International Journal of Advances in Medicine
Bonapelli VR et al. Int J Adv Med. 2019 Dec;6(6):1755-1758
http://www.ijmedicine.com
pISSN 2349-3925 | eISSN 2349-3933
DOI: http://dx.doi.org/10.18203/2349-3933.ijam20195167

Original Research Article

Acute exacerbations of asthma occurring frequently time to check your techniques

Vijaysagar Reddy Bonapelli, Sujay D. J., Prakruthi J., Sathiqali A. S.*

Department of Medicine, Yenepoya Medical College, Mangalore, Karnataka, India

Received: 12 October 2019
Revised: 20 October 2019
Accepted: 24 October 2019

***Correspondence:**
Dr. Sathiqali A. S.,
E-mail: sathiq_ali@hotmail.com

ABSTRACT

Background: Asthmatics form a predominant section of patients in OPD. If poorly controlled the frequency of attacks requiring an emergency department visit adds to the burden. It was noticed that the patients who were on inhalational therapy had poor control despite the absence of other factors which could lead to exacerbations. Hence author evaluated the inhalational techniques.
Methods: A prospective study undertaken in the department of medicine in tertiary care hospital in Dakshina Kannada District, Karnataka enlisting 25 patients admitted with acute exacerbation of bronchial asthma. The patients were assessed for their symptoms, signs and recurrent attacks along with their cough severity index and inhaler scores and the observations were tabulated.
Results: Of the twenty-five, 15 were on inhalation therapy with various modes of deliveries. There were 15 males and 10 females from ages 20 to 50years. The number of attacks of asthma was higher in those not on inhalation therapies than those using inhalation therapies. Also, the level/severity of cough, measured as Cough Severity Index, was assessed among the two groups. Those on inhalation therapy had a lower grade of cough than those not on therapy . Mean AEC was 94 among those on inhalation therapy and 209 among those not on therapy. Inhalational score was calculated for each patient. There is a strong negative correlation of -0.709 between inhalation score and recurrent attacks, which is statistically significant (p=0.003). Lower inhalation scores were associated with recurrent attacks.
Conclusions: Recurrent exacerbations in an asthmatic patient on inhalation therapy are due to improper inhalational technique. It was suggested that it is wise to spend time with the patients in authors OPD set up and teach them the correct techniques of using inhalational therapy hence reducing frequency of attacks and cost of health care in such patients.

Keywords: Asthma, Cough severity index, Inhaler scoring system, Inhalational therapy, Metered-dose inhaler techniques

INTRODUCTION

Asthma is one of the most common chronic diseases all over the world. For the last 30 years, there has been a rise in asthma prevalence; 10-12% in adults, whereas in children it is 15%. It appears to be stabilizing in developed countries. In developing countries, there is a rising incidence, which is associated with urbanization.[1]

Asthma can appear at any age, but usually, a peak is seen in the 3 years age group. Long-term studies that have kept children under follow up up to 40 years of age suggest that many with asthma become asymptomatic during adolescence but asthma returns in some during adult life; particularly in those with persistent symptoms and severe asthma.[2]

Asthma is a heterogeneous disease. It is the hyper-responsiveness of the airway tracts. It is usually triggered by various stimuli, like dust, pollen, and other environmental factors. It is associated with a specific chronic inflammation of the mucosa of lower airways.[3]

It is difficult to differentiate asthma from chronic obstructive pulmonary diseases, as both diseases present with similar symptoms in the elderly. Characteristic symptoms with which a patient presents are dyspnea, wheeze and cough. Pulmonary function tests help in the confirmation of the disease. Simple spirometry confirms airflow limitations with a reduced FEV1, FEV1/FVC ratio, and PEF. Reversibility is demonstrated by a >12% and a 200ml increase in FEV1 15 minutes after an inhaled short-acting β2 agonist.[4]

According to GINA guidelines asthma COPD overlap syndrome (ACOS) is characterized by persistent airflow limitation with several features usually associated with asthma and several features usually associated with COPD. ACOS is therefore identified in clinical practice by features that it shares with both asthma and COPD. Post-bronchodilator increase in FEV1 >12% and 400ml from baseline is compatible with a diagnosis of ACOS.[5]

METHODS

It was a cross-sectional study conducted on patients with asthma attending pulmonary Medicine or General Medicine in a tertiary care hospital, Dakshina Kannada District, Karnataka. The study was conducted for a period of 1 year from May 2017 to April 2018. Patients who were clinically stable and on inhaled corticosteroids were also included in this study.

A total of 25 patients below 50 years of age were studied. All 25 patients affected with asthma were recruited consecutively as outpatients during their regular checkup visits and inpatients in general medicine and pulmonary medicine ward on meeting.

Inclusion criteria

- Age above 18 years of age,
- Previously diagnosed case of bronchial asthma for a period of >1 year in order to capture the exacerbations.

