

Compare the Effectiveness of Systematic Steroids Verses Nebulizer in Pediatric Patients of Acute Exacerbation of Asthma

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ABSTRACT

Aim: To compare efficacy of the nebulizer with systematic steroids in acute exacerbation of asthma patients.

Study design: Prospective study

Place and duration of study: Department of Pediatric Medicine, Sandeman Provincial Hospital, Quetta from 1st February 2022 to 31st July 2022.

Methodology: One hundred patients with acute exacerbation of asthma and age of 1-10 years were included. Patients were divided into two groups where Group A was given flunisolide nebulization and comprised of 50 cases. The group B was given systematic steroid budesonide. The post outcomes of treatment were noted after two weeks.

Results: The mean age in group A and B as 5.8±7.45 and 5.6±7.25 years respectively. More boys were presented with acute exacerbation of asthma with a percentage of 66% and 68% in group A and B than girls as 34% and 32% respectively. The duration of asthma in Group A was found to be mean 3.5±6.60 years while in group B it was 4.2±4.20 years post treatment. Hospitalization was also observed at a significant higher rate in group B than Group A.

Conclusion: The nebulizer has a better efficacy than systematic steroids in acute exacerbation of asthma.

Keywords: Acute exacerbation, Asthma, Pediatrics, Efficacy

INTRODUCTION

Worldwide data reports that bronchial asthma is widely reported in children with a long term illness history. The inflammation which is causes in the air ways of children may result into persistent structural alterations in cases where timely treatment is not delivered.¹⁻³ In toddlers the diagnosis of asthma is very difficult and challenging. In many cases it is left undiagnosed and untreated specifically in toddlers near four years of age which further creates complications and lifetime morbidity⁴.

In the recent years a dramatic increase in the cases of asthma have been reported which have led to long term hospitalization in children. Long term treatment for the asthma has mostly been desired through usage of inhaled corticosteroids (ICS) for the purpose of reducing inflammation and symptoms⁵. In cases with bronchial asthma at least one exacerbation is recorded requiring hospitalization. Children with acute exacerbation of asthma have a significant decrease in the quality of life scoring. The drop is obvious from 6.2 to 4.2. In many cases the systematic steroid application has also shown better results in terms of efficacy of the treatment^{6,7}.

The systematic steroid was used within an hour of exacerbation the overall reduction in asthma related hospitalization was seen in 60% cases^{8,9}. In cases where oral prednisolone was not given within early hours of asthma of exacerbation a greater risk of hospitalization was present^{10,11}.

The present study was conducted to compare the nebulizer with systematic steroid application in acute asthma of exacerbation cases. This study provided evident data which could assist in better choice of treatment procedure for the cases with acute asthma of exacerbation.

MATERIALS AND METHODS

This prospective study conducted after IRB permission in the Department of Pediatric Medicine, Sandeman Provincial Hospital, Quetta from 1st February 2022 to 31st July 2022 and 100 patients were enrolled. The patients comprised of children suffering from acute exacerbation of asthma. The children age was between 1-10 years. The sample size generation was done through available software program (WHO based) on web. It used 80% power of test

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and 95% CI. As all patients were minors therefore the informed consent for their study participation was taken from their parents or guardians. The clinical details of their symptoms as asthma severity as well as its existence, sleep disturbances, wheezing, auxiliary muscle usage, suprasternal-retraction were noted as single scoring method. Only cases with mild symptoms were involved in the study. Mils stage Exacerbation was scored as 4-8 with a reduction in oscillometer resistances >35% after inhaling 200ug salbutamol. Children who had been on ICS /3 months history or cromons, antihistamine or antileukotrienes, theophylline or on systematic corticosteroid in the month before participation in the study were excluded from the study. All the patients were divided into two groups where group A received nebulized steroid while Group B received systematic steroid. Each group had 50 cases in it. The group A received 20 µg/dl flunisolide in BD/seven days followed by alternate day/seven days. In group B systematic budesonide as 0.5mg in BD/seven days was administered followed by 0.25 mg/seven days in BD. An air jet nebulizer was used and parents were guided its biosafety usage. Both groups' outcomes were observed post two weeks of treatment through oscillometric resistances. The data was entered and analyzed through SPSS-25.0. The Chi square test and 't' test were applied and p value <0.05 taken as significant.

