

Poor inhaler technique in patients with bronchial asthma treated in King Hussein Medical Center (KHMC): Rates and effects

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ABSTRACT

Objective: To find out the rates of poor inhaler technique in patients diagnosed to have bronchial asthma visiting the pulmonary clinic in King Hussein Medical Center (KHMC). The effect of poor inhaler technique on asthma control was assessed as well.

Method: Prospective observational study of 150 patients, diagnosed to have bronchial asthma, and who were followed up in pulmonary clinic in King Hussein Medical Center (KHMC), between January 2016 and January 2018. The rate of poor inhaler technique in patients using inhalers regularly for more than 3 months was assessed during their regular visit to the pulmonary clinic. The effects of poor inhaler technique on asthma control was assessed in these patients as well, using the Global Initiative for Asthma (GINA) control guidelines.

Results: Of the 150 patients enrolled in our study, 95 patients (63.3%) were males. The mean (\pm SD) age was 46.0 ± 6.8 years. The ages ranged between (21-64) years. Poor inhaler technique was observed in 78 patients (52%). The most common cause of poor inhaler technique in these patients was the lack of education about asthma medication use,

which was seen in 64 patients (82%), followed by lack of education about the importance of regular and correct inhaler use on the control of asthma, which was seen in 14 patients (18%). Patients with poor inhaler technique were found to have poor asthma control, with 57 (73%) patients having uncontrolled asthma, 18 patients (23%) having partially controlled asthma, and only 3 patients (4%) having controlled asthma.

Conclusion: Poor inhaler use in patients with bronchial asthma was found to be significant in our study, with more than half the patients showing improper technique. Proper education about the use of asthma medications should be done to ensure the proper use of inhalers. Patients with poor inhaler technique were found to have poor asthma control; a fact that emphasizes the importance of proper inhaler use in asthma patients.

Key words: Bronchial asthma, inhalers, poor technique

Introduction

Bronchial asthma is one of the most common respiratory diseases worldwide, with an estimated prevalence of 5-10% globally (1,2). Inhaled medications play an important and integral role in the management of bronchial asthma and inhalers are considered to be the cornerstone in bronchial asthma treatment (3). Proper use of the inhalers ensures better deposition of the drug to the lungs, and decreases the systemic side effects (4). Poor inhaler technique in bronchial asthma patients is a significant problem, as it may decrease the therapeutic effect of the delivered medication, causing poor control of the disease (5,6).

The inhaler devices have improved significantly over time in order to ensure easy and proper use of inhalers, and thus to make sure that the medication is delivered properly as intended. However, poor inhaler technique still poses a huge obstacle and might decrease the effectiveness of these inhalers in delivering the drug properly to the lungs (7).

In our study, our aim was to assess the rates of poor inhaler technique in patients with bronchial asthma, treated in the pulmonary clinic in King Hussein Medical Center (KHMC). The cause of the poor inhaler technique was assessed in those patients. The effects of poor inhaler technique on asthma control was evaluated as well.

Methods

In our study, 150 patients who were diagnosed to have bronchial asthma, and who were treated and followed up in the pulmonary clinic in King Hussein Medical Center (KHMC) were enrolled in our study between January 2016 and January 2018. Before being enrolled in the study, the patients were informed properly about the study and its aims, after which written consent was signed by all the patients who agreed to be part of this study. The ethical committee approval was obtained before starting the study. Inclusion criteria were the following: age more than 14 years, an established diagnosis of bronchial asthma, regular follow up in our clinic for at least 2 years, and patients who were given inhaled corticosteroids as pressurized metered dose inhalers (MDI's). Exclusion criteria were the following: patients who were non compliant to their medications, patients who were not given controller inhalers as part of their asthma treatment, and patients with Asthma COPD Overlap (ACO).

After the patients were enrolled in the study, information regarding their age and gender was gathered by the treating pulmonologist. After that, the patients were asked to demonstrate how they used their inhalers in the clinic. The treating pulmonologist evaluated the technique used by the patients. The steps that were checked during the evaluation of the technique of using the pressurized metered-dose inhaler were the following: shaking the canister, holding the canister in an upright position at the mouth, begin with slow breath then actuate the inhaler once while continuing the slow breath, inhaling to total lung capacity, and finally holding the breath for at least 10 seconds. Patients who failed to do any step correctly were considered to have poor inhaler technique.

