

Asthma case study

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University of Perpetual Help System - DALTA Alabang - Zapote Road,
Pamplona, Las Pinas City College of Nursing A Case Study of Bronchial
Asthma In Acute Exacerbation (BAIAE) Submitted by: Angela Marie Ferrer
BSN 3B July 17, 2012 Definition A condition of the lungs characterized by
widespread narrowing of the airways due to spasm of the smooth muscle,
edema of the mucosa, and the presence of mucus in the lumen of the
bronchi and bronchioles.

Bronchial asthma is a chronic relapsing inflammatory disorder with increased
responsiveness of tracheobroncheal tree to various stimuli, resulting in
paroxysmal contraction of bronchial airways which changes in severity over
short periods of time, either spontaneously or under treatment. Causes
Allergy is the strongest predisposing factor for asthma. Chronic exposure to
airway irritants or allergens can be seasonal such as grass, tree and weed
pollens or perennial under this are the molds, dust and roaches.

Common triggers of asthma symptoms and exacerbations include air way
irritants like air pollutant, cold, heat, weather changes, strong odors and
perfumes. Other contributing factor would include exercise, stress or
emotional upset, sinusitis with post nasal drip, medications and viral
respiratory tract infections.

Most people who have asthma are sensitive to a variety of triggers.

A person's asthma changes depending on the environment activities,
management practices and other factor. Factors that can contribute to
asthma or airway hyperreactivity may include any of the following: *
Environmental allergens: House dust mites, animal allergens (especially cat

and dog), cockroach allergens, and fungi are most commonly reported. *

- * Viral respiratory tract infections
- * Exercise; hyperventilation
- * Gastroesophageal reflux disease
- * Chronic sinusitis or rhinitis
- * Aspirin or nonsteroidal anti-inflammatory drug (NSAID) hypersensitivity, sulfite sensitivity
- * Use of beta-adrenergic receptor blockers (including ophthalmic preparations)
- * Obesity: Based on a prospective cohort study of 86, 000 patients, those with an elevated body mass index are more likely to have asthma.
- * Environmental pollutants, tobacco smoke
- * Occupational exposure
- * Irritants (eg, household sprays, paint fumes)
- * Various high and low molecular weight compounds: A variety of high and low molecular weight compounds are associated with the development of occupational asthma, such as insects, plants, latex, gums, diisocyanates, anhydrides, wood dust
- * Emotional factors or stress
- * Perinatal factors: Prematurity and increased maternal age increase the risk for asthma
- * Breastfeeding has not been definitely shown to be protective.
- * Both maternal smoking and prenatal exposure to tobacco smoke also increase the risk of developing asthma

Clinical Manifestation

The three most common symptoms of asthma are cough, dyspnea, and wheezing.

In some instances cough may be the only symptoms. An asthma attack often occurs at night or early in the morning, possibly because circadian variations that influence airway receptors thresholds. An asthma exacerbation may begin abruptly but most frequently is preceded by increasing symptoms over the previous few days. There is cough, with or without mucus production. At

times the mucus is so tightly wedged in the narrow airway that the patient cannot cough it up.

Prevention Patient with recurrent asthma should undergo test to identify the substance that participate the symptoms. Patients are instructed to avoid the causative agents whenever possible. Knowledge is the key to quality asthma care. Medical Management There are two general process of asthma medication: quick relief medication for immediate treatment of asthma symptoms and exacerbations and long acting medication to achieve and maintain control and persistent asthma.

Because of underlying pathology of asthma is inflammation, control of persistent asthma is accomplish primarily with the regular use of anti inflammatory medications.

* Long-acting control Medication Corticosteroid are the most potent and effective anti inflammatory currently available. They are broadly effective in alleviating symptoms, improving air way functions, and decreasing peak flow variability. Cromolyn sodium and nedocromil are mild to be moderate anti-inflammatory agents that are use more commonly in children.

They also are effective on a prophylactic basis to prevent exercise-induced asthma or unavoidable exposure to known triggers. These medications are contraindicated in acute asthma exacerbation. `Long acting beta-adrenergic agonist is use with anti-inflammatory medications to control asthma symptoms, particularly those that occur during the night these agents are also effective in the prevention of exercise-induced asthma.

* Quick relief medication Short acting beta adrenergic agonists are the medications of choice for relief of acute symptoms and prevention of exercise-induced asthma.

