Pathophysiology of Acute Asthma Exacerbation

Sarah Elswick
Otterbein University, sarah.elswick@otterbein.edu

Follow this and additional works at: https://digitalcommons.otterbein.edu/stu_msn

Recommended Citation
Elswick, Sarah, "Pathophysiology of Acute Asthma Exacerbation" (2017). Nursing Student Class Projects (Formerly MSN). 263.
https://digitalcommons.otterbein.edu/stu_msn/263

This Project is brought to you for free and open access by the Student Research & Creative Work at Digital Commons @ Otterbein. It has been accepted for inclusion in Nursing Student Class Projects (Formerly MSN) by an authorized administrator of Digital Commons @ Otterbein. For more information, please contact digitalcommons07@otterbein.edu.
Asthma is characterized by two phenotypes: gradual onset and sudden onset. Depending on the phenotype, the response to interventions may be different. For example, in gradual onset there is mucus plugging in the airway, and a slower response to treatment. Sudden onset typically does not have mucus plugging, and responds more rapidly to treatment (Hestoft, et al., p. 522). This is one example of why understanding the complex pathophysiological processes is crucial when diagnosing and treating patients.

Understanding the pathophysiology of asthma supports the ability to prevent acute attacks by avoiding triggers, or intervening early when symptoms begin.

Early recognition and treatment of acute asthma exacerbation has direct effect on mortality and mortality in these patients.

Understanding of the physiologic process occurring in asthmatic patients is critical in order to understand how therapeutic interventions impact the patient’s disease process.

Introduction

The original presentation or development of asthma may occur in children or adults. Acute asthma exacerbation may be gradual or sudden in onset, depending on the phenotype (Hestoft, et al., p. 534).

Be seen in pediatric patients, or it may have a new onset in adulthood.

Effective management is multi-factorial; This topic was chosen due to its relevance in the healthcare setting, and applicability to the practice of the APN. APN’s must understand and be prepared to encounter this common illness.

Significance of Pathophysiology

Asthma is thought to have two phenotypes; gradual onset and sudden onset. Depending on the phenotype, the response to interventions may be different. For example, in gradual onset there is mucus plugging in the airway, and a slower response to treatment. Sudden onset typically does not have mucus plugging, and responds more rapidly to treatment (Hestoft, et al., p. 522). This is one example of why understanding the complex pathophysiological processes is crucial when diagnosing and treating patients.

Understanding the pathophysiology of asthma supports the ability to prevent acute attacks by avoiding triggers, or intervening early when symptoms begin.

Early recognition and treatment of acute asthma exacerbation has direct effect on mortality and mortality in these patients.

Understanding of the physiologic process occurring in asthmatic patients is critical in order to understand how therapeutic interventions impact the patient’s disease process.

Conclusion

Thorough and effective patient education is a key factor in preventing an acute exacerbation of asthma.

With proper prevention and evidence based practice, mortality for patient’s with mild to moderate acute asthma exacerbation is low.

However, approximately 10 to 50% of patients may still require positive pressure ventilation for severe acute asthma and mortality may be as high as 22% (Hestoft, et al., p. 532).

Recognizing the signs and symptoms quickly will assist the APN in making a more timely intervention.

Although Asthma has the ability to produce severe acute exacerbations that may become life threatening, this chronic illness can be properly managed with proper trigger/identification, identification, medications, medication plan, and periodic monitoring of the patient’s respiratory status using peak flow.

References


Pathophysiology of Asthma Exacerbation

Sarah Elswick BSN, RN

Otterbein University, Westerville, Ohio

Signs and Symptoms of Acute Asthma Exacerbation

- Dyspnea
- Cough
- Airflow obstruction
- Wheezing
- Anxiety
- Tachypnea
- Red flags of impending respiratory failure:
  - Tachypnea
  - Tachycardia
  - Use of accessory muscles
- The presence of pulvus paradoxus in patients with acute severe asthma is an indication of ventilatory muscle fatigue and respnding failure (Hestoft, et al., p. 523).
- Use of mechanical ventilation is indicated when other therapies fail to improve the patient’s condition and intervene appropriately
- The presence of asthma may continue to increase in prevalence and is one of the most common lung disorders seen and treated in the healthcare setting (Heftenbach, Wagner, and Wegmann 2017, p. 510).
- An asthma exacerbation can usually be presented in the clinical setting under one of two subcategories: severe, or respiratory arrest imminent.
- Severe: characterized by dyspnea at rest that interferes with conversation, peak expiratory flow rate (PEFR) <40% predicted, usually requires emergency department (ED) visit and likely hospitalization. Patient experiences partial relief from treatment after inhalation of short-acting beta-agonists
- Respiratory Arrest Imminent: Patient is too dyspneic to speak; wheezing, FEEP > 40cm H2O; patient is alert and oriented to 2nd stim; patient feels cold, cyanotic, and has tachycardia.