All the patients were asked whether or not they were educated regarding the importance of using their inhalers properly in order to control their disease, and the proper technique to use their inhaled medications, and their answers were documented in their files. After that, control of their disease was assessed using the Global Initiative for Asthma (GINA) control guidelines.

The number and percentage of the patients who had poor inhaler technique was calculated, and those who were not educated regarding importance of using their inhalers properly in order to control their disease, and the proper technique to use their inhaled medications were calculated as well. The number of patients with poor inhaler technique who had uncontrolled asthma was calculated.

Results

Of the 150 patients enrolled in our study, 95 patients (63.3%) were males. The mean(\pm SD) age was 46.0 \pm 6.8 years. The ages ranged between 21-64 years.

Poor inhaler technique was observed in 78 patients (52%). The most common cause of poor inhaler technique in these patients was the lack of education about proper technique to use their inhaled medications, which was seen in 64 patients (82%), followed by lack of education about the importance of regular and correct inhaler use on the control of asthma, which was seen in 14 patients (18%).

Patients with poor inhaler technique were found to have poor asthma control. Out of the 78 patients who demonstrated poor inhaler technique, 57 (73%) patients had uncontrolled asthma, 18 patients (23%) had partially controlled asthma, and only 3 patients (4%) had controlled asthma. While out of the 72 patients who demonstrated proper inhaler technique, 64 patients (89%) had controlled asthma, 6 patients (8%) had partially controlled asthma, and only 2 patients (3%) had uncontrolled asthma.

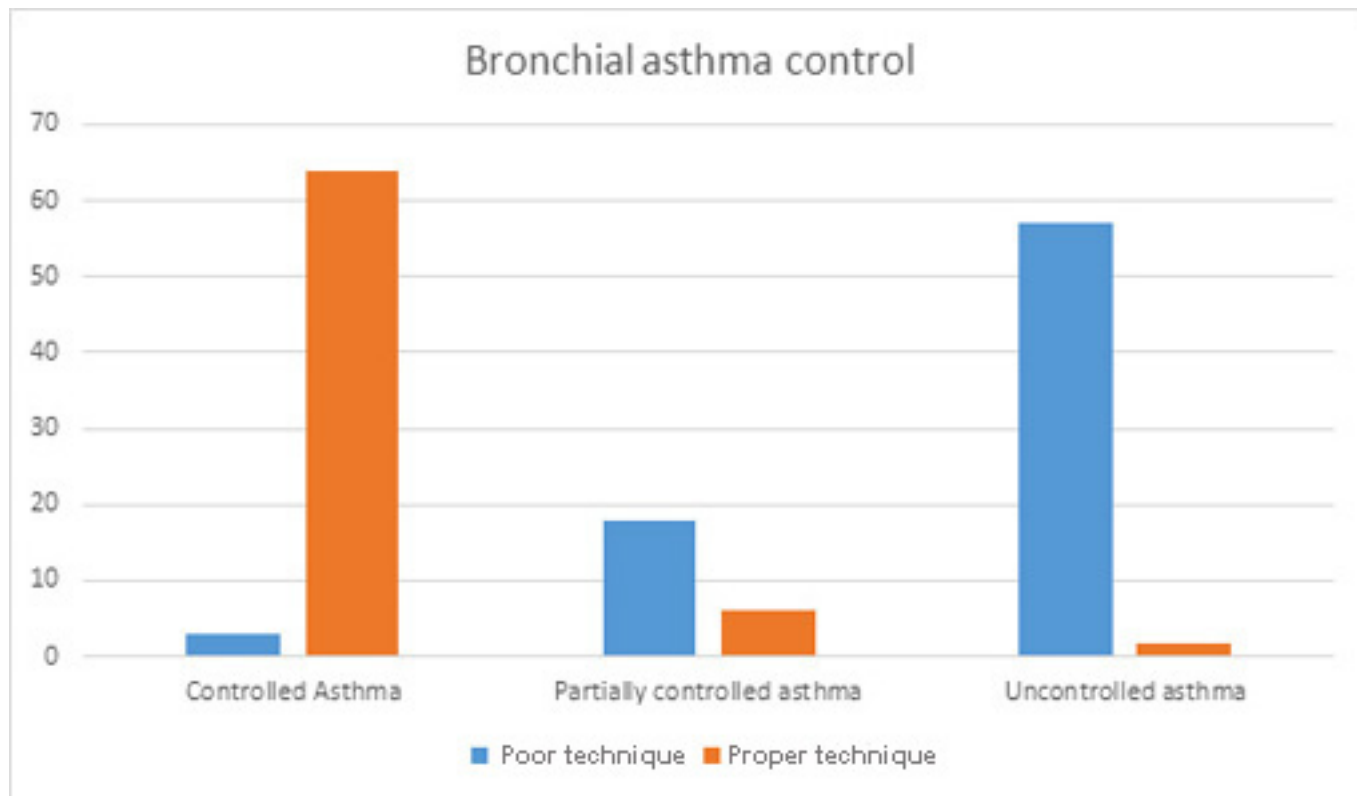
Chart 1 shows a comparison between the control of asthma in patients who demonstrated poor inhaler technique and those who demonstrated proper inhaler technique.

