COMPARISON BETWEEN INHALATION AND SYSTEMIC STEROID THERAPY IN ACUTE EXACERBATION OF MODERATE TO SEVERE BRONCHIAL ASTHMA IN CHILDREN

By

Hesham Ahmed Mohamed Ali*, Al Hassan Mostafa Zahran*, Ramy Mohamed Zakarya*

*Pediatrics Department, Faculty of Medicine, Al-Azhar University, Cairo

ABSTRACT

Background: *Corticosteroids are by far the most effective controllers used in the treatment of asthma and the only drugs that can effectively suppress the characteristic inflammation in asthmatic airways. They play an important role in the treatment of acute asthma exacerbations in the ED as well as post discharge from the ED.*

Objectives: *To compare the effects of inhaled corticosteroids (ICS) against systemic corticosteroids (SC) in children consulting in emergency department (ED) for acute asthma exacerbation.*

Methods: *This was a prospective study done on children with acute asthma exacerbation coming to the emergency room of Al-Sayed Galal university hospital for evaluation and treatment. The study was carried out from July 2018 to January 2019.*

Results: *60 children were evaluated; 34 cases (56.7%) were males while 26 cases (43.3%) were females with age ranging between 2 and 14 years. No significant statistical difference was found between inhaled corticosteroids and systemic corticosteroids in treatment of acute exacerbation of moderate to severe bronchial asthma in children.*

Conclusion: *There is no evidence of a difference between ICS and SC in terms of hospital admission rate, return to hospital within week, length of stay in ED and adverse effects in children consulting for asthma exacerbations.*

Key words: *Inhaled corticosteroids; systemic corticosteroids; acute asthma; exacerbation; asthma; children*

INTRODUCTION

Athma is a heterogenous disease, usually characterized by chronic airway inflammation. It is defined by the history of respiratory symptoms such as wheezes, shortness of breath, chest tightness and cough that vary over time and in intensity, together with

variable expiratory airflow limitation. **(GINA 2018)**

There are two major pathological features in asthmatics' airways, inflammation, and hyperresponsiveness. **(GINA 2018)**

Acute asthma exacerbations are defined as "episodes of progressive increase in shortness of breath, cough, wheezing, or chest tightness, or some combination of these symptoms." **(National Asthma Education and Prevention Program, 2007)**

Systemic corticosteroids given early in the course of treatment of acute asthma exacerbations in the ED were overall shown to be effective and decrease hospital admission rate. **(GINA 2018)**

Inhaled steroids are the main stay of asthma management. They were shown to very consistently change many of the pathologic inflammatory features of asthma in the lung airways. They lead to decrease cellular infiltrates including T-lymphocytes, mast cells, eosinophils, and macrophages. Also, epithelial damage, goblet cell hyperplasia, and vascular blood flow significantly decreases with inhaled steroid therapy **(Fanta, 2009)**.

Ethical consideration:

Participants or their guardians were given informed consent that includes the aim and steps of the study.

Approval of the local committee in the pediatrics department, college and university were obtained before the study.

There is no conflict of interest regarding the study, authorship and publication.

The data of the patients and the results of the study are confidential and the patients have the right to keep.

The patient had the right to withdraw from the study at any time.

PATIENTS AND MATERIALS

Study design:

This was a prospective study that included 60 pediatric patients (34 Males & 26 Females) with Asthma coming to the emergency room of Al-Sayed Galal university hospital for evaluation and treatment. The study was carried out from July 2018 to January 2019.

All patients fulfilled the following criteria:

Inclusion Criteria:

- Any patient diagnosed with bronchial asthma by a specialist between 2-14 years.
- Acute exacerbation of moderate to severe bronchial asthma by Asthma Score. (score ≥ 8)

GINA guidelines 2018 updates were used for diagnosis, classification of asthma severity and assessment of asthma control. **(GINA 2018)**

Exclusion Criteria:

- Any patient < 2 years or > 14 years.
- Use of inhaled or systemic steroids in the preceding 72 hours.
- Acute exacerbation of mild bronchial asthma by Asthma Score. (score ≤ 7)

Method:

Patients were subjected to the following:

History was taken from caregivers or patients themselves while all patients underwent full physical examination, assessment of asthma severity and classification of asthma control according to GINA guidelines. **(GINA 2018)**

Studied patients were followed up to one week after discharge.

All data of asthma patients were collected through previously prepared sheet

1- Personal data:

Patient's name, age, sex and residence

2- Thorough history taking:

• Past history

Detailed past history, including ordinary Vaccines, additional vaccines, Previous NICU admission, number of previous hospitalization, feeding history and passive smoking.

