Two regimens of dexamethasone versus prednisolone for acute exacerbations in asthmatic Egyptian children

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Received 4 August 2018
Revised 4 October 2018
Accepted 9 October 2018
Published Online First 10 November 2018

EAHP Statement 4: Clinical Pharmacy Services.

ABSTRACT

Introduction Asthma is one of the most prevalent chronic respiratory diseases, which often leads to an emergency department visit. Prednisolone is the most commonly used corticosteroid in treatment of asthma exacerbation. Oral dexamethasone demonstrates bioavailability similar to that of oral prednisolone but has a longer half-life.

Objective To evaluate in adouble-blind,randomised clinical trial the efficacy of different doses of dexamethasone versus prednisolone in controlling asthma exacerbations in children.

Methods We recruited 60 patients with asthma exacerbation, aged 2–11 years. Participants were randomly divided into three groups (20 patients each). Group I received a single dose of oral dexamethasone 0.3 mg/kg (maximum 12 mg), group II received 0.6 mg/kg/day of oral dexamethasone for 2 days (maximum 16 mg/day) and group III received 1.5 mg/kg/day oral prednisolone for 5 days (maximum 60 mg/day). Our primary outcomes were changes in Paediatric Respiratory Assessment Measure (PRAM), eosinophilic count and serum immunoglobulin E on day 5. Secondary endpoints were reporting any adverse effects and relapse rate during the 5 days. After 30 days, the Asthma Therapy Assessment Questionnaire (ATAQ) was given to the parents of the recruited patients.

Results Among the three study groups, there was a highly statistically significant difference in IgE level, saturated oxygen, peak expiratory flow, forced expiratory volume in 1 s/forced vital capacity, PRAM and Modified Pulmonary Index Score; however, the eosinophilic count was significantly lower within the same group. Vomiting, gastrointestinal tract cramps, ATAQ and relapse rate showed a non-statistically significant