

Management of Acute Asthma in Adults: Review Questions

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QUESTIONS

Choose the single best answer for each question.

1. Which of the following chemical mediators is NOT responsible for bronchospasm in an asthma attack?
 - A) Histamine
 - B) Leukotrienes LTC₄, LTD₄, and LTE₄
 - C) Vasoactive intestinal peptide
 - D) Substance P
2. Which of the following situations does NOT warrant hospitalization for an asthma attack?
 - A) Respiratory alkalosis after nebulization with a β -adrenergic agonist
 - B) Respiratory acidosis after nebulization with a β -adrenergic agonist
 - C) An asthma attack in a psychotic patient
 - D) An asthma attack in a homeless patient
 - E) Central cyanosis
- 3a. Which of the following medications would be LEAST helpful in the immediate phase of an asthma exacerbation?
 - A) Aminophylline
 - B) Intravenous corticosteroid
 - C) β -Adrenergic agonist
 - D) Anticholinergic agent
 - E) Epinephrine
- 3b. Which of the following medications would be MOST useful in the late phase of an asthma exacerbation?
 - A) Intravenous corticosteroid
 - B) Aminophylline
 - C) β -Adrenergic agonist
 - D) Anticholinergic agent
 - E) Epinephrine
4. Which one of the following statements regarding the use of corticosteroids is FALSE?
 - A) Corticosteroids may potentiate the use of β_2 -adrenergic agonists.
 - B) Corticosteroids may decrease hospital admission rates.
 - C) Aminophylline does not potentiate the benefits of corticosteroids.
 - D) Corticosteroids increase the release of arachidonic acid.

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EXPLANATION OF ANSWERS

1. **(C) Vasoactive intestinal peptide.** Histamine, certain leukotrienes (ie, LTC₄, LTD₄, and LTE₄), and substance P exert bronchoconstrictive actions whereas vasoactive intestinal peptide is a potent bronchodilator. Histamine is found throughout the body but occurs in highest concentration in the lungs, where it causes contraction of bronchial smooth muscle (bronchospasm). LTC₄, LTD₄, and LTE₄ form slow-reacting substance of anaphylaxis (SRS-A), a substance that induces slow, prolonged contraction of bronchial smooth muscles. Substance P is a potent vasoactive substance that produces contraction of various smooth muscles.
2. **(A) Respiratory alkalosis after nebulization with a β-adrenergic agonist.** Respiratory alkalosis after nebulization with a β-adrenergic agonist demonstrates that the patient is ventilating and portends a favorable response. In contrast, respiratory acidosis after nebulization with a β-adrenergic agonist demonstrates that the nebulization has not been of benefit and that the patient is not ventilating and is becoming hypercarbic. Both the psychotic and homeless patient who have experienced an asthma attack are relative indications for hospital admission because of these patients' high frequency of relapse and return to the emergency department. These patients are also associated with poor educability about their disease as well as poor access to medication and health care. Central cyanosis is an ominous sign that is associated with imminent respiratory failure and often necessitates intubation.
- 3a. **(B)** and 3b. **(A) Intravenous corticosteroid.** The

immediate phase of an asthma attack is caused by bronchospasm regardless of the stimuli. Except for intravenous corticosteroids, all of the agents suggested as answers (ie, aminophylline, β-adrenergic agonist, anticholinergic agent, epinephrine) act in the early stage of bronchospasm. Aminophylline is a phosphodiesterase inhibitor with weak to moderate bronchodilating effects and an onset of action within 1 hour. β-adrenergic agonists are bronchodilators that have an onset of action of approximately 10 minutes, whereas anticholinergic agents have an onset of action of 20 to 30 minutes. Epinephrine has an immediate response. However, the effects of these bronchodilators are short lived. Aminophylline is given as a continuous intravenous infusion whereas β-adrenergic agonists and anticholinergic agents can be coadministered from every 2 hours to continuous therapy. Intravenous corticosteroids, however, which have a much longer onset of action (4 to 8 hours), are not helpful in the early bronchospastic stage of asthma. Corticosteroids are useful for the latter, inflammatory phase of an asthma exacerbation.

4. **(D) Corticosteroids increase the release of arachidonic acid (FALSE).** Corticosteroids, because of their anti-inflammatory role, inhibit the release of arachidonic acid, thereby diminishing the inflammatory response from leukotrienes and other inflammatory mediators.

Adapted from Franklin CM, Gluck EH, Sorresso DJ, Pinchouck MJ: Management of acute asthma in adults. Hospital Physician Critical Care Medicine Board Review Manual 1997:1(4).

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