• Family history

Family history of atopy

• Present history

Shortness of breath, chest tightness, wheezing and cough

3- Full clinical examination:

Full clinical examination to assess general condition of patient and give clue for initial diagnosis including:

- Vital signs (heart rate, respiratory rate, blood pressure and temperature) with oxygen saturation.
- Chest examination for signs of respiratory distress (tachypnea, chest indrowing, grunting and cyanosis).

- Cardiovascular examination to exclude any congenital heart disease.

During the period of the study, all children attending the emergency room with acute exacerbation of bronchial asthma were examined and assessed using Asthma Score and Pulmonary Index Score.

The patients who fullfilled the above mentioned criteria were divided randomly into 2 main equal groups as follow:

- Group I: received nebulized (budesonide 0.25mg) 1ml in 3 ml of normal saline.

- Group II: was subdivided into 3 equal groups; IIA:received oral prednisone (1mg/kg), IIB received IV methyl prednisolone (2mg/kg), IIC received IM dexamthasone (0.6 mg/kg).

After 15 minutes:

Nebulized salbutamol (0.3 mg/kg in 3ml of normal saline) was given and repeated every 30 minutes when needed within the first 2 hours and every 1-2 hours thereafter.

Further assessment was done 2 and 4 hours after steroid administration

Comparison was made between the two groups using Pulmonary Index Score and Asthma Score as well as by the percentage requiring admission.

Comparison between the outcomes of both groups was done including hospital admission rate, return to hospital within week, length of stay in ED and adverse effects.

Statistical analysis:

Data were analyzed with SPSS version 21.

Qualitative data were described using number and percent.

Association between categorical variables was tested using Chi-square test.

Continuous variables were presented as mean ± SD (Standard deviation) for parametric data and Median for non-parametric data.

Level of significance:

For all above mentioned statistical tests done, the threshold of significance is fixed at 5% level (p-value).

The results were considered:

- Non-significant when the probability of error is more than 5% ($p > 0.05$).
- Significant when the probability of error is less than 5% ($p \leq 0.05$).

- Highly significant when the probability of error is less than 0.1% ($p \leq 0.001$).

The smaller the p-value obtained, the more significant are the results.

RESULTS

Table (1): Comparison between the two studied groups according to personal data

Personal data	Group I (n = 30)		Group II (n = 30)		Test of sig.	P
	No.	%	No.	%		
Sex						
Male	15	50.0	19	63.3	χ^2= 1.086	0.297
Female	15	50.0	11	36.7		
Age						
Min. – Max.	2.0 –14.0		2.0 –14.0		U= 398.50	0.445
Mean ± SD.	6.87±3.92		7.52±3.76			
Median	6.0		6.75			
Residence						
Urban	26	86.7	30	100.0	χ^2= 4.286	0.112
Rural	4	13.3	0	0.0		
Family history of atopy						
Positive	21	70.0	21	70.0	χ^2= 0.000	1.000
Negative	9	30.0	9	30.0		

Table (1) shows the demographic data of patients in the two studied groups. There were no statistical significant differences between the two groups as regards sex, age, residence and family history. (P = 0.297, 0.445, 0.112 and 1.000 respectively).

Demographic data analysis revealed that bronchial asthma was more common in males (34cases) than females (26 cases).

Table (2): Comparison between the two studied groups according to examination

Examination	Group I (n = 30)	Group II (n = 30)	P
Heart Rate (B/Min)			
Min. – Max.	75.0 –120.0	70.0 –125.0	0.334
Mean ± SD.	93.07±12.13	96.43±14.55	
Median	90.50	95.00	
Respiratory rate (B/Min)			
Min. – Max.	17.0 –50.0	15.0 –54.0	0.972
Mean ± SD.	31.27±10.37	31.17±11.26	
Median	29.0	28.50	
SO_2			
Min. – Max.	85.0 –99.0	83.0 –99.0	0.655
Mean ± SD.	95.67±4.31	95.13±4.87	
Median	98.0	98.0	
Blood Pressure			
Systolic (mmHg)			0.952
Min. – Max.	90.0 –120.0	90.0 –120.0	
Mean ± SD.	104.5 ±10.61	104.3 ±10.73	
Median	102.5	100.0	
Diastolic			
Min. – Max.	50.0 –80.0	50.0 –80.0	0.347
Mean ± SD.	62.67±11.04	65.33±10.74	
Median	60.0	65.0	
Temperature (C)			
Min. – Max.	36.50–37.80	36.50–37.60	0.823
Mean ± SD.	37.14 ±0.31	37.16 ±0.27	
Median	37.0	37.15	

SD: Standard Deviation, SO2: Oxygen saturation

During the full clinical examination there was no statistical significant difference between both groups regarding the vital signs at time of presentation.

Table (3): Comparison between the studied groups according to asthma score

Asthma Score	Group I (n = 30)	Group IIA (n = 10)	Group IIB (n = 10)	Group IIC (n = 10)	p
Presentation					
Min. – Max.	7.0 – 15.0	8.0 – 15.0	8.0 – 15.0	8.0 – 14.0	0.757
Mean ± SD.	10.43 ± 2.46	11.10 ± 2.33	11.10 ± 2.18	10.70 ± 2.45	
Median	10.0	10.50	11.0	10.50	
After 2 hours					
Min. – Max.	5.0 – 14.0	5.0 – 15.0	5.0 – 15.0	5.0 – 14.0	0.249
Mean ± SD.	8.50 ± 2.43	10.20 ± 3.12	10.0 ± 2.91	9.20 ± 2.70	
Median	8.0	10.0	10.0	9.0	
After 4 hours	**(n = 21)**	**(n = 9)**	**(n = 8)**	**(n = 9)**	
Min. – Max.	5.0 – 12.0	5.0 – 14.0	5.0 – 13.0	5.0 – 10.0	0.689
Mean ± SD.	7.10 ± 2.28	8.33 ± 3.77	7.75 ± 2.87	6.67 ± 2.06	
Median	6.0	6.0	6.0	6.0	

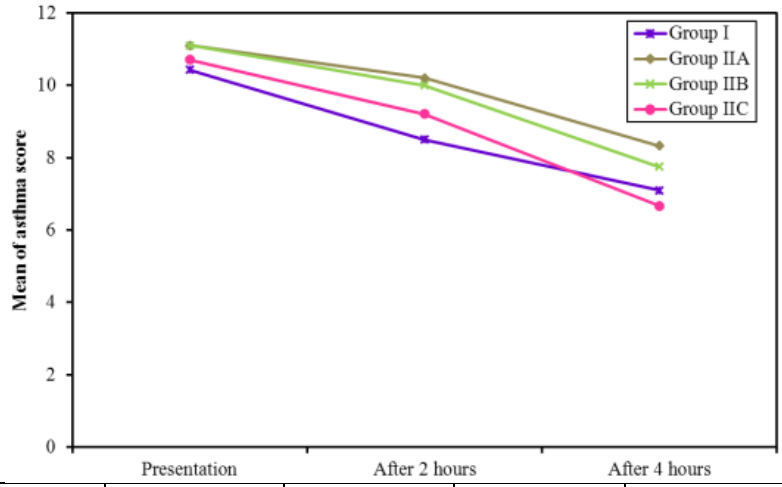


Figure (1): Comparison between the studied groups according to asthma score

At presentation, there was no statistically significant difference between the studied groups (P = 0.757).

After two hours of treatment, the total score in group (I) was lower than the total score in group (II). However, no statistically significant difference between the total asthma score in patients of the studied groups (P = 0.249).

After four hours of treatment, there was no statistically significant difference between the studied groups (P = 0.689)

There was no significant statistical difference between the three subgroups IIA, IIB or IIC either at presentation or after 2 and 4 hours of presentation.

Table (4): Comparison between the two studied groups according to asthma score at presentation, after 2 and after 4 hours of treatment

Asthma Score	Group I (n = 30)	Group II (n = 30)	U	P
At presentation				
Min. – Max.	7.0 –15.0	8.0 –15.0	385.50	0.335
Mean ± SD.	10.43±2.46	10.97±2.25		
Median	10.0	11.0		
After 2 hours				
Min. – Max.	5.0 –14.0	5.0 –15.0	327.50	0.068
Mean ± SD.	8.50±2.43	9.80±2.85		
Median	8.0	10.0		
After 4 hours				
Min. – Max.	5.0 –12.0	5.0 –14.0	259.00	0.758
Mean ± SD.	7.10±2.28	7.58±2.96		
Median	6.0	6.0		

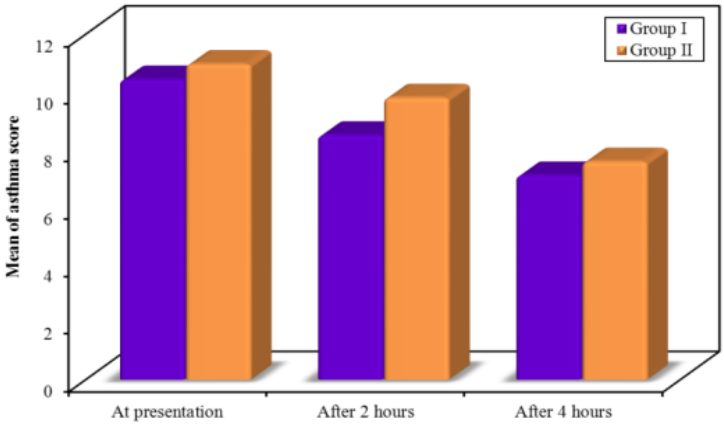


Figure (2): Comparison between the two studied groups according to asthma score at presentation, after 2 and after 4 hours of treatment

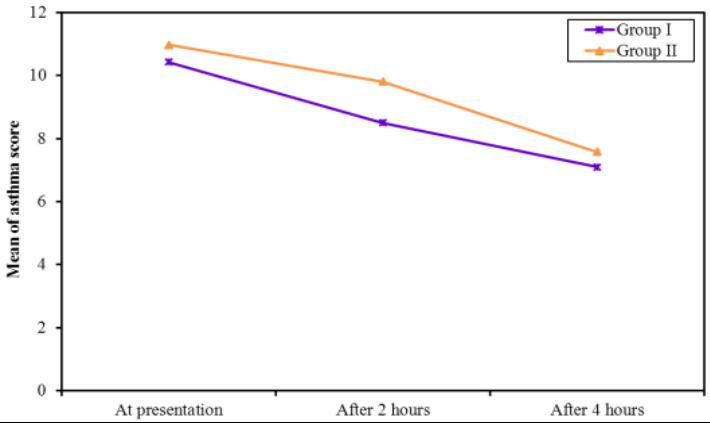
At presentation, there was no statistically significant difference between the two studied groups (P = 0.335)

After two hours of treatment, the total score in group (I) was lower than the total score in group (II). However, no statistically significant difference between the total asthma score in patients of the two studied groups (P = 0.068)

After four hours of treatment, there was no statistically significant difference between the two studied groups (P = 0.758)

Table (5): Comparison between the three studied periods according to asthma score in the two studied groups

Asthma Score	At presentation	After 2 hours	After 4 hours	Fr	p
Group I (n = 30)					
Min. – Max.	7.0 –15.0	5.0 –14.0	5.0 –12.0	39.692*	<0.001*
Mean ± SD.	10.43 ±2.46	8.50 ±2.43	7.10 ±2.28		
Median	10.0	8.0	6.0		
Sig. bet. periods	p_1=0.021*,p_2<0.001*,p_3<0.001*				
Group II (n = 30)					
Min. – Max.	8.0 –15.0	5.0 –15.0	5.0 –14.0	46.539*	<0.001*
Mean ± SD.	10.97 ±2.25	9.80 ±2.85	7.58 ±2.96		



Median	11.0	10.0	6.0		
Sig. bet. periods	p_1=0.052,p_2<0.001*,p_3<0.001*				

Comparing the total score of each group before, after 2 and after 4 hours of treatment, there was statistically significant decrease in the total score in the three studied periods after 2 and 4 hours compared to time of presentation. (P < 0.001)

Figure (3): Comparison between the three studied periods according to asthma score in the two studied groups

Table (6): Comparison between the two studied groups according to pulmonary index score

Pulmonary Index Score	Group I (n = 30)	Group II (n = 30)	U	P
At presentation				
Min. – Max.	7.0 –12.0	7.0 –12.0	339.50	0.092
Mean ± SD.	9.17±2.09	10.0 ±1.84		
Median	8.0	10.0		
After 2 hours				
Min. – Max.	3.0 –12.0	5.0 –12.0	305.50*	0.030*
Mean ± SD.	7.80±2.67	9.30±2.28		
Median	8.0	9.0		
After 4 hours				
Min. – Max.	5.0 –12.0	4.0 –12.0	246.00	0.552
Mean ± SD.	7.19±2.54	7.42±2.58		
Median	6.0	6.0		

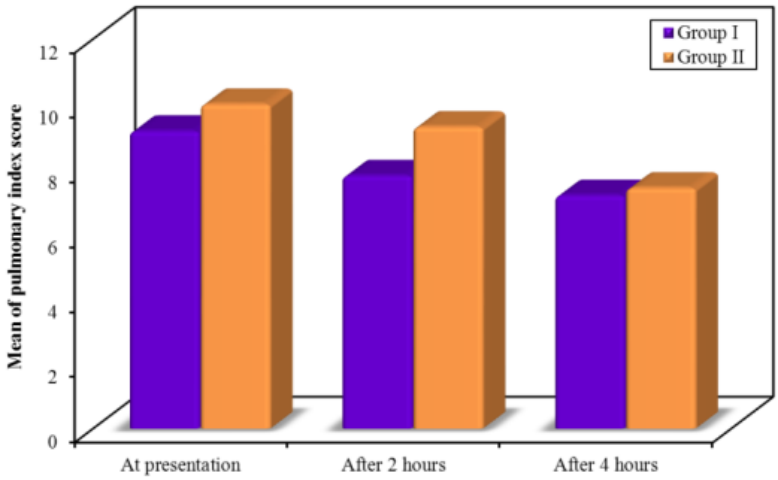


Figure (4): Comparison between the two studied groups according to pulmonary Index Score

At presentation, there was no statistically significant difference between the two studied groups (P = 0.092).

After two hours of treatment, the total score in group (I) was lower than the total score in group (II). This means more rapid improvement with group (I) which received ICS than group (II) which received SC.

There was statistically significant decrease in the total asthma score in patients of group (I) more than those of group (II) after 2 hours. (P = 0.030)

After four hours of treatment, there was no statistically significant difference between the two studied groups (P = 0.552)

Table (7): Comparison between the three studied periods according to pulmonary Index Score

Pulmonary Index Score	At presentation	After 2 hours	After 4 hours	Fr	p
Group I (n = 30)					
Min. – Max.	7.0 –12.0	3.0 –12.0	5.0 –12.0	33.818*	<0.001*
Mean ± SD.	9.17 ±2.09	7.80 ±2.67	7.19 ±2.54		
Median	8.0	8.0	6.0		
Sig. bet. Periods	p_1=0.064,p_2<0.001*,p_3=0.001*				
Group II (n = 30)					
Min. – Max.	7.0 –12.0	5.0 –12.0	4.0 –12.0	42.883*	<0.001*
Mean ± SD.	10.0 ±1.84	9.30 ±2.28	7.42 ±2.58		
Median	10.0	9.0	6.0		
Sig. bet. Periods	p_1=0.267,p_2<0.001*,p_3<0.001*				

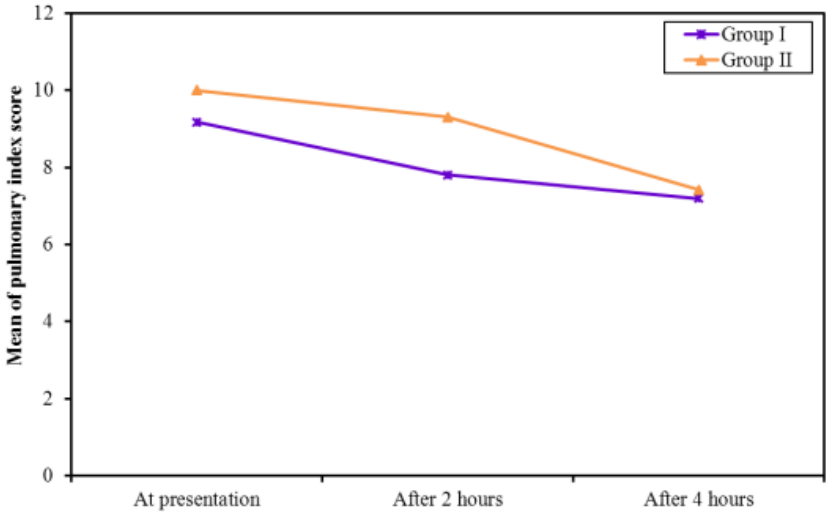


Figure (5): Comparison between the three studied periods according to pulmonary Index Score

Comparing the total score of each group before, after 2 and 4 hours of treatment, there was statistically significant decrease in the total score in the three studied groups after 2 and 4 hours compared to time of presentation. (P < 0.001).

Table (8): Comparison between the two studied groups according to outcome

Outcome	Group I (n = 30)		Group II (n = 30)		χ^2	P
	No.	%	No.	%		
Adverse effects (vomiting)	2	6.7	3	10.0	0.218	1.000
Improved patients	22	73.3	20	66.7	0.317	0.573
Length of stay in ED	9	30.0	4	13.3	2.455	0.117
Patients admitted to Ward	5	16.7	6	20.0	0.111	0.739
Patients admitted to PICU	3	10.0	4	13.3	0.162	1.000
Patients returned to hospital within week	2	6.7	3	10.0	0.218	1.000

When comparing group (I) to group (II) as regards the outcome, there was no significant difference between the two groups when comparing the adverse effects, number of improved cases, length of stay in ED, number of cases admitted in ward or PICU and finally number of patients returned to hospital within week. (P = 1.000, 0.573, 0.117, 0.739, 1.000 and 1.000 respectively.

DISCUSSION

Asthma is one of the most common chronic diseases in children worldwide. Asthma is characterized by chronic airway inflammation, impaired pulmonary function, and episodic respiratory symptoms. Asthma is the most prevalent childhood chronic disease requiring emergency department (ED) visits due to its exacerbation **(Bilan et al., 2014)**.

Despite advances in care, asthma still imposes a significant burden on the pediatric population. Mortality, hospitalization rates, acute exacerbations and symptom control remain sub-optimal. In controlled trials, most patients gain high levels of control but in 'real-life' clinical practice, most patients do not **(Thomas, 2015; Hossny et al., 2016)**.

Our study included 60 children with asthma with no statistical significant differences between the two groups as regards sex, age, residence or family history.