Discussion

Using inhalers in the proper technique is very important in patients with bronchial asthma. Improper inhaler use was shown by many studies to decrease drug delivery to the lungs, which will in turn lead to poor asthma control, and increases ER visits and hospitalization (8-11).

In our study, we evaluated the technique of using the MDI's in patients with bronchial asthma. The rates of poor inhaler technique were found to be significant, with 52% of the patients showing improper inhaler technique. The most common cause for the observed poor technique in our study was the fact that the patients didn't have proper education regarding how to use their device correctly. It is very important, according to the asthma management guidelines, to properly educate asthma patients regarding the handling and technique of their

Chart 1: Comparison between the control of asthma in patients who demonstrated poor inhaler technique and those who demonstrated proper inhaler technique



inhalers, and to assess the technique during each visit to the clinic (12,13). This emphasizes the importance of having inhaler training once the inhaler is prescribed to the patient. This training can be provided either by the pulmonologist or by the respiratory nurse. It was shown that simple verbal description on how to use the inhaler was not sufficient to ensure proper technique in patients with bronchial asthma (14). It is advised that the proper technique should be demonstrated by the healthcare provider in the clinic, and to ask the patients after that to demonstrate their technique (12). A lesser, yet significant factor causing poor inhaler technique was the lack of education about the importance of regular and correct inhaler use on the control of asthma. This emphasizes the importance of the physician-patient relationship, and the importance of explaining the details of the disease to the patient once they are diagnosed in the clinic. Ronmark E et al showed in their study that only 50% of the patients with bronchial asthma showed proper technique when using their inhalers (15). However, the percentage increased to 80% after educating the patients regarding their disease.

An important effect of poor inhaler use in our study was its detrimental effect on the control of bronchial asthma. About 73% had uncontrolled asthma symptoms, compared to only 3% in those who used their inhalers properly. This result is consistent with what was found by other studies, which showed a strong relation between poor inhaler technique and the high rates of uncontrolled asthma (16-20).

Further studies should be done to establish the various factors that can be involved in causing poor inhaler technique in patients with bronchial asthma such as age, gender, level of education and the presence of other comorbidities. Analyzing these factors can help us target the cause, which will in turn increase the rates of proper inhaler use.

In conclusion, the rates of bronchial asthma patients demonstrating poor inhaler technique were significant. Failure to educate the patients regarding the proper technique to use their inhalers was the main cause for this observation. In our study, patients demonstrating poor inhaler technique were found to have higher rates of uncontrolled disease compared to those who used their inhalers properly.