They have the rapid onset of action. Anti-cholinergic may have an added benefit in severe exacerbations of asthma but they are used more frequently in COPD. Nursing Management The main focus of nursing management is to actively assess the airway and the patient response to treatment. The immediate nursing care of patient with asthma depends on the severity of the symptoms. A calm approach is an important aspect of care especially for anxious client and one's family.

This requires a partnership between the patient and the health care providers to determine the desired outcome and to formulate a plan which includes: * the purpose and action of each medication * trigger to avoid and how to do so * when to seek assistance the nature of asthma as chronic inflammatory disease Anatomy and Physiology The upper respiratory tract consists of the nose, sinuses, pharynx, larynx, trachea, and epiglottis. The lower respiratory tract consists of the bronchi, bronchioles and the lungs.

The major function of the respiratory system is to deliver oxygen to arterial blood and remove carbon dioxide from venous blood, a process known as gas exchange. The normal gas exchange depends on three processes: * Ventilation - is movement of gases from the atmosphere into and out of the lungs.

This is accomplished through the mechanical acts of inspiration and expiration. * Diffusion - is a movement of inhaled gases in the alveoli and

across the alveolar capillary membrane * Perfusion - is movement of oxygenated blood from the lungs to the tissues.

Control of gas exchange - involves neural and chemical process The neural system, composed of three parts located in the pons, medulla and spinal cord, coordinates respiratory rhythm and regulates the depth of respirations The chemical processes perform several vital functions such as: * regulating alveolar ventilation by maintaining normal blood gas tension * guarding against hypercapnia (excessive CO₂ in the blood) as well as hypoxia (reduced tissue oxygenation caused by decreased arterial oxygen [PaO₂]). An increase in arterial CO₂ (PaCO₂) stimulates ventilation; conversely, a decrease in PaCO₂ inhibits ventilation. helping to maintain respirations (through peripheral chemoreceptors) when hypoxia occurs. The normal functions of respiration O₂ and CO₂ tension and chemoreceptors are similar in children and adults.

however, children respond differently than adults to respiratory disturbances; major areas of difference include: * Poor tolerance of nasal congestion, especially in infants who are obligatory nose breathers up to 4 months of age * Increased susceptibility to ear infection due to shorter, broader, and more horizontally positioned eustachian tubes. Increased severity or respiratory symptoms due to smaller airway diameters * A total body response to respiratory infection, with such symptoms as fever, vomiting and diarrhea. Diagnostic procedures: * General Physical Examination * Skin: * Observe for the presence of atopic dermatitis, eczema, or other manifestations of allergic skin conditions * Evidence of respiratory distress manifests as * increased respiratory rate, * increased heart rate, *

diaphoresis, and * use of accessory muscles of respiration. * Marked weight loss or severe wasting may indicate severe emphysema. * Pulsus paradoxus: * This is an exaggerated fall in systolic blood pressure during inspiration and may occur during an acute asthma exacerbation. * Depressed sensorium: * This finding suggests a more severe asthma exacerbation with impending respiratory failure.

* Chest Examination * End-expiratory wheezing or a prolonged expiratory phase is found most commonly, although inspiratory wheezing can be heard.

* Diminished breath sounds and chest hyperinflation (especially in children) may be observed during acute asthma exacerbations. The presence of inspiratory wheezing or stridor may prompt an evaluation for an upper airway obstruction such as vocal cord dysfunction, vocal cord paralysis, thyroid enlargement, or a soft tissue mass (eg, malignant tumor). *

Differential Diagnoses * Airway Foreign Body Heart Failure Allergic and Environmental Asthma Pulmonary Embolism Alpha1-Antitrypsin Deficiency Pulmonary Eosinophilia Aspergillosis Sarcoidosis Bronchiectasis Sinusitis, Chronic * Bronchiolitis Tracheomalacia COPD URTI Churg-Strauss Syndrome Vocal Cord Dysfunction Cystic Fibrosis Foreign Body Aspiration

Gastroesophageal Reflux Disease Laboratory Studies * Blood eosinophilia greater than 4% or 300-400/ μ L * Eosinophil counts greater than 8% may be observed in patients with concomitant atopic dermatitis. * This finding should prompt an evaluation for allergic bronchopulmonary aspergillosis, Churg-Strauss syndrome, or eosinophilic pneumonia * Total serum immunoglobulin E levels greater than 100 IU are frequently observed in patients experiencing allergic reactions, but this finding is not specific for asthma * British Thoracic

Society recommends using sputum eosinophilia determinations to guide therapy Imaging Studies In most patients with asthma, chest radiography findings are normal or may indicate hyperinflation.