McKeever and his colleagues, (2018), and Jackson with his colleagues, (2018), found in their studies that there was no significant difference in the asthma exacerbation rate between the subgroups based on age, time elapsing before treatment initiation which run in line with our results **(McKeever et al., 2018; Jackson et al., 2018)**.

Bilan and his colleagues, (2014), found in their study that there was no significant difference in both groups of their study regarding age and sex which run in line with our results **(Bilan et al., 2014)**.

All patients of both groups have received the ordinary vaccines while only 13.3% of group I and 10% of group II have received the additional vaccines with no statistical significant differences between the two groups as regards receiving ordinary vaccines, additional vaccines, previous NICU admission and passive smoking.

Our study showed no statistical significant difference between both groups as regards feeding history, previous hospitalization, and severity classes or according to symptoms control.

Jackson and his colleagues, (2018), concluded in their study that, in children with mild-to-moderate persistent asthma treated with daily inhaled glucocorticoids, quintupling the dose of inhaled glucocorticoids at the early signs of loss of asthma control did not result in a lower rate of exacerbations than continuation of the daily maintenance dose, did not improve other asthma outcomes, and may be associated with diminished linear growth which run in line with our results **(Jackson et al., 2018)**.

Regarding compliance to medical management, our results revealed that there was no statistical difference between both groups.

On clinical examination, there was no statistical significant difference between both groups of the study regarding, heart rate, respiratory rate, blood pressure "whether systolic or diastolic", temperature as well as oxygen saturation at presentation. The respiratory rate in each group showed statistical significant decrease at 2 hours and 4 hours after treatment compared to baseline value while comparing the two groups regarding respiratory rate there was no statistical significant difference.

Oxygen saturation in each group showed statistical significant decrease at 2 hours and

4 hours after treatment compared to baseline value while oxygen saturation of the two groups showed no statistical significant difference.

Edmonds and his colleagues, (2018), found in their study that there was no significant difference between both groups of their study regarding respiratory rate, oxygen saturation and systolic blood pressure which was in agreement with our results **(Edmonds et al., 2018)**.

Applying asthma score at presentation, then after 2 hours and 4 hours after treatment; there was no statistical significant difference between groups of the study. But, applying asthma score for each group there was significant improvement in each group at 4 hours after treatment compared to its asthma score at presentation and at 2 hours after treatment.

Regarding pulmonary index, there was no statistical significant difference in both groups at presentation and 4 hours after treatment while there was significant improvement in group II after 2 hours after treatment.

Edmonds and his colleagues, (2018), concluded in their study that after ICS and systemic corticosteroids improves the clinical scores "asthma score and pulmonary index" shortly after administration which was in agreement with our results **(Edmonds et al., 2018)**.

Auscultatory findings "Wheezes" in each group showed statistical significant improvement at 2 hours and 4 hours after treatment compared to baseline findings while when comparing these finding in both groups we found that there was only statistical improvement in group I at 2 hours after treatment while there was no statistical significant difference in auscultatory finding between both groups at presentation and at 4 hours after treatment. Clinically, intercostal retraction in each group showed statistical significant improvement at 2 hours and 4 hours after treatment compared to baseline findings while comparing both groups according to intercostal retraction showed no significant difference. Dyspnea in each group showed statistical significant improvement at 2 hours and 4 hours after treatment compared to baseline findings while when comparing this finding in both groups we found that there was only statistical improvement in group I at 2 hours after treatment than in group II while there was no statistical significant difference between both groups at

presentation or at 4 hours after treatment.

It is reported in **GINA (2018)** that there was no difference between ICS and OCS in controlling asthma exacerbation clinical symptoms which agree with our results that found the insignificant difference was at admission and after 4 hours **(GINA, 2018)**.

Outcome of both groups didn't show statistical significant difference between both groups of the study regarding the adverse effects, number of improved cases, period of stay in Emergency Department, number of cases admitted in ward or PICU or number of readmitted patients to hospital within week. In addition side effects especially vomiting.

Edmonds and coworkers, (2018), concluded in their study that ICS are well tolerated with few short term side effects across a wide variety of doses and this was in agreement with our results **(Edmonds et al., 2018)**.

Yousef and his colleagues, (2012), showed in their study that children did not demonstrate any reduction in hospitalization or use of oral corticosteroids when used ICS, though there was suggestion of symptomatic improvement with higher doses of ICS **(Yousef et al., 2012)**.

Beckhaus and coworkers, (2014), also found no difference between ICS and systemic corticosteroids in the outcomes of unscheduled visits for asthma symptoms, or need for additional courses of systemic corticosteroids which runs in line with our results **(Beckhaus et al., 2014)**.

Edmonds and his colleagues, (2018), concluded in their study that there was insufficient evidence that ICS therapy alone can be used to replace systemic corticosteroid therapy, therefore systemic corticosteroids should not be withheld from patients with acute asthma presenting to the ED which was in agreement with our results **(Edmonds et al., 2018)**.

