Comparison of the Frequency of Relapse After Treatement of Acute Exacerbation of Asthma with Oral Dexamethsone Versus Oral Prednisolone in Children

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Abstract

Objective: To compare the frequency of relapse after treatment of acute exacerbation of asthma with oral dexamethasone versus oral prednisolone in children aged 2-12 years.

Methods: Total 400 patients as per the inclusion criteria were enrolled. The cases were divided into 2 clusters with equal number of participants. 200 participants were in oral dexamethasone group and 200 in oral prednisolone group. After standard treatment of acute asthmatic exacerbation (nebulization with salbutamol) in emergency department, group 1 was given 0.6mg/kg of tablet dexamethasone in emergency continued for next 2 days and placebo agent for next 3 days, group II was given tablet prednisolone (2mg/kg) in emergency and 1mg/kg/day dose for next 5 days.

Results: Children 2 to 12 years of age were included in both groups, with mean age of 5.55±2.33 years in dexamethasone group while 7.57±2.37 years in prednisolone group. Duration of improvement of symptoms was 2.00±0.21 days in dexamethasone group while 2.00±0.48 days in prednisolone group. Relapse was seen in 18% in dexamethasone group as compare to 15% in prednisolone Group, difference in relapse rate was not significant in both groups(p=0.419).

Conclusion: Two days course of oral dexamethasone has almost similar frequency of relapse as with oral prednisolone in management of acute asthmatic exacerbations management in patients discharged from the emergency department.

Keywords: Asthma, Dexamethasone, Prednisone, Relapse

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Introduction

Asthma is defined as reversible chronic inflammatory condition of lung airways resulting in airflow obstruction is known as Asthma. It is associated with hyper- responsiveness of airways and is the most prevalent chronic airway disease. Patients present most commonly with complaints of wheeze (expiratory) and intermittent dry cough most commonly. Older children report with shortness of breath (with inability to speak long sentences), chest pain and chest tightness. Asthma is one of the common reasons for emergency visits and hospitalization. The impact of asthma on quality of life of patients, as well as cost of management, is very high.[1,2] Therefore, early resolution of symptoms can have positive impact of quality of life and management cost.[3,4]

Systemic corticosteroids are important to reduce the severity of symptoms, duration of bronchodilator use and relapse rate.[3–5,5,6] There is always debate on short term use of systemic steroids especially prednisolone, it is widely used, is cost effective but it has issues of compliance and palatability. Whereas, shorter treatment duration of dexamethasone with longer half-life (72 hours), offers benefits of greater compliance over prednisolone.[7]

Studies report variable relapse rate of both dexamethasone and prednisolone. Objective of our study is to see if there is significant difference in relapse rate between dexamethasone and prednisolone after acute

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exacerbation of asthma in local settings.

Methods

This RCT was conducted in department of Pediatric Medicine from 15th April 2016 to 15th October 2016. Total 400 participants with acute exacerbation 2-12 years of age were included in current study. The population under study was randomly distributed in 2 groups. This distribution was made by random numbers table. Two hundred participants were included in oral dexamethasone group and 200 in oral prednisolone group. After standard treatment of acute exacerbation of asthma (nebulization with salbutamol) in emergency department group 1 was given 0.6mg/kg of tablet dexamethasone and for next 2 days and placebo agent for next 3 days, group II was given tablet prednisolone 2mg/kg in emergency and 1mg/kg/day for next 5 days. Severity of asthma was assessed by Pediatric Respiratory Assessment Measure (PRAM) score. After 2 weeks both groups were assessed in terms of relapse in asthma. Data was analyzed by SPSS-20. Follow up done in OPD or by phone.

Results

The mean age was 5.55±2.33 years in dexamethasone group while 7.57±2.37 years in prednisolone group. The mean duration of improvement of symptoms was 2.00±0.21 days in dexamethasone group and 2.00±0.48 days in prednisolone group (Table 1). Frequency and percentage of gender in both groups are shown in Table 2.

Relapse was seen in 18% cases in Dexamethasone Group as compare to 15% in Prednisolone Group (P=0.419) (Table 3).

