How do patients determine that their metered-dose inhaler is empty?

Rubin BK, Durotuye L.

Department of Pediatrics, Wake Forest University School of Medicine, Medical Center Blvd, Winston Salem, NC 27157, USA. brubin@wfubmc.edu

Abstract

STUDY OBJECTIVE: To evaluate how patients determined that pressurized metered-dose inhaler (pMDI) canisters were empty and to measure pMDI depletion under different circumstances in the laboratory.

SETTING: Most of the study was performed in a university research laboratory.

PARTICIPANTS: Fifty consecutive patients attending the Brenner Children's Hospital Asthma Center were initially questioned regarding pMDI use, and they demonstrated their use of the inhaler.

MEASUREMENTS AND RESULTS: Of the 50 children and parents questioned, 74% did not know how many actuations were in their canisters, and all used their pMDI until they could not longer "hear" the medication when actuating. Only half shook the canister before actuating. In the laboratory, chlorofluorocarbon (CFC) canisters typically had 86% more actuations than the nominal dose, and hydrofluoroalkane (HFA) canisters had 52% more. Canister flotation was ineffective in identifying when a pMDI was depleted, and water obstructed the valve opening 27% of the time. For CFC inhalers, shaking the pMDI before firing increased the number of actuations per canister (p = 0.009 [vs not shaking]), but this was not true for HFA inhalers.

CONCLUSIONS: If patients are not taught to recognize when a pMDI is empty, they may continue to use the medication for up to twice the intended duration. Until accurate dose counters are added to pMDIs, counting the number of doses administered is the only accurate method with which to tell when the canister should be discarded.

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