Jackson and his colleagues, (2018), found in their study that there was no significant difference between ICS and OCS in cases of asthma which agree with our results **(Jackson et al., 2018)**.

Nakanishi and his colleagues, (2003), concluded that in their study, ICS were found to be useful in the management of acute asthma in children; however, spirometry data suggested a more rapid resolution of asthma with OCS which disagree with our

results. **(Nakanishi AK et al., 2003)**

Schuh and his colleagues, (2006), stated that in their study, airway obstruction in children with mild to moderate acute asthma in the emergency department improves faster on oral than inhaled corticosteroids which was against our results. **(Schuh S et al., 2006)**

The evidence is insufficient to recommend the routine use of high doses of ICS as an alternative to SC in acute asthma exacerbation in children.

CONCLUSION

When comparing ICS to SC in children with acute asthma, there is no evidence of a difference regarding the outcome of both groups including hospital admission rate, return to hospital within week, length of stay in ED and adverse effects.

The evidence is insufficient to recommend the routine use of high doses of ICS as an alternative to SC in acute asthma exacerbation in children.

RECOMMENDATION

Systemic corticosteroids given early in the course of treatment of acute asthma exacerbations in the ED were overall shown to be effective and are recommended as they decrease hospital admission rate.

ICS are effective as part of therapy for asthma exacerbations and can be as effective as Systemic corticosteroids at preventing relapses.

More studies with big samples and good methodological quality are needed and also cost effectiveness studies must be performed in order to clear decision of most appropriate administration route of corticosteroids in acute asthma exacerbation in children.

REFERENCES

1. **Beckhaus AA, Riutort MC and Rodriguez CJ. (2014):** Inhaled versus systemic corticosteroids for acute asthma in children. A systematic review. Pediatr Pulmonol, 49: 326-334.
2. **Bilan N, Saboktakin L and Ghasempour M. (2014):** A comparison of Oral and Inhalant Corticosteroids in Treatment of Mild to Moderate Asthma Exacerbation in Children. Adv Biosci Clin Med, 3(2): 5-12.
3. **Edmonds ML, Milan SJ, Camargo CA, Pollack CV and Rowe BH. (2018):** Early use of inhaled corticosteroids in the emergency department treatment of acute asthma. Cochr Database Syst Rev, 12: CD002308.
4. **Fanta CH. (2009):** Asthma. N Engl J Med, 360: 1002-1014.

5. **Global Initiative for Asthma (GINA) (2018):** Global strategy for asthma management and prevention. Available from: https://ginasthma.org/wp-content/uploads/2018/04/wms-GINA-2018-report-tracked_v1.3.pdf
6. **Hossny E, Rosario N, Lee BW, Singh M, El-Ghoneimy D, Yi JS and Souef PL. (2016):** The use of inhaled corticosteroids in pediatric asthma: update. World Allerg Organiz J, 9: 26-49.
7. **Jackson DJ, Bacharier LB, Mauger DT, Boehmer S, Beigelman A and Chmiel JF, (2018):** Quintupling Inhaled Glucocorticoids to Prevent Childhood Asthma Exacerbations. N Engl J Med, 378: 891-901.
8. **McKeever T, Mortimer K, Wilson A, Walker S, Brightling C and Skeggs A, (2018):** Quadrupling inhaled glucocorticoid dose to abort asthma exacerbations. N Engl J Med, 378: 902-910.
9. **Nakanishi AK, Klasner AK and Rubin BK. (2003):** A randomized controlled trial of inhaled flunisolide in the management of acute asthma in children. Chest, 124:790–794.
10. **National Asthma Education and Prevention Program (2007):** Expert Panel Report 3 (EPR-3): Guidelines for the Diagnosis and Management of Asthma Summary Report 2007. J Allergy Clin Immunol, 120:S94–138.
11. **Schuh S, Dick PT, Stephens D, Hartley M, Khaikin S, Rodrigues L and Coates AL. (2006):** High-dose inhaled fluticasone does not replace oral prednisolone in children with mild to moderate acute asthma. Pediatrics, 118:644–650.
12. **Thomas M. (2015):** Why aren't we doing better in asthma: time for personalized medicine? NPJ Prim Care Respir Med, 25: 15004.
13. **Yousef E, Hossain J, Mannan S, Skorpinski E and McGeady S, (2012):** Early intervention with high-dose inhaled corticosteroids for control of acute asthma exacerbations at home and improved outcomes: a randomized controlled trial. Allergy Asthma Proc, 33(6):508–13.

