

Science Education Collection

Preparing and Administering Inhaled Medications

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Overview

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Inhaled medications are prescribed for conditions affecting the bronchi, which branch off of the trachea, and bronchioles, which are progressively smaller conducting airways spread throughout the lung tissue. These conditions can be classified as acute (*i.e.*, temporary, with quick onset) or chronic (*i.e.*, persistent and/or recurrent symptoms lasting months to years). Common acute conditions requiring inhaled medications include acute bronchitis, pneumonia, tuberculosis, pulmonary edema, and acute respiratory distress syndrome. Chronic conditions requiring inhaled medications encompass those classified as COPD (*i.e.*, asthma, chronic bronchitis, and emphysema), as well as other chronic conditions, including cystic fibrosis, lung cancer, and pneumoconiosis.

These conditions often require medications to open airways, decrease airway inflammation, and promote airflow. The delivery of medications directly into the airways allows for a faster response when compared to systemically administered medications and decreases the impact of systemic side effects. Inhaled medications come in different forms and delivery devices. Common inhaled medications include short- and long-acting bronchodilators and corticosteroids. These may be delivered using various types of inhalation delivery devices, such as metered-dose inhalers, dry-powder inhalers, and breath-activated inhalers. These devices require either a chemical propellant, deep inhalation, or a fine mist to deliver the medication. Regardless of the type of delivery, the goal is the same: to deliver the medications to the lower bronchi and bronchioles. For those using metered-dose inhalers and who have difficulties inhaling the medications into the lower airways, a device called a spacer may be used to help coordinate breathing with medication release from the device.

Because these medications require administration that is coordinated with the breathing cycle, it is important to educate the patient about the procedure prior to administering the medication and for the patient to have a working understanding of the process before beginning inhaled medication administration. A thorough respiratory assessment should also be completed prior to administering any inhaled medication to ensure the appropriateness of the medication and delivery device and the ability to comply with administration procedure.

This demonstration will present the preparation and administration of inhaled medications using the metered-dose inhaler as the prototype delivery device.

Procedure

1. General medication administration considerations (review in the room, with the patient).

1. Upon first entering the patient's room, wash hands with soap and warm water, applying vigorous friction for at least 20 s. Hand sanitizers may be used if the hands are not visibly soiled, but vigorous friction should also be applied.
2. At the bedside computer, log into the patient's electronic health record and review the patient's medical history and previous administration times. Verify with the patient any medication allergies and discuss his/her physical allergic responses and reactions.
3. At the bedside computer, pull up the Medication Administration Record (MAR).
 1. Review the inhaled medications that are due to be administered, and clarify with the patient whether he/she has a preference or concerns prior to acquiring and preparing the medication.
 2. Assess the patient's respiratory rate and auscultate breath sounds in all respiratory fields to determine medication appropriateness and to serve as a reference for evaluating medication effectiveness. If the patient demonstrates shallow respirations or increased work of breathing, this delivery method may be inappropriate, and the care provider should be notified.
4. Review the medication administration process with the patient and ensure that the patient has sufficient knowledge, understanding, and ability to follow the instructions and effectively carry out the procedure. Provide additional education as needed.
5. Leave the patient's room, washing hands as described above (step 1.1)

2. Go to the medication preparation area and complete the first safety check using the five "rights" of medication administration. Refer to the "Safety Checks for Acquiring Medications from a Medication Dispensing Device" video.

1. Upon acquiring the medication from the medication dispensing device, verify the expiration date.

3. In the medication preparation area, complete the second safety check using the five "rights" of medication administration. Refer to the "Safety Checks for Acquiring Medications from a Medication Dispensing Device" video.

4. Gather the necessary supplies, including a cup of water, a basin, and a spacer (if required). Take the supplies into the patient's room.

Administration

5. Wash hands when entering the patient's room.

6. In the patient's room, complete the third and final medication safety check, adhering to the five "rights" of medication administration.

7. As with any medication administration, remind the patient of the medication purpose, any adverse reactions, and the administration procedure.

