

## ORIGINAL ARTICLE

# Comparison of Outcome between Dexamethasone Versus Prednisolone Administration in Acute Moderate Asthma

NUSRAT HUSSAIN<sup>1</sup>, SULEMAN<sup>2</sup>, ASIF JAVED<sup>3</sup>, MUHAMMAD YOUSAF<sup>4</sup>, NASIR<sup>5</sup>, RABIA SALEEM SAFDAR<sup>6</sup>

<sup>1,2</sup>Assistant Professor, NMU, Multan

<sup>3</sup>Associate Professor, MMDC, Multan

<sup>4</sup>Senior Registrar, NMU, Multan

<sup>5</sup>PGR, Nishtar Hospital, Multan

<sup>6</sup>Senior Registrar, Nishtar Hospital, Multan

Correspondence to Dr. Nusrat Hussain, Assistant Professor, NMU, Multan

## ABSTRACT

**Aim:** To compare the outcome of dexamethasone versus prednisolone administration in acute moderate asthma.

**Methods:** This randomized control trial was carried out in the Department of Pediatrics Nishtar Medical University Multan. The duration of the study was 12 months. 60 (30 in each group) patients were enrolled. Informed consent and demographic detail was taken. Then patients were randomly divided in two groups. In group A, patients were given 5-days course of 1.5 mg/kg/day (max 60 mg) oral prednisolone. In group B, patients were given 2 doses of iv dexamethasone (0.6 mg/kg/dose) 24 hours apart. During hospital stay, children were evaluated for cough, wheezing and vomiting. When symptoms were resolved, then children were discharged and total hospital stay was noted.

**Results:** In this study, in oral prednisolone group, the mean hospital stay of the patients was 28.9±7.99 hours and in IV dexamethasone group the mean hospital stay was 24.2±6.08 hours (p-value=0.013). In oral prednisolone group, the readmission within 7 days was found in 10(33.3%) patients and in IV dexamethasone group the readmission within 7 days was 3(10%) patients (p-value=0.028). In oral prednisolone group, the vomiting was noted in 6(20%) patients and in IV dexamethasone group the vomiting was noted in 3(10%) patients (p-value=0.472). In oral prednisolone group, the cough was noted in 16 (53.3%) patients and in IV dexamethasone group the cough was noted in 8(26.7%) patients (p value=0.035). In the oral prednisolone group the wheezing was noted in 15 (50%) patients and in IV dexamethasone group wheezing was noted in 7(23.3%) patients.

**Conclusion:** IV dexamethasone showed statistically significant better outcome in terms of wheezing, cough, shorter hospital stay and readmission within 7 days as compared to oral prednisolone administration in acute moderate asthma.

**Key words:** Acute asthma, Dexamethasone, Prednisolone

## INTRODUCTION

In emergency, acute asthma is recurrent reason while the larger part of cases can be discharged<sup>1</sup>. These cases are well-known when children experience unique symptoms of acute asthma<sup>2</sup>. Systemic steroids are a key part in the curing of moderate to severe acute asthma. Immune regulatory and analgesic effects of dexamethasone are clinically well documented, and this synthetic corticosteroid acts as an agonist of glucocorticoid receptors<sup>3</sup>.

Dexamethasone may be measured an alternative to prednisone for children admitted with asthma attack without admission to critical care<sup>4</sup>. When used for acute asthmatic attack, the repetition rates of dexamethasone and prednisone were revealed to be equal. However, no solid conclusion could be created at this time. However, compared to prednisone, dexamethasone is connected with a reduced occurrence of vomiting. More uniform studies are mandatory to maintain this claim<sup>5</sup>.

## METHODS

This study was done at Pediatrics ward, Nishtar Medical University, Multan with duration of 12 months after IRB permission and comprised of 60 cases. Sampling technique used was Non Probability, consecutive

### Inclusion Criteria:

- Children with 5-14 years of age
- Both genders
- Diagnosed with acute moderate asthma

**Exclusion Criteria:** Children who are already taking trial drugs, Children with co-morbid conditions like diabetes (BSR>200mg/dl), CRF i.e. creatinine >1.8 mg/dl, liver failure.

