

ASTHMA CONTROL

Is the Inhaler Technique Associated with Asthma Control?

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To the Editor

Inhalation is the preferred route for administering antiasthmatic treatments. Despite the correct use of inhaler devices being essential for optimal drug delivery, poor inhaler technique is frequent in asthmatic patients. However, a recent literature review found that there is not enough evidence on the relationship between inhaler technique and asthma control (1). Recently Armour et al. (2) concluded that patients with incorrect inhaler technique were more likely to have poor asthma control.

To contribute to a new evidence about the relationship between asthma control and inhaler technique, we performed a subanalysis of the data collected in the AFasma study; the study's primary objective was to evaluate the effectiveness of a pharmaceutical intervention on the control of asthmatic patients. We recruited a cohort of 362 asthmatic patients treated with budesonide/formoterol (Symbicort Turbuhaler®, AstraZeneca, Madrid, Spain) within 51 community pharmacies in the Spanish provinces of Madrid and Málaga. At baseline, asthma control was assessed using a shortened version of the Asthma Control Questionnaire (ACQ-5) (3). Inhaler technique was assessed using a 10-step Turbuhaler checklist according to guidelines included in the *Spanish Guide for Asthma Management* (4) (Table 1) and was considered correct when all the checklist steps were performed correctly. Additionally, we assessed the inhaler technique in two different ways: by considering only those steps compromising treatment efficacy (Table 1: steps 1–8) and by considering those steps described by other authors as critical errors (Table 1: steps 1–6) (5, 6). A multivariate logistic regression analysis was used to assess the association of asthma control with inhaler technique. The dependent variable was asthma control (dichotomized into controlled and partially controlled/not controlled) and the primary independent variable was the inhaler technique (dichotomized into correct and incorrect). Three models were constructed according to the three ways of assessing inhaler technique. Independent variables associated with

asthma control according to recent literature (1, 2, 7) were included in the model (Table 1). All the independent variables were entered into the multivariate model simultaneously.

Despite using different tools than those used by other authors (2, 5, 6) to assess asthma control and inhaler technique, we also found an association between these variables (Table 1: models 1 and 2). However, when more restrictive criteria were used no relationship was observed (Table 1: model 3). This is a relevant finding, since it seems that the association between asthma control and inhaler technique could depend on the steps used to assess the inhaler technique. Besides, there is a wide variability in the literature regarding the criteria used to assess this variable. Hence, our results underline the necessity to establish a consensus on the steps used to define the proper inhaler technique. The creation of validated tools for its assessment for each inhaler device could probably be essential for the study of the association between asthma control and inhaler technique. For example, we believe that the inclusion of step 1 (Unscrew and lift off the cover) in the assessment tool of the Turbuhaler inhaler technique should be discussed. Baschetti et al. (8) and Melani et al. (5) found that no patients performed step 1 incorrectly; so this step does not discriminate between patients with incorrect and correct inhaler techniques.

Moreover, the different complexities of the inhaler devices can affect the probability of performing the inhaler technique correctly. It is therefore possible that the analysis of the association between the inhaler technique and asthma control should be adjusted for the type of inhaler device. The interaction between the type of inhaler device and the inhaler technique should also be examined. Finally, those studies aimed at identifying the association between asthma control and inhaler technique (2, 5, 6) have not adjusted the association for all those variables that can affect asthma control. Accordingly, further specific studies should take into account those variables, allowing the association between inhaler technique and asthma control to be as consistent as possible. Therefore, we believe more evidence is needed to state with certainty that inhaler technique is associated with asthma control.

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TABLE 1.—Multivariate logistic regression analysis to assess the effect of the inhaler technique on asthma control.

Variable	Adjusted OR	95% CI	P-value	Hosmer–Lemeshow test ^a (chi-squared; p-value)
Inhaler technique (model 1 ^b)				
Incorrect	Reference			8.94 (.347)
Correct	1.97	1.12–3.45	.018	
Inhaler technique (model 2 ^c)				
Incorrect	Reference			12.56 (.128)
Correct	2.21	1.33–3.69	.002	
Inhaler technique (model 3 ^d)				
Incorrect	Reference			10.89 (.208)
Correct	1.45	0.89–2.36	.131	

Notes: Logistic models were adjusted for gender (male, female), smoking status (smoker, nonsmoker), living area (urban, rural), body mass index (normal weight, overweight, obese), and adherence to antiasthmatic treatment (adherent, nonadherent). OR, odds ratio; 95% CI, 95% confidence interval.

^aFor determining the goodness of fit of the model (the model was considered acceptable if the test was not statistically significant).

^bModel 1: Inhaler technique was assessed using the 10-step checklist.

^cModel 2: Inhaler technique was assessed using steps 1–8.

^dModel 3: Inhaler technique was assessed using steps 1–6.

Steps to assess the inhaler technique: (1) Unscrew and lift off the cover. (2) Hold the inhaler upright. (3) Twist the red grip fully to the right as far as it will go and twist it back again to the left. A “click” will be heard. (4) Breathe out gently, taking care not to breathe into the Turbuhaler. (5) Place the mouthpiece between the teeth and lips. (6) Inhale forcefully and deeply. (7) Remove the inhaler from the mouth, hold breath for 8 seconds, and exhale away from the mouthpiece. (8) If further doses are needed, wait 30 seconds and repeat steps 2–7. (9) Replace white cap. (10) Rinse mouth with water. Do not swallow.

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DECLARATION OF INTEREST

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

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