المقارنة بين العلاج بالإستنشاق والعلاج النظامي للإستيرويدات في التفاقم الحاد للأزمة الربوية المتوسطة إلى الشديدة في الأطفال

رامي محمد زكريا* الحسن مصطفى زهران * هشام أحمد محمد على*

جامعة الأزهر– كلية الطب – قسم طب الأطفال

الأزمة الربوية هي إلتهاب مزمن في الممرات الهوائية وهي من أكثر الأمراض شيوعا في الاطفال، وتفاقم الربو الحاد من بين الأسباب الأكثر شيوعا للعرض على قسم الطوارئ ودخول المستشفى وخاصة في الأطفال؛ وقد كانت الكورتيزونات المستنشقة هي الدعامة الأساسية لعلاج الربو لسنوات عديدة من خلال آثارها المضادة للالتهابات .

ولقد تم استخدام الكورتيزونات العامة في علاج الأزمة الحادة المتوسطة الى الشديدة وذلك بمجرد دخول المريض الى قسم الطوارىء ؛وقد تم دراسة استخدام الكورتيزونات المستنشقة في علاج الازمة الربوية الحادة مع بعض النتائج الايجابية والأخرى السلبية.

وتهدف هذة الدراسة إلى المقارنة بين تأثير استخدام جرعة واحدة من الكورتيزون الاستنشاقي و استخدام الكورتيزون العام في علاج الازمة الربوية الحادة المتوسطة الى إلى الشديدة في الأطفال.

وقد أجريت هذة الدراسة على ٦٠ طفلا مصابا بالأزمة الحادة المتوسطة إلى الشديدة وتم تجميع الحالات من قسم الطوارىء بمستشفى سيد جلال الجامعي.

شروط الاشتمال في الدراسة:

- أي طفل مصاب بالأزمة الربوية تم تشخيصه عن طريق أخصائي أطفال ويتراوح عمره بين سنتين و١٤ سنة.

- الأطفال المصابون بالأزمة الربوية الحادة المتوسطة إلى الشديدة وفقا لتقييم درجة الربو .

شروط الاستبعاد من الدراسة:

- أي طفل اصغر من سنتين أو أكبر من ١٤ سنة.

- استخدام الكورتيزونات المستنشقة خلال ال ٧٢ ساعة السابقة للدراسة.

- الأطفال المصابون بالأزمة الربوية الحادة الطفيفة وفقا لتقييم درجة الربو.

خلال فترة الدراسة خضع كل الأطفال المصابين بالأزمة الربوية لتقييم مبدأي بإستخدام درجة الربو ودرجة مؤشر الرئة وتم تقسيم الحالات عشوائيا الى مجموعتين متساويتين ضمت كل مجموعة ٣٠ طفلا.

وقد تم إعطاء المجموعة الأولى بيوديزونايد (٠,٢٥مجم/كجم) في ٣مل محلول ملح طبيعي أما المجموعة

الثانية فتم إعطاءها البريدنيزون عن طريق الفم (١مجم/كجم) ميثيل بريدنيزولون وريدي (٢مجم/كجم), ديكثاميثازون بالعضل (٠,٦ مجم/كجم) وبعد ١٥ دقيقة, سوف تستنشق جميع الحالات السالبيوتامول (٠,٣مجم/كجم) في ٣مل محلول ملح طبيعي مع إمكانية تكراره كل نصف ساعة حسب الحالة وذلك في أول ساعتين وتكراره كل ساعه او ساعتين بعد ذلك.

وتم إعادة تقييم الحالات بعد ساعتين من إعطاء الكورتيزون وبعد ٤ ساعات ثم المقارنة بين المجموعتين بإستخدام مؤشر الربو و درجة مؤشرالرئة.

وتشير نتائج الدراسة إلى عدم وجود فرق ملحوظ بين المجموعة التي أعطيت الكورتيزون الإستنشاقي والمجموعة التي أعطيت الكورتيزون العام كعلاج للأزمة الربوية الحادة المتوسطة إلى الشديدة في الأطفال.

وأيضا لم يكن هناك فارق بين المجموعتين من حيث التأثير على معدل تحسن الحالات أو سرعة التحسن أو العودة إلى المستشفى خلال إسبوع من العلاج أو حتى من حيث ألاعراض الجانبية.

وتوصي الدراسة بضرورة استخدام الكورتيزون العام مبكرا في علاج التفاقم الحاد للربو نظرا لتأثيره الإيجابي والملحوظ على معدل تحسن الحالات كما أن الكورتيزون الإستنشاقي لا يقل أهميه من حيث سرعة التحسن ومنع الإنتكاسة.

كما توصي الدراسة بضرورة عمل المزيد من الدراسات على عينة أكبر من المرضى للوصول إلى الكورتيزون ألافضل تأثيرا في علاج التفاقم الحاد للأزمة الربوية المتوسطة إلى الشديدة في الأطفال.