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Survey of Outcome of Asthmatic Children Referred to Outpatient Clinic of Tabriz University of Medical Sciences

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Abstract: This study was designed to follow patients regarding to achieving control, identify disease exacerbations and discover relation between exacerbation and risk factors. In a cross sectional-analytic study, 400 asthmatic patients in the range of 2-14 years old who were visited at the specialized outpatient clinic of Tabriz University of Medical Sciences were divided and studied on the base of disease severity. At the end (at least one year treatment), patients were categorized based on level of disease control and one year after this stage, cases of exacerbation were identified and studied. By excluding patients with poor adherence, 342 patients continued treatment as intermittent, mild persistent, moderate persistent and severe persistent asthma (38, 235, 61 and 8 patients, respectively). After a period of one year treatment, the patients were divided as well controlled, partly controlled and uncontrolled (68, 30 and 2%, respectively). Cases of disease exacerbations were more if sinusitis, familial asthma history and poor adherence were present ($p < 0.01$, $p < 0.001$ and $p < 0.05$, respectively). There is meaningful association between poor adherence, sinusitis and positive family history of asthma with disease exacerbation.

Key words: Asthma, disease exacerbation, poor adherence

INTRODUCTION

Childhood asthma is an epidemic with major public health and financial consequences. The number of Asthma cases in children fewer than 5 years old in the United States increased >160 and 74% among children ages 5 through 14 years (Lara *et al.*, 2002). Previous researches have documented the substantial morbidity of pediatric asthma, particularly related to acute exacerbations of the disease, with an estimated annual 1.6 million Emergency Department (ED) visits and over 200, 000 hospitalizations among children with asthma. In addition, data from the National Health Interview Survey showed that children with asthma experienced 10.1 million days of school missed annually, substantial limitations in activity and increased risk of poor school functioning (Stevens and Gorelick, 2001).

One of the important problem with the asthma is underestimation of disease by patient or her/his parents. Various studies show that sever persistent asthma, poor compliance, lack of primary care controls, frequent hospitalization and emergency department visits, inadequate follow up, lack of information about severity of disease and under use of corticosteroids could lead to death (Bartter and Pratter, 1996).

In the past, severity of asthma was determined based on symptoms, status of airway interactivity and lung function tests. Nevertheless, it should keep in mind that severity of asthma, background disease and its response to therapy are changeable over months or years. Asthma is a controllable problem and on this way, the close corporation of children, parents and health care team is required. The aim of treatment in asthma is achievement to the disease control and maintaining it. This is achievable with patient adherence to the following cycle: evaluation of disease severity, treatment to reach for disease control, follow up and maintaining the disease at controlled state. Consistent clinical follow up is necessary for optimal control and administrating drugs in minimum effective dose for reducing the costs. Follow up visits should carry out one to three months after baseline visit and then every three months and in the case of disease attack during two weeks to one month.

This study was conducted based on outcome criteria of National Center for Health (out comes) with the aim of disease status follow up after treatment for one year, determining the rate of disease attacks, association of exacerbation of disease with non compliance, co-morbidities and familial history.

Table 1: Asthma classification based on disease severity

	Intermittent	Mild stable	Moderate stable	Sever stable
Daily symptoms	Less than one episode in a week	More than one episode in a week but less than one episode in a day	Every day	Continuous
Nightly symptoms	Equal or less than one episode in month	More than two episodes in a month	More than one episode in a week	Frequently

Asthma control levels: Controlled: without exacerbations, Partially controlled: one or more in a year, Uncontrolled: one time in a week

MATERIALS AND METHODS

In a cross-sectional analytical study, 400 asthmatic patients in different stages of diseases, within age groups of 2-14 years, admitted to outpatient clinic of Tabriz University of Medical Sciences during 3 years from 2004 to 2007, were evaluated.

The diagnosis of asthma was physician diagnosed by observation and clinical findings and based on GINA criteria. The patients and their parents were educated on application of drugs, spacer and affecting subjects and according to a regular program visited every month which in, consuming of reliever and inhaler drugs was recorded and if needed the patients underwent education program again. In the case of the patients without regular refer to clinic, follow up was carried out with telephone calls. If the patient didn't show exacerbation during one year, assumed as controlled and the drug administrated in minimum required dosage. Initially, classification of patients was performed in conventional methods and after follow up period, they grouped based on GINA, 2006 guideline (Table 1).

During one year follow up, patients were re evaluated for exacerbation, emergency department visit and admission at PICU or ward.

In this study, noncompliance was assumed less than 50% of drug use. Also, sinusitis was expressed as existence of opacity in paranasal sinuses radiographs in symptomatic patients. The gathered data was analyzed with Chi-square using SPSS version 15 and p-value less than 0.05 assumed statistically significant.

There was any intervention in the study, therefore particular ethical consideration was not intended; nevertheless the patient's information was kept secured.