**Data Collection Procedure:** Children who met the criteria were included after ethical committee approval. Parents gave their permission for the procedure to proceed. The patient's

Received on 11-10-2022

Accepted on 27-03-2023

demographics were taken into consideration. In group A, patients were given 5-days course of 1.5 mg/kg/day (max 60 mg) oral prednisolone. Dexamethasone (0.6 mg/kg/dose) was administered intravenously to individuals in group B twice, separated by 24 hours. Children were admitted in wards and were followed-up there till discharge. During hospital stay, children were evaluated for cough, wheezing, and vomiting. The youngster was released from the hospital after symptoms had subsided, and the length of stay was recorded. For the next seven days, the youngsters were monitored in OPD. If a child presented with recurrent episode of asthma attack within 7 days, then it was noted: SPSS version 21 was used.

## RESULTS

The detail of results is given in tables.

Table1: Gender distribution

Gender	Groups		Total	p-value
	A	B		
Male	18(60%)	19(63.3%)	37(61.7%)	0.791
Female	12(40%)	11(36.7%)	23(38.3%)	
Total cases	30(100%)	30(100%)	60(100%)	

Group A= Oral Prednisolone

Group B=IV Dexamethasone

Table2: Wheezing between two groups

Wheezing	Groups		Total	p-value
	A	B		
Yes	15(50%)	7(23.3%)	22(36.7%)	0.032
No	15(50%)	23(76.7%)	38(63.3%)	
Total cases	30(100%)	30(100%)	60(100%)	

Table 3: Cough between two groups

Cough	Groups		Total	p-value
	A	B		
Yes	16(53.3%)	8(26.7%)	24(40%)	0.035
No	14(46.7%)	22(73.3%)	36(60%)	
Total cases	30(100%)	30(100%)	60(100%)	

Table 4: Vomiting between two groups

Vomiting	Groups		Total	p-value
	A	B		
Yes	6	3	9	0.472
	20%	10%	15%	
No	24	27	51	
	80%	90%	85%	
Total cases	30	30	60	
	100%	100%	100%	

Table 5: Comparison of hospital stay (hrs)

Hospital stay (Hrs)	Groups		P value
	A	B	
N=	30	30	0.013
Mean	28.9	24.2	
SD	7.99	6.08	

Table 6: Re admission within 7 days

Readmission within 7 days	Groups		Total	p-value
	A	B		
Yes	10	3	13	0.028
	33.3%	10%	21.7%	
No	20	27	47	
	66.7%	90%	78.3%	
Total cases	30	30	60	
	100%	100%	100%	

**DISCUSSION**

Mean hospital stay in groups A and B was 28.9±7.9 and 24.2±6.1 hours, respectively (p<0.01). A 7-day readmission was seen in 10 cases (33.3%) in A group and 03 patients i.e.10% in B group (p=0.03). Six cases of group A and three cases of group B reported having vomiting (p=0.47). Cough was reported in 16 (53.3%) cases of B group (p=0.035). There were 15 individuals in the oral prednisolone i.e. A group and seven cases of IV dexamethasone (B group) who developed wheezing symptoms (p=0.03).

A short course of dexamethasone is already being used for inpatient asthma control in several institutions. The statistics for outpatients are encouraging, but the evidence for this practice in the inpatient population is lacking. It is the most typically recommended corticosteroid regimen of a 5-day dosage of prednisone for children with asthma exacerbations currently being used in hospitals<sup>6</sup>.

Asthma exacerbations can be improved with the use of oral corticosteroids, which were originally discovered in 1956, compared to "antispasmodics," in adults. When corticosteroids were first used to treat acute asthma, the outcomes of controlled studies were mixed.<sup>7</sup>

A 2017 study found that patients using dexamethasone stayed in the hospital for 4.9±5.4 hours, while using prednisolone stayed in the hospital for 4.8±5.7 hours (p>0.05), with 0.4% vs. 0.7% of patients being readmitted to the hospital, vomiting in 2.1% vs 4.4%, and persistent symptoms in 43.8% vs 37.7%, respectively.