RESULTS

The mean age in group A and B as 5.8±7.45 and 5.6±7.25 years respectively. There were more cases in 1-5 years than in 6-10 years of age. More boys were presented with acute exacerbation of asthma with a percentage of 66% and 68% in group A and B than girls as 34% and 32% respectively (Table 1).

Only cases of mild exacerbation of asthma were included in the study which was found to have a PEFr% as ≥70 with sentence making power in speech and a nervous mental status. There was no use of accessory muscles in them while they had a good saturation of oxygen in them (Table 2).

The duration of asthma in Group A was found to be mean 3.5±6.60 while in group B it was 4.2±4.20 post treatment. Hospitalization was also observed at a significant higher rate in group B than Group A. Moreover, there were higher numbers of satisfactory cases reported in Group A than Group B (Table 3).

The oscillometric resistance showed that there was a significant decrease in group B values of CMH20/LLS especially at

the first day and post two weeks in comparison with the group A (Fig. 1).

Table 1: Demographic details of groups A and B cases

Variables	Group A (n=50)	Group B (n=50)	P value
Age (years)	5.8±7.45	5.6±7.25	0.77
1-5	27 (54%)	26 (52%)	0.74
6-10	23 (46%)	24 (48%)	0.85
Gender			
Boys	33 (66%)	34 (68%)	0.71
Girls	17 (34%)	16 (32%)	0.55

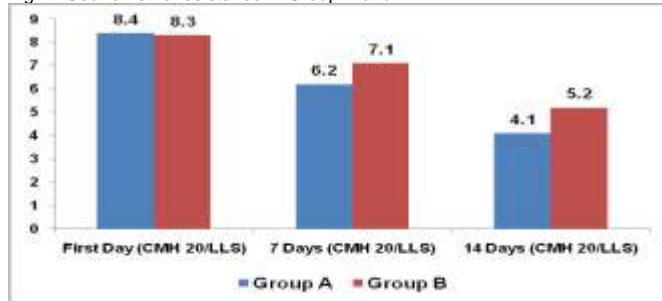
Table 2: Clinical characteristics of mild cases of acute exacerbation of asthma

Severity	Mild
Peak expiratory flow rate %	≥70
Speech	Sentences
Mental Status	Nervous
Accessory Muscle use	No
O2 Saturation	≥95

Table 3: Comparison of duration of Asthma and hospitalization in group A and B

Variables	Group A (n=50)	Group B (n=50)	P value
Asthma duration	3.5±6.60	4.2±4.20	0.045
History of allergy	31 (62%)	29 (58%)	0.51
Hospitalization (days)	1.6±3.15	2.9±9.32	0.041
Satisfaction agreed	45 (90%)	40 (80%)	0.045

Fig. 1: Oscillometric resistance in Group A and B



DISCUSSION

Acute exacerbation of asthma is a common pediatric presentation which required immediate caring and concern. The administration of an efficient and quality of treatment is the first goal of a pediatrician. There is an extensive amount of literature available in context to the administration of systematic steroid for the treatment of the acute exacerbation of asthma. Studies have reported that the usage of budesonide is well reported and is efficient in cases of acute exacerbation of asthma. On the contrary there is also literature available which defends that nebulizer based steroid administration also provides promising results in asthma¹¹⁻¹⁴.

In the present study there were more boys than girls suffering from acute exacerbation of asthma. The center of disease control and prevention has reported that 11.9% boys have an incidence of developing asthma in comparison to 7.5% girls¹⁵. Kynyk et al¹⁶ also reported that boys have a twice risk of developing asthma than girls. Similar results have also been reported in the present study¹⁶⁻¹⁸.

The current research have also found out that the nebulizer steroid application has better outcomes than systematic budesonide in terms of duration of hospitalization as well as reducing the asthma duration. The patients receiving nebulizer based steroid also had a better score of patient satisfaction level than the budesonide cases. There has been similar findings reported in studies elsewhere^{19,20}.

Multiple studies have reported that ICS improvement in terms of clinical scoring and pulmonary functions specially FEV115 reduces the application of bronchodilators as well as reduces the duration of hospitalization²¹⁻²⁴.

CONCLUSION

The nebulizer has a better efficacy than systematic steroids in acute exacerbation of asthma.

Conflict of interest: Nil

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