* Chest radiography should be considered in all patients being evaluated for asthma to exclude other diagnoses. * Sinus CT scanning may be useful to help exclude acute or chronic sinusitis as a contributing factor.. Pulmonary function testing (spirometry) * Spirometry assessments should be obtained as the primary test to establish the asthma diagnosis. * Spirometry should be performed prior o initiating treatment in order to establish the presence and determine the severity of baseline airway obstruction. * The assessment and diagnosis of asthma cannot be based on spirometry findings alone because many other diseases are associated with obstructive spirometry indices.

* Spirometry measures the forced vital capacity (FVC), the maximal amount of air expired from the point of maximal inhalation, and the FEV1. A reduced ratio of FEV1 to FVC, when compared with predicted values, demonstrates the presence of airway obstruction. Optimally, the initial spirometry should also include measurements before and after inhalation of a short-acting bronchodilator in all patients in whom the diagnosis of asthma is considered.

* Reversibility is demonstrated by an increase of 12% and 200 mL after the administration of a short-acting bronchodilator Methacholine- or histamine-challenge testing * Bronchoprovocation testing with either methacholine or histamine is useful when spirometry findings are normal or near normal, especially in patients with intermittent or exercise-induced asthma symptoms. Bronchoprovocation testing helps determine if airway hyperreactivity is present, and a negative test result usually excludes the

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diagnosis of asthma. * Methacholine is administered in incremental doses up to a maximum dose of 16 mg/mL, and a 20% decrease in FEV1, up to the 4 mg/mL level, is considered a positive test result for the presence of bronchial hyperresponsiveness.

Peak-flow monitoring * Peak-flow monitoring is designed for ongoing monitoring of patients with asthma because the test is simple to perform and the results are a quantitative and reproducible measure of airflow obstruction. It can be used for short-term monitoring, exacerbation management, and daily long-term monitoring. * Peak-flow monitoring should not be used as a substitute for spirometry to establish the initial diagnosis of asthma. * Results can be used to determine the severity of an exacerbation and to help guide therapeutic decisions as part of an asthma action plan.

Exercise testing * Testing involves 6-10 minutes of strenuous exertion at 85-90% of predicted maximal heart rate and measurement of postexercise spirometry for 15-30 minutes. The defined cutoff for a positive test result is a 15% decrease in FEV1 after exercise.

Eucapnic hyperventilation * Eucapnic hyperventilation with either cold or dry air is an alternate method of bronchoprovocation testing. * It has been used to evaluate patients for exercise-induced asthma and has been shown to produce results similar to those of methacholine-challenge asthma testing. I.

LABORATORY WORKS NAME OF TEST| NORMALVALUE| RESULTS|

SIGNIFICANCE| Complete Blood CountPurpose: CBC is ordered to aid in the detection of anemias; hydration status; and as part of routine hospital admission test.

The differential WBC is necessary for determining the type of infection.

| RBC: 4-6 x 10/LHct: 0. 37- 0. 47Hgb: 110- 160 gm/LWBC: 5-10 x 10

/LLymphocytes: 0. 25-0. 35Segmenters: 0. 50-0.

65Eosinophil: 0. 01-0. 06| 5. 480. 481598. 20.

250. 580. 07| Increased segmenters (mature neutrophils) reflect a bacterial infection since this are the body's first line of defense against acute bacterial invasion. Lymphocytes are decreased during early acute bacterial infection and only increase late in bacterial infections but continue to function during the chronic phase. | II. DRUG STUDY

Name of the drug | Classification | Dosage/ Frequency | Route | Mechanism of Action | Indication | Nursing Responsibilities | Generic name: Duavent (ipratropium salbutamol) Brand name: DuaNeb | Salbutamol Sulfate| Nebule q 1 hour| Oral nebulization | The combination of ipratropium and albuterol is used to prevent wheezing, difficulty breathing, chest tightness, and coughing.

| Management of reversible bronchospasms associated with obstructive airway diseases, bronchial asthma| Take care to ensure that the nebulizer mask fits the user's face properly and that nebulized solution does not escape into the eyes. * Evaluate therapeutic response. |