Hospital readmission was 0.5% with dexamethasone and 2.9% with prednisolone, and persistent symptoms were recorded in 35% with dexamethasone while 22% with prednisolone (p<0.05). Patients who received intravenous steroids first appeared sicker based on clinical respiratory severity scores. Further randomized

prospective trials are required to assess the efficacy of dexamethasone in hospitalized asthmatics<sup>9</sup>. Further studies exposed non significant difference at day 7 between the two groups regarding perseverance of symptoms<sup>8</sup>.

There were 62 of 69 dexamethasone and 64 of 74 prednisolone patients who were reviewed after 4 days for the primary outcome in Gordon et al study. There was a difference of 0.2 with a 95% confidence interval of 0.4 to 0.7 in the mean change in total asthma score at 4-day follow up between the dexamethasone and prednisolone groups. Dexamethasone patients (5.9%) and prednisolone patients (4.1%), all of whom were initially discharged, were readmitted before the 2-week follow-up (a difference of 1.8%; a 95% confidence interval of 5.4% to 9.0%)<sup>10</sup>. Altamimi et al<sup>11</sup> studied with single dosage of dexamethasone (0.6 mg/kg) versus five days of prednisolone (2 mg/kg daily).

**CONCLUSION**

Dexamethasone showed statistically significant better outcome in terms of wheezing, cough, shorter hospital stay and readmission within 7 days as compared to prednisolone in acute moderate asthma. So it is recommended that in future dexamethasone should preferably be used for the treatment of acute asthma.

**Conflict of interest:** Nil

**REFERENCES**

- Kirkland, SW., Cross, E., Campbell, S et al. 2018. Intramuscular versus oral corticosteroids to reduce relapses following discharge from the emergency department for acute asthma. *Cochrane Database Syst Rev*, 6, Cd012629.
- Leung, JS. 2021. Paediatrics: how to manage acute asthma exacerbations. *Drugs in context*, 10, 2020-12-7.
- Parikh, K., Hall, M., Mittal, V et al. 2015. Comparative Effectiveness of Dexamethasone versus Prednisone in Children Hospitalized with Asthma. *J Pediatr*, 167, 639-44.e1.
- Vohra, M., Sharma, AR., Satyamoorthy, K et al. 2021. Pharmacogenomic considerations for repurposing of dexamethasone as a potential drug against SARS-CoV-2 infection. *Personalized medicine*, 18, 389-98.
- WEI, J., LU, Y., HAN, F et al. 2019. Oral Dexamethasone vs. Oral Prednisone for Children With Acute Asthma Exacerbations: A Systematic Review and Meta-Analysis. *Front Pediatr*, 7, 503.
- Keeney, GE., Gray, MP., Morrison, AK et al. 2014. Dexamethasone for acute asthma exacerbations in children: a meta-analysis. *Pediatrics*, 133, 493-99.
- Weinberger, M. 2018. Randomized trial of dexamethasone versus prednisone for children with acute asthma exacerbations: why? *The Journal of pediatrics*, 197, 316-317.
- Paniagua, N., Lopez, R., Muñoz, N et al. 2017a. Randomized trial of dexamethasone versus prednisone for children with acute asthma exacerbations. *The Journal of pediatrics*, 191, 190-196. e1.
- Goodrich, NP., Nabower, A., Pachunka, J et al. 2020. A Retrospective Comparative Analysis of Dexamethasone versus Prednisolone in Hospitalized Asthma Exacerbations. *Pediatrics*, 146, 238-39.
- Gordon, S., Tompkins, T., Dayan, PS. 2007. Randomized trial of single-dose intramuscular dexamethasone compared with prednisolone for children with acute asthma. *Pediatr Emerg Care*, 23, 521-7.
- Altamimi, S., Robertson, G., Jastaniah, W et al. 2006. Single-dose oral dexamethasone in the emergency management of children with exacerbations of mild to moderate asthma. *Pediatric emergency care*, 22, 786-93.