Exclusion criteria

- Those with other respiratory co-morbidities like pneumonia, pleural effusion.
- Moribund patient with life expectancy <3 weeks.
- Those who are unable to blow into spirometry.
- Blind persons and physical disability.
- Pregnant women.

After the ethical clearance, informed participants or their relatives was interviewed for symptoms of dyspnea, cough, wheeze, chest pain, drowsiness, altered sensorium. A detailed clinical examination was done with reference to respiratory rate, the pattern of breathing, chest expansion, anteroposterior & transverse diameter, percussion note and auscultation findings. Patient's functional and cognitive impairment was assessed by Barthel's index and montreal cognitive assessment.

Investigations which were done for each patient included complete blood count, erythrocyte sedimentation rate, chest x-ray, oxygen saturation and pulmonary function tests with spirometry.

Each patient was asked to complete the following two questionnaires', Medical research council dyspnea scale and Cough severity index.

Dyspnea was graded by MRC dyspnea scale.[6]

- Grade I- Not troubled by breathlessness except on strenuous exercise
- Grade II- short of breath when hurrying or walking up a slight hill
- Grade III- Walks slower than contemporaries on the level because of breathlessness, or has to stop for breath when walking at own pace
- Grade IV- Stops for breath after about 100 m or after a few minutes on the level
- Grade V- Too breathless to leave the house or breathless when dressing or undressing

Degree of cough was assessed by the cough severity index questionnaire and was scored as follows:[7]

- 0= Never.
- 1= Almost never
- 2=Sometimes.
- 3= Almost always.
- 4= Always

Table 1: Inhaler scoring system.

Typical errors observed	Inhaler score
A perfect technique	10
Breath hold <5 sec	9
No breath hold	8
Actuate inhaler slightly late in inspiration	7
Actuate late but well before full inspiration	6
Actuate too late/ too early	5
Poor inspiratory effort with late/early actuation	4
Very poor co-ordination of inspiration/actuation	3
Failure to actuate or no inspiration	2
Little idea how to use inhaler	1
No idea what to do with the inhaler	0

The pattern of prescription by various consultants was collected. If inhalers or Rota halers or any other devices were prescribed, details were collected and patients were assessed for the correctness of inhalation techniques, by inhalation score used in a study conducted by S C Allen and S Ragab.[8] The inhaler scoring system has been detailed in (Table 1).

Patient details such as number of exacerbations in the last one year, hospitalizations, admission to ICU were noted.

The data obtained was tabulated with Statistical Package for Social Sciences (SPSS- version 22.0), distribution of normality was evaluated using Shapiro- Wilk test, and it showed that the data was normally distributed. Statistical methods used are:

- Chi square test used to determine the association between use of ICS and number of attacks.
- Student T test used to determine association of mean AEC of participants on ICS and those without.
- Mann Whitney U test is used to compare the severity of cough in study group on ICS and those of without.

Confidence interval is 95%.

RESULTS

In this cross-sectional study, 25 patients with asthma were included within an age group of 20 to 50 years. Of which, 15 were males with mean age of 42.7(±8.89) and 10 were females with a mean age of 39.4(±10.14). Clinical profile of this study showed that almost all patients presented with dyspnea and cough. (Table 2) summarizes the demographic characteristics, symptoms of patients and cough severity index, recurrence of attacks and their inhalational scores.

Severity of cough and dyspnea were assessed by MRC scale and Cough Severity Index Score (CSIS). Of 25 patients, 10 presented with MRC grade-III dyspnea, 9 with grade-II, 4 with grade IV and 2 patients with grade-I. 11 patients with asthma presented with a CSIS of 2, 5 patients each with severity score of 1 and 3, 4 patients with a severity score of 4, 15 were on inhalation therapy with various modes of deliveries. The number of attacks of asthma was higher in those not on inhalation therapy(mode=3) than those using inhalation therapy (mode=1). The chi square test denoted a significant difference in the number of recurrent episodes between the two groups with p = 0.024. Also, the level/severity of cough, those on inhalation therapy had a lower grade of cough (mode= grade-II) than those not on therapy (mode=grade 3). Mann Whitney U test was used to check for the difference in severity of cough of patients across both the groups and was significant (p=0.014).

Mean AEC was 94 among those on inhalation therapy and 209 among those not on therapy. While it is much less in inhalation therapy group than those not on inhalation therapy group, it was not statistically significant(t test = -1.227, 95% CI -308.72±78.79).

Inhalational score was calculated for each patient based on how effectively the inhalational therapy was being taken at home. There is a strong negative correlation of -0.709 between inhalation score and recurrent attacks, which is statistically significant at p=0.003. The lower the inhalation score, more recurrent episodes are seen, thus showing that better inhalation scores are necessary for better control

Table 2: Demographic characteristics, symptoms and scores.

