pH = 7.337 (7.35-7.45); HCO3 = 18.3 (21-28) (metabolic acidosis); Lactate = 1.46 mmol/L (0.3-0.8 mmol/L)
 - A low pH and a low HCO3 indicate metabolic acidosis (Pagana et al., 2019)
 - Elevated lactate also implies acidosis (Pagana et al., 2019)
 - A lack of oxygen being delivered to the body's tissues can lead to anaerobic metabolism, which produces lactic acid (Capriotti, 2020)
- CBC: Hct = 44.8 (30-40); Lymphocyte = 16.3 (20-40); Eosinophil = 9.1 (1-4)
 - Hct may be slightly elevated if the patient is dehydrated
 - Lymphocytes are likely decreased because the neutrophil count is in the high end of its range due to acute infection
 - Eosinophils are elevated with allergic responses like asthma exacerbations (Capriotti, 2020)
- CMP: Glucose = 118 (70-110); Creatinine = 0.86 (0.3-0.7); Alk phos = 285 (65-210); Mag = 2.7 (1.4-1.7)
 - Glucose is elevated during acute stress situations
 - Dehydration is one of the only possible causes for elevated creatinine if there is not a history of renal dysfunction (Pagana et al., 2019)
 - Alk phos is elevated likely due to his recent round of antibiotic (Pagana et al., 2019)
 - Mag is possibly elevated due to his recent antibiotic round (Pagana et al., 2019)
- Chest X-Ray: negative for infiltrates; positive for hyperinflation
 - Shows that the airway is somewhat obstructed, and the patient is inhaling more than they are exhaling

Reference for normal lab ranges:
Pagana, K. D., Pagana T. J., & Pagana T. N. (2019). *Mosby's diagnostic & laboratory test reference* (14th ed.) Elsevier.

Active Orders

- Pt up ad lib
 - + there are no reasons to limit ambulation
- Clear liquid diet - advance as tolerated
 - + patient was just taken off an NPO diet, so it is important to ease back into a regular diet to ensure he tolerates it
- VS q2 with BP
 - + the patient's condition needs to be monitored to show improvement or decline so treatment can be altered as needed
- D/C continuous neb treatment
 - + the patient's condition has improved enough that continuous neb is no longer necessary
- Albuterol 2.5 mg q2 via neb, q1h PRN shortness of breath, wheezing
 - + it is important to keep this order active in case the patient needs to create airway patency
- O2 per protocol to keep SaO2 ≥92%
 - + a decreased SaO2 means tissues are not receiving sufficient oxygen, and this can lead to many complications
- Cardiac monitoring
 - + elevated magnesium can cause alterations in cardiac rhythm
- Daily weight
 - + this is the most effective way to monitor fluid retention and fluid loss / patient is taking prednisolone so this is an important assessment
- Strict I&O
 - + it is important to maintain the patient's hydration status to aid in movement of secretions related to asthma exacerbation
- D/C CBC, CMP for today
 - + it is not necessary to maintain these levels based on the patient's condition (avoid invasive procedure)

	inflammatory response)	patients with an asthma exacerbation), nares patent with inflammation (common finding in patients with an asthma	laterally in upper and lower extremities	by narrowing of airways/ bronchoconstriction) - hyper expansion of chest wall (common finding in patients with an asthma exacerbation, due to				Oxygen needs: 3L Nasal cannula
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		exacerbation, inflammatory response) , no septal deviation - Oral mucosa pink and moist, signs of inflammation in oropharynx (common finding in patients with an asthma exacerbation, inflammatory response)		increased inspiration with decreased expiration due to obstructed airways and oxygen hunger) - use of accessory muscles/ labored breathing (common finding in patients with an asthma exacerbation, caused by narrowing of airways)						
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<p align="center">Nursing Diagnosis 1</p> <p>Impaired gas exchange related to status asthmaticus as evidenced by an SaO₂ of 92% and 93% with 3L via nasal cannula.</p>	<p align="center">Nursing Diagnosis 2</p> <p>Ineffective breathing pattern related to status asthmaticus as evidenced by expiratory wheezes, hyper expansion of chest wall, and the use of accessory muscles.</p>	<p align="center">Nursing Diagnosis 3</p> <p>Ineffective peripheral tissue perfusion related to status asthmaticus as evidenced by elevated serum lactate and SaO₂ of 92% and 93% with 3L via nasal cannula.</p>
<p align="center">Rationale</p> <p>Status asthmaticus causes ventilation-perfusion mismatching, which means that ventilation and circulation are not working together. Gas exchange is not occurring in the pulmonary arteries.</p>	<p align="center">Rationale</p> <p>The patient does not have patent airways which is producing expiratory wheezes, causing his chest wall to expand with continued inhalation and decreased exhalation, and making him use accessory muscles when he breathes because he cannot ventilate properly.</p>	<p align="center">Rationale</p> <p>The lack of peripheral tissue perfusion resulted in anaerobic metabolism since oxygen was not present in the tissues, which caused an elevated serum lactate. The problem here is the anaerobic metabolism at inappropriate times due to the asthma exacerbation.</p>
<p align="center">Interventions</p> <p>Intervention 1: Continue providing supplemental oxygen Intervention 2: Continue to monitor SaO₂ to ensure it does not drop below the provider's</p>	<p align="center">Interventions</p> <p>Intervention 1: Practice breathing exercises with the patient to help them control chest expansion and proper ventilation, as well as fully exhaling to reduce hyper expansion</p>	<p align="center">Interventions</p> <p>Intervention 1: Monitor SaO₂ and ensure the percentage does not drop below 92% per provider's order Intervention 2: Continue to administer IV fluid as</p>

recommended range (92%)	Intervention 2: Continue to administer nebulizer treatment as prescribed and continue to monitor lung sounds to evaluate the treatment	prescribed with monitored weight and strict I&O
<p align="center">Evaluation of Interventions</p> <p>The patient should never have had his nasal cannula removed unless necessary and his SaO₂ should have been monitored every two hours as ordered.</p>	<p align="center">Evaluation of Interventions</p> <p>The patient should demonstrate the breathing exercises and should also receive nebulizer treatment as ordered.</p>	<p align="center">Evaluation of Interventions</p> <p>The patient should have his SaO₂ monitored every two hours as ordered and should also receive IV fluids at the prescribed rate. His SaO₂ should stay above 92% and his hydration status should be maintained.</p>

References (3):

Capriotti, T. (2020). *Davis advantage for pathophysiology* (2nd ed.). F. A. Davis

Hinkle, J. L., & Cheever, K. H. (2018). *Brunner & Suddarth's textbook of medical-surgical nursing* (14th ed). Wolters Kluwer.

Jones & Bartlett Learning. (2021). *Nurse's drug handbook* (20th ed.). Jones & Bartlett Learning.

Pagana, K. D., Pagana T. J., & Pagana T. N. (2019). *Mosby's diagnostic & laboratory test reference* (14th ed.) Elsevier.