8. Assist the patient into an upright position to facilitate lung expansion.

9. Administer the inhaled medication using the mouthpiece.

1. Shake the inhaler vigorously and then remove the mouthpiece cover.
2. Ask the patient to hold the lower portion of the inhaler between his/her thumb and middle finger, with the index finger at the top of the canister, and place the mouthpiece of the inhaler between the upper and lower lips.
3. Instruct the patient to take a deep breath and to exhale fully.
4. Ask the patient to close his/her lips tightly around the mouthpiece and to inhale deeply and fully while depressing the canister with his/her index finger to release the medication.
5. At the top of the patient's inhalation, ask him/her to hold his/her breath for 10 s, or as long as it is comfortable, and to release his/her index finger from the top of the canister.
6. If a second inhaled dose is ordered, have the patient wait for approximately 1 min prior to administering the second dose. For the second inhaled dose, instruct the patient to repeat steps 9.1-9.5.

10. Variation: Administer the inhaled medication using a spacer.

1. Shake the inhaler vigorously and remove the mouthpiece cover.
2. Holding the inhaler near the bottom, between your thumb and middle finger of your non-dominant hand, and the spacer between the thumb and index finger of your dominant hand, insert the mouthpiece of the inhaler into the spacer end.
3. Ask patient to hold the lower portion of the inhaler between his/her thumb and middle finger, with the index finger at the top of the canister. Have the patient support the spacer between the index finger and thumb of his/her non-dominant hand.
4. Instruct the patient to place the mouthpiece of the spacer between the upper and lower lips, to close his/her lips tightly around the mouthpiece, and to breathe normally.
5. Ask the patient to depress the canister with his/her index finger, to release the medication, and to take in a slow, deep breath.
6. At the top of the patient's inhalation, ask him/her to hold his/her breath for 10 s, or as long as it is comfortable, and then to release the index finger from the top of the canister and to remove the spacer from his/her mouth before slowly exhaling.
7. If a second inhaled dose is ordered, have the patient wait for approximately 1 min prior to administering the second dose. For the second inhaled dose, instruct the patient to repeat steps 10.1-10.6.

11. If the patient received an inhaled corticosteroid, or if he/she requests it, hand the patient the cup of water and ask him/her to swish the water in his/her mouth and spit it in the basin.

12. As with any medication, document the medication administration date, time, and location of administration in the electronic MAR.

13. Prior to leaving the room, remind the patient about any side effects/adverse effects or considerations for which he/she should notify the nurse.

14. Leave the patient room and wash hands with soap and water for at least 20 s, applying vigorous friction

Applications and Summary

This demonstration provides instructions on the administration of inhaled medications using a metered-dose inhaler, with mouthpiece and spacer variations. For effective inhaled medication administration, it is important for the patient to be able to follow the instructions and to have adequate respiratory functioning to allow for a full, complete inhalation. If the patient is unable to coordinate the inhalation with depression of the inhaler canister, using a spacer can help to increase the likelihood of the patient receiving the full medication dose. Proper training by medical professionals will promote proper patient use and effective airway management. It is important to instruct the patient to keep the inhaler at room temperature; if it drops below room temperature, it should be warmed only with the hands prior to use to promote the effectiveness of the chemical propellant. The device should never be warmed with anything other than hands, nor should it be punctured (to avoid injury). It is important that the patient is instructed on the proper cleaning of the inhaler. To do this, the patient should remove the medication canister from the inhaler holder and mouthpiece. The inhaler and cap should be rinsed with warm water and dried completely before recombining the inhaler components. Common errors with the administration of inhaled medications include performing poor breath/dose administration coordination, failing to hold the breath at the top of inhalation for a long enough duration, breathing in too quickly to receive the full dose, failing to shake the inhaler adequately, inhaling through the nose instead of the mouth, and failing to allow sufficient time between medication doses.

References

1. Fink, J., Rubin, B. Problems with inhaler use: A call for improved clinician and patient education. *Respir Care*. **50** (10), 1360-1375 (2005).