Patient parameters		Value = N (% of total)
Age- Mean		41 years
Gender	Male	15 (60%)
	Female	10 (40%)
Cough Severity Index	0	1 (4%)
	1	6 (24%)
	2	10 (40%)
	3	4 (16%)
	4	4 (16%)
Inhalational therapy	yes	15 (60%)
	no	10 (40%)
Inhalational Score- Mean		8
Recurrent attacks	1	11 (44%)
	2	6 (24%)
	3	6 (24%)
	4	2 (8%)

DISCUSSION

Recurrent exacerbations in an asthmatic patient on inhalation therapy are due to improper inhalational technique. Spending more time with the patient in educating the patient about the proper technique for use of inhaler is equally important as prescribing one.

A study conducted in Ethiopia identified that lack of education about the proper use of inhalational anti-asthmatics medications, poly pharmacy and co-morbidities result in increased non-adherence rate. Hence, promoting optimal medication adherences through education, proper patient consultation essential to optimize the benefits of treatment.[9]

Another study published in 2014, by Lurslurchachai L et al, evaluated 326 patients of whom only 16% received a perfect MDI (Metered-dose inhaler) inhalational score. It underlined the fact that poor MDI technique is common among inner-city patients with asthma and is associated with poor adherence to controller medications. It also noted that older patients with asthma are at higher risk of improper MDI technique.[10]

Researchers have used novel pictograms and other out-reach programs to educate patients about the benefits of proper techniques. Among the intervention group patients were taught with the help of a pictogram the correct methods of inhalational technique, significant differences noted in the intervention group compared to the control group.[11]

In the present study author assessed cough severity score in patients who were on inhalational therapy and otherwise. Author assessed inhalational score for patient who were on different modes of delivery like rotahaler, MDI, nebulization etc. On statistical analysis, there was a strong negative correlation of -0.709 between inhalation score and recurrent attacks (p=0.003). The lower the inhalation score, more recurrent episodes are seen, thus indicating that a higher inhalational score which would translate to proper techniques would result in lesser attacks.

CONCLUSION

Recurrent exacerbations in an asthmatic patient on inhalation therapy are due to improper inhalational technique. It was suggested that it is wise to spend time with the patients in our OPD set up and teach them the correct techniques of using inhalational therapy hence reducing frequency of attacks and cost of health care in such patients. This would not only result in reduced burden on patients but also healthcare facilities.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Papadopoulos NG, Agache I, Bavbek S, Bilo BM, Braido F, Cardona V, et al. Research needs in allergy: an EAACI position paper, in collaboration with EFA. Clini Translational Allergy. 2012 Dec;2(1):21.
2. Roorda RJ. Prognostic factors for the outcome of childhood asthma in adolescence. Thorax. 1996 Jan 1;51(Suppl 1):S7-12.
3. Longobardi L, Di Giorgio A, Perrotta F, Costigliola A, Cerqua F.et al. Bronchial asthma in the elderly patient. J Gerontol Geriatr. 2016;64:55-65.
4. Bateman ED, Reddel HK, van Zyl-Smit RN, Agusti A. The asthma-COPD overlap syndrome: towards a revised taxonomy of chronic airways diseases? Lancet Respirat Med. 2015 Sep 1;3(9):719-28.
5. Bousquet J, Mantzouranis E, Cruz AA, Aït-Khaled N, Baena-Cagnani CE, Bleecker ER, et al. Uniform definition of asthma severity, control, and exacerbations: document presented for the World Health Organization Consultation on Severe Asthma. J Allergy Clini Immunol. 2010 Nov 1;126(5):926-38.
6. Manali ED, Stathopoulos GT, Kollintza A, Kalomenidis I, Emili JM, Sotiropoulou C, et al. The Medical Research Council chronic dyspnea score predicts the survival of patients with idiopathic pulmonary fibrosis. Respiratory Med. 2008 Apr 1;102(4):586-92.
7. Shembel AC, Rosen CA, Zullo TG, Gartner-Schmidt JL. Development and validation of the cough severity index: a severity index for chronic cough related to the upper airway. Laryngoscope. 2013 Aug;123(8):1931-6.
8. Allen SC, Ragab S. Ability to learn inhaler technique in relation to cognitive scores and tests of praxis in old age. Postgrad Medica J. 2002 Jan 1;78(915):37-9.
9. Ayele AA, Tegegn HG. Nonadherence to inhalational medications and associated factors among patients with asthma in a referral hospital in Ethiopia, using validated tool TAI. Asthma Res Prac. 2017 Dec;3(1):7.
10. Lurslurchachai L, Krauskopf K, Roy A, Halm EA, Leventhal H, Wisnivesky JP. Metered dose inhaler technique among inner-city asthmatics and its association with asthma medication adherence. Clini Respira J. 2014 Oct;8(4):397-403.
11. Almomani BA, Mokhemer E, Al-Sawalha NA, Momany SM. A novel approach of using educational pharmaceutical pictogram for improving inhaler techniques in patients with asthma. Respira Med. 2018 Oct 1;143:103-8.

Cite this article as: Bonapelli VR, Sujay D J, Prakruthi J, Sathiqali A S. Acute exacerbation of asthma occurring frequently- time to check your techniques. Int J Adv Med 2019;6:1755-8.