Intervention

- The Johns Hopkins Asthma and Allergy Center conducted a study that found that between 15 and 35% of patients with asthma had allergic rhinitis (Khair, 2014, p. 354).
- Smoking cessation and/or nicotine replacement therapy help reduce airway inflammation.
- Avoidance of triggers.
- Use of oxygen and oxygen delivery methods.
- Use of nebulizer, inhaler and spacer device.
- Oxygen therapy to maintain SpO2 >92%
- Selective beta 2 agonists Antimuscarinics
- Corticosteroids.
- Magnesium sulfate when indicated (Heslindle, 2013, p 4E).
- The nurse should be knowledgeable regarding potential side effects or adverse effects of the administered medications, such as tachycardia in response to inhaled albuterol.

Nursing Implications

- Presence of strong assessment skills in order to recognize this condition and not misdiagnose asthma. Ability to identify abnormal lung sounds and recognize respiratory difficulty or imminent respiratory failure.
- Facilitate communication with interdiscipinary care team as needed (i.e. Respiratory therapy). Other disciplines, such as radiology or laboratory, may be involved as well depending on presentation of the patient and physician’s orders.
- Be knowledgeable regarding potential therapeutic interventions:
  - Performing pulse oximetry
  - Use of oxygen and oxygen delivery methods.
  - Use of nebulizer, inhaler and spacer device.
  - Oxygen therapy to maintain SpO2 >92%
  - Selective beta 2 agonists Antimuscarinics
  - Corticosteroids.
- Smoking cessation and/or nicotine replacement therapy.
- Avoidance of triggers.
- Use of oxygen and oxygen delivery methods.
- Use of nebulizer, inhaler and spacer device.
- Oxygen therapy to maintain SpO2 >92%
- Selective beta 2 agonists Antimuscarinics
- Corticosteroids.
- Magnesium sulfate when indicated (Heslindle, 2013, p 4E).
- The nurse should be knowledgeable regarding potential side effects or adverse effects of the administered medications, such as tachycardia in response to inhaled albuterol.

Educatong patients on the following:
- Risk factors.
- Avoidance of triggers.
- Proper use of rescue inhaler
- Spacer use.
- Asthma action plan.
- Smoking cessation and/or nicotine replacement therapy.
- Use of oxygen and oxygen delivery methods.
- Use of nebulizer, inhaler and spacer device.
- Oxygen therapy to maintain SpO2 >92%
- Selective beta 2 agonists Antimuscarinics
- Corticosteroids.
- Magnesium sulfate when indicated (Heslindle, 2013, p 4E).
- The nurse should be knowledgeable regarding potential side effects or adverse effects of the administered medications, such as tachycardia in response to inhaled albuterol.

Educating patients on the following:
- Risk factors.
- Avoidance of triggers.
- Proper use of rescue inhaler
- Spacer use.
- Asthma action plan.
- Smoking cessation and/or nicotine replacement therapy.
- Use of oxygen and oxygen delivery methods.
- Use of nebulizer, inhaler and spacer device.
- Oxygen therapy to maintain SpO2 >92%
- Selective beta 2 agonists Antimuscarinics
- Corticosteroids.
- Magnesium sulfate when indicated (Heslindle, 2013, p 4E).
- The nurse should be knowledgeable regarding potential side effects or adverse effects of the administered medications, such as tachycardia in response to inhaled albuterol.

Educating patients on the following:
- Risk factors.
- Avoidance of triggers.
- Proper use of rescue inhaler
- Spacer use.
- Asthma action plan.
- Smoking cessation and/or nicotine replacement therapy.
- Use of oxygen and oxygen delivery methods.
- Use of nebulizer, inhaler and spacer device.
- Oxygen therapy to maintain SpO2 >92%
- Selective beta 2 agonists Antimuscarinics
- Corticosteroids.
- Magnesium sulfate when indicated (Heslindle, 2013, p 4E).
- The nurse should be knowledgeable regarding potential side effects or adverse effects of the administered medications, such as tachycardia in response to inhaled albuterol.

Educatong patients on the following:
- Risk factors.
- Avoidance of triggers.
- Proper use of rescue inhaler
- Spacer use.
- Asthma action plan.
- Smoking cessation and/or nicotine replacement therapy.
- Use of oxygen and oxygen delivery methods.
- Use of nebulizer, inhaler and spacer device.
- Oxygen therapy to maintain SpO2 >92%
- Selective beta 2 agonists Antimuscarinics
- Corticosteroids.
- Magnesium sulfate when indicated (Heslindle, 2013, p 4E).
- The nurse should be knowledgeable regarding potential side effects or adverse effects of the administered medications, such as tachycardia in response to inhaled albuterol.

Educating patients on the following:
- Risk factors.
- Avoidance of triggers.
- Proper use of rescue inhaler
- Spacer use.
- Asthma action plan.
- Smoking cessation and/or nicotine replacement therapy.
- Use of oxygen and oxygen delivery methods.
- Use of nebulizer, inhaler and spacer device.
- Oxygen therapy to maintain SpO2 >92%
- Selective beta 2 agonists Antimuscarinics
- Corticosteroids.
- Magnesium sulfate when indicated (Heslindle, 2013, p 4E).
- The nurse should be knowledgeable regarding potential side effects or adverse effects of the administered medications, such as tachycardia in response to inhaled albuterol.