Table 1: *Mean±SD of patients according to Age and Duration of Improvement of Symptoms in Both Groups*

Variable	Dexamethasone group (n=200)	Prednisolone group (n=200)
Age (years)	5.55±2.33	7.57±2.37
Duration of improvement of symptoms (days)	2.00±0.21	2.00±0.48

Table 2: *Frequency and Percentage of Genders in Both*

Gender	Dexamethasone group (n=200)	Prednisolone group (n=200)
Male	103 (51.5%)	99 (49.5%)
Female	97 (48.5%)	101 (50.5%)

Table 3: *Comparison of Relapse in both Groups (n=400)*

Group	Relapse		P value
	Yes	No	
Dexamethasone	36 (18%)	164 (82%)	0.419
Prednisolone	30 (15%)	170 (85%)	
Total	66 (16.5%)	334 (83.5%)	

Discussion

Asthma is one of the common reasons for emergency visits and hospitalization. Asthma has significant impact on quality of life in addition to posing an economic burden. Therefore, appropriate asthma management is warranted to minimize asthma related issues.[1,2,4,6]

Systemic corticosteroids (intramuscular/oral) help in reducing the severity of symptoms, duration of bronchodilator use, relapse rate and duration of hospital stay.[3–5,5,6,8] Some studies suggest shorter and lower dose of systemic steroids is less effective in managing exacerbation of asthma.[5]

There is always a debate on using short term systemic steroids especially prednisolone/prednisone vs dexamethasone. Prednisolone is widely used, is cost effective but associated with poor compliance and palatability. Dexamethasone has shorter treatment duration due to longer half-life (72 hours), and therefore better compliance and palatability.9 In this study, we compared relapse rate between prednisolone and dexamethasone.

Our results indicate that relapse rate was 18% in dexamethasone group as compare to 15% in prednisolone group (p=0.419). Dexamethasone exhibited 82% efficacy versus 85% with prednisolone in preventing relapses. This difference is statistically insignificant. In contrast to one retrospective study reported lower relapse rate with dexamethasone in comparison with prednisolone in asthma. In this study, there were 8769 patients, out of which 7130 received 5 days of prednisolone and 1639 received single dose dexamethasone. Disparity in sample size of both groups have impacted results.[10] Another study showed shorter length of hospital stay in patients receiving dexamethasone in comparison with prednisolone, which was not seen in our study.[11] Another study, used of single dose of dexamethasone vs 3 days of prednisolone in acute exacerbation of asthma in 226 patients. Day 4 PRAM score was same in both groups. Whereas, relapse rate in 2 weeks was higher in dexamethasone group 13.1% as compared to prednisolone group 4.2%.We failed to

observe significant difference in relapse rate between our groups.[12]

There are some studies showing comparable relapse rate in acute exacerbation of asthma, when single dose of dexamethasone is given as compared to 4 to 5 days prednisolone.[12,13] Likewise, there are many studies in which two doses of dexamethasone were compared with 5 to 7 days prednisolone with similar results, as were seen in our study.[4,6,7,14,15]

One RCT, compared 3 groups, 1st received treatment with single, low dose (0.3mg/kg) of dexamethasone, 2nd with two and higher doses (0.6mg/kg) of dexamethasone, 3rd received prednisolone 1.5mg/kg for 5 days. Relapse rate was found to be similar in all groups.[16] Likewise, a meta-analysis and systemic review showing comparable results in both groups as are seen in our study. But there is paucity of large clinical trials.[9] One study suggests dexamethasone has significant cost in comparison with prednisolone, while our study was not focusing cost of treatment.[17]

Limitations are single center study with small sample size. Further multicenter large clinical trails are required to suggest dose, duration of dexamethasone in comparison with prednisolone keeping in view compliance palatability and cost.

Dexamethasone has longer duration of action up to 72 hours, comparatively long half-life. It is palatable with less risk of nausea and vomiting as compared to prednisolone as shown by many studies.[3,7,9,15,18,19] This may offer an advantage in using it over prednisolone.

We found that prednisolone and dexamethasone both were effective without any significant difference in side effects. As a consequence, dexamethasone may be used as substitute to prednisolone because of shorter treatment regimens.

Conclusion

A 2-days course of oral dexamethasone has same frequency of relapse as 5-day oral prednisone in acute exacerbation of asthma.

Conflict of Interest: None

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Authors Contribution

Z.F: Data CoIIection,

O.A: Data Analysis

A.I: Conception, Interpretation fo Data.

S.A.M: