Efficacy and Cost Comparisons of Bronchodilator Administration Between MDI’s With a Disposable Spacer and Nebulizer for Acute Asthma Treatment

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Abstract

Study Design

Patients were randomly assigned to the study group (MDL-LiteAire spacer combination) or control group (Nebulizer). Codes for the study device were known only to the pharmacist and all personnel involved in patient recruitment and drug administration. The study group (N=30) received 540 mcg of albuterol by MDI (six actuations of 90 mcg/actuation, Warwick Pharmaceuticals Corporation, Reno NV) with the spacer (LiteAire) followed by a placebo nebulizer treatment (3 ml of 0.3% normal saline solution). The control group (N=29) received 6 actuations of placebo MDI with spacer (LiteAire) followed by 2.5mg (3ml) Albuterol (Dey, Napa, CA) by Nebulizer (Cardinal Health Edison, NJ) on a similar schedule. Both groups were bled after each actuation and medication was administered and recorded as treatment as soon as possible. Peak flows were measured just before and immediately after inhalation and the aerosol was inhaled from the spacer by tidal breathing. Each patient received rescue treatment for albuterol as required. Oral or intravenous steroids were administered at the discretion of the ER physician. A baseline peak flow and a ‘symptom severity score’ were recorded for each patient at the start of the study, and for each hour until discharge. Based on each patient’s perception of severity of symptoms, a score of 0-3 was assigned, each hour before discharge, a score of 0 for no change in symptoms, 1 for a slight change in symptoms, 2 for a moderate change in symptoms, and 3 for a severe change in symptoms. The median length of treatment was 2 hours for both groups, with a range of 1-2.5 hours for the nebulizer group. Neither gender nor race was found to be significant predictor of treatment. The primary outcomes measured were change in patients’ symptoms and peak flow rates, and duration of treatment. Secondary outcome measures were length of stay in the ED, cost of therapy and the number of rescue treatments. The length of stay was calculated from the time of enrollment into the study to the time of discharge. The cost of therapy was calculated as the sum of each individual score, allowing a maximum of 12. A higher score reflected a greater severity of symptoms and decreasing score indicated improvement. Both groups were followed for their respiratory peak flow, symptom severity and the number of rescue bronchodilator treatments every hour for a maximum of 8 hours. The time for the first rescue treatment on discharge was a parameter of enrollment in the LiteAire and nebulizer groups, respectively (p=0.01).

Conclusion

Bronchodilator delivery with MDI/spacer combination for management of acute asthma is an equally efficacious and more economical alternative to nebulizer delivery.

Introduction

Patients with acute asthma are usually treated with nebulized albuterol in the emergency department and the inpatient setting after admission. An albuterol metered dose inhaler (MDI) with a spacer can be used safely and effectively. Spaces allow the patient to inhale aerosol from the MDI without the need to coordinate the actuation of MDI and inhalation, a step many patients have difficulty learning. Equivalent efficacy of albuterol MDI and the spacer group (N=29) received placebo by MDI using LiteAire followed by albuterol nebulization. Peak flows, symptom scores and need for rescue bronchodilator were monitored. Results

Patients in the two randomized groups had similar baseline characteristics. The severity of asthma exacerbation, median peak flows, and symptom scores were not significantly different between the two groups. The median improvement in peak flow was 120.75 (70-190) L/min versus 120.80 (105-190) L/min in the LiteAire and nebulizer groups, respectively (p=0.56). The median improvement in the symptom score was 7.15 (7-9) versus 7.14 (5-9) in the LiteAire and nebulizer groups, respectively (p=0.78). Median cost of treatment per patient was $10.11 (interquartile range 10.03-10.28) versus $16.26 (interquartile range 9.88-24.45) in the LiteAire and nebulizer groups, respectively (p=0.01).

Beta agonist delivery with MDI/spacer combination for management of acute asthma can be an equally efficacious and more economical alternative to nebulizer delivery. Efficacy and Cost Comparisons of Bronchodilator Administration Between MDI’s With a Disposable Spacer and Nebulizer for Acute Asthma Treatment

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Bronchodilator delivery with MDI/spacer combination for management of acute asthma can be an equally efficacious and more economical alternative to nebulizer delivery.