References

1. NIH. National Asthma Education and Prevention Program: Expert panel report 3: guidelines for the diagnosis and management of asthma. 2007, Bethesda (MD): National Heart, Lung, and Blood Institute. NIH Publication No. 07-4051.
2. Turner S, Paton J, Higgins B, Douglas G: British guidelines on the management of asthma: what's new for 2011?. *Thorax*. 2011, 66 (12): 1104-5.
3. G. Crompton: A brief history of inhaled asthma therapy over the last fifty years. *Prim Care Respir J*, 15 (2006): 326-331.
4. Cochrane MG, Bala MV, Downs KE, Mauskopf J, Ben-Joseph RH: Inhaled corticosteroids for asthma therapy: patient compliance, devices, and inhalation technique. *Chest*. 2000, 117 (2): 542-50.

5. A.E. Hesselink, B.W.J.H. Penninx, H.A.H. Wijnhoven, et al: Determinants of an incorrect inhalation technique in patients with asthma or COPD. *Scan J Prim Health Care*, 19 (2001):255-260
6. S. Pedersen, L. Frost, T. Arnfred: Errors in inhalation technique and efficiency in inhaler use in asthmatic children. *Allergy*, 41 (1986): 118-124
7. S.A. Diamond, K.R. Chapman: The impact of a nationally coordinated pharmacy-based asthma education intervention. *Can Respir J*, 8 (2001): 261-265
8. Molimard M, Le Gros V: Impact of patient-related factors on asthma control. *J Asthma*. 2008, 45 (2): 109-13.
9. Dolovich MB, Ahrens RC, Hess DR, Anderson P, Dhand R, Rau JL: Device selection and outcomes of aerosol therapy: evidence-based guidelines: American college of chest physicians/American college of asthma, allergy, and immunology. *Chest*. 2005, 127 (1): 335-71.
10. Coelho AC, Souza-Machado A, Leite M, Almeida P, Castro L, Cruz CS: Use of inhaler devices and asthma control in severe asthma patients at a referral center in the city of Salvador, Brazil. *J Bras Pneumol*. 2011, 37 (6): 720-8.
11. Lavorini F, Magnan A, Dubus JC, Voshaar T, Corbetta L, Broeders M: Effect of incorrect use of dry powder inhalers on management of patients with asthma and COPD. *Respir Med*. 2008, 102 (4): 593-604.
12. Global Initiative for Asthma (GINA). Global strategy for asthma management and prevention. Available from: <http://www.ginasthma.org>
13. National Asthma Education and Prevention Program. Expert panel report 3: guidelines for the diagnosis and management of asthma; 2007. Available from: <http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.pdf>.
14. P. Sestini, V. Cappiello, M. Aliani, et al.: Prescription bias and factors associated with improper use of inhalers. *J Aerosol Med*, 19 (2006):127-136
15. Ronmark E, Jogi R, Lindqvist A, Haugen T, Meren M, Loit HM: Correct use of three powder inhalers: comparison between Diskus, Turbuhaler, and Easyhaler. *J Asthma*. 2005, 42 (3): 173-8.
16. D. Dougherty, N. Sander, M. Schatz et al.: National Asthma Education and Prevention Program Expert Panel Report 3. Guidelines for the Diagnosis and Management of Asthma Summary Report, National institute of health, Bethesda, MD, USA, 2007.
17. H. Tewodros, B. Amsalu, S. Abebe, W. Aschalew, and G. Kibrom: Level of asthma control and risk factors for poor asthma control among clinic patients seen at a referral hospital in Addis Ababa, Ethiopia. *BMC Research Notes* 2017, 10: 558.
18. C. Bahriti, H. Sadhana, M. Rahul, and K. Asha: Evaluation of relationship between inhalation technique and asthma control and quality of life. *Indian Journal of Pharmacology* 2017, 49 (1):110–15.
19. A. Dudvarski Ilic, V. Zugic, B. Zvezdin, I. Kopitovic, I. Cekerovac, and V. Cupurdija: Influence of inhaler technique on asthma and COPD control: multicenter experience. *International Journal of Chronic Obstructive Pulmonary Disease* 2016, 11: 2509–17.
20. V. R. N. Giraud: Misuse of corticosteroid metered-dose inhaler is associated with decreased asthma stability. *European Respiratory Journal* 2002 , 19(2): 246–51.