RESULTS AND DISCUSSION

The number of patients in primary grouping was shown at Fig. 1. Total 58 patients (14.5%) showed poor adherence to treatment and were excluded from study. Remaining 342 patients continued the therapy as 38, 235,

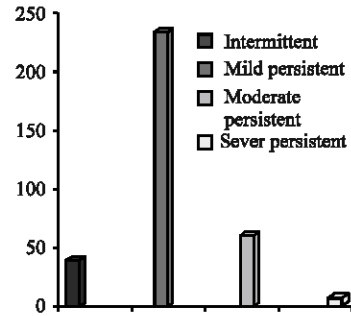


Fig. 1: Classification of patients based on severity

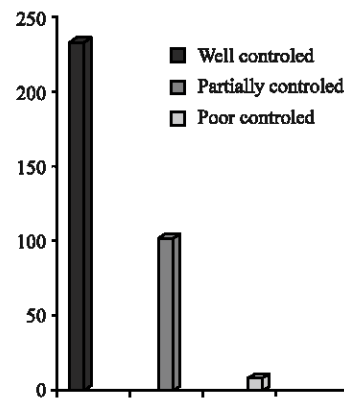


Fig. 2: Classification of patients based on level of control

61 and 8 patients in intermittent, mild, moderate and sever persistent groups, respectively. After at least one year treatment, 233 (68%), 102 (30%) and 7 (2%) of patients were categorized as controlled, partially controlled and poor controlled, respectively (Fig. 2). In the one year follow up 60 (15%) patients experienced disease attacks and therefore 21 patients were hospitalized, 30 patients were treated at home and 9 patients were visited at emergency department. Among the patients with exacerbation, 15 were of poor adherence, 13 partially controlled, 7 non controlled and 25 in controlled group. There was a statistically significant relationship between poor adherence and asthma attacks ($p < 0.05$).

Fifteen of one hundred and seventy three patients with sinusitis showed asthmatic attacks which was statistically significant ($p < 0.01$). In this study, 13 of 25 patients with familial history of asthma, experienced asthmatic attacks which was statistically significant ($p < 0.01$). Total 6 of 61 patients with familial history of allergy and 5 of 50 patients with personal history of allergy showed asthmatic attacks which were statistically non-significant.

This study was conducted to evaluate the outcome of asthmatic children in respect to recent attacks and its

relationship with factors such as poor compliance, co-morbidities, familial history of asthma and allergy and personal history of allergy.

Based on this study, the new cases of asthmatic attacks in the poor adhered patients and patients with co-morbidities such as sinusitis and familial history of asthma were high.

But there was not statistically significant relationship between familial or personal allergy and rate of disease attacks.

Recent clinical studies suggest different methods for outcome evaluation. Cessation, exacerbation and frequency of symptoms and evaluation of life quality of children by nurses are some of these methods (Skoner *et al.*, 2002). One of the objects for healthy people 2010 is 50% decrease in rate of emergency department visits for fewer than 5 years old asthmatic children (Teach *et al.*, 2006). It seems that an attempt for increasing the adherence for patients to therapeutic regimen and control of predisposing factors may be helpful in achieving this object.

Raymond *et al.* (1998) that poor adherence to drug regimen is correlated well to increased rate of hospitalization due to asthmatic attacks. An other study revealed that the likelihood of attack experiences and activity limitations in the good adhered patients is decreased (McQuaid *et al.*, 2003). These results were in accordance with our results.

In Stevens and Gorelick (2001) study the outcome of asthmatic patients and the rate of relapses and hospitalization were shown 13 and 3%, respectively. The rate of relapses in our study was 15%. Also, there was a positive relationship between need to repeated emergency department visits and severity or poor disease control. Poor outcome had a relationship with inappropriate disease control. Based on definition of poor outcome by Stevens and Gorelick (2004), 180 of 367 patients (49%) were poor outcome. Also based on another definition which is more conservative, 85 of 367 patients (23%) had poor outcome. In this study, 32% of patients did not show good outcome which was in the above range, totally.

Bateman *et al.* (2004) showed that patients with appropriate control experience less exacerbations of disease.

Based on a questionnaire, Vollmer *et al.* (2002) classified asthma control status into five groups of no problem (48%), one problem (23.6%), two problems (15.4%), three problems (9.9%) and four problems (2.6%). The rate of relapse was greater in patients with more problems which were in accordance with our study in the case of relationship between level of disease control and adherence to treatment.

Atopy which is defined as positive dermatological response to inhalational allergens was shown in majority of asthmatic patients especially children. Nevertheless, there was not clear relationship between atopy and asthma outcome (Ulrik, 1999).

Roorda *et al.* (1992) reported that existence of allergy is not of value in prognosis of asthma from childhood to adolescence. In this study, there was no relationship between personal or familial history of allergy and occurrence of new asthmatic attacks in future. In the explanation of this case, some reasons may pointed out: the locus of genes related to allergy is not exactly cleared out. Also, at definition of atopy as positive skin test and or clinically determination based on medical notes, there was a difference. Also positive personal or familial history of allergy accompany with other co-morbidities which make the final evaluation difficult.

Van Schayck *et al.* (1991) in two year follow up study did not show any direct effect for atopy. Based on Sears *et al.* (2003) study familial history of wheezing had no value in the prediction of asthmatic attacks. In our study, there was a positive association between history of asthma in first degree family and asthma attacks in children.

In respect to co-morbidities, sinusitis and asthma are shown in great majority of cases with each other. Nevertheless, it is not yet clear cut whether there is a causal association between them or simply is different clinical manifestation of same underlying pathological process (de Benedictis and Bush, 1999). One study showed that there was a positive relationship between a sever form of sinusitis called chronic hyperplasic sinusitis with asthma (Steinke *et al.*, 2006). An other study reported that patients with sinusitis experience more sever form of asthma (Dixon *et al.*, 2006).

Lai *et al.* (2006) pointed out that aggressive treatment of sinusitis may improve life quality and rate of symptoms in asthmatic patients.

Tsao *et al.* (2003) emphasized that every asthmatic patient should be evaluated about co-existence of sinusitis. The results of our study were in accordance of above reports.

CONCLUSION

Following up asthmatic patients in respect to evaluation of response to treatment and relapse has an important role in disease improvement. Poor adherence to treatment and existence of co-morbidities such as sinusitis and positive history of asthma in first degree family may have significant effect on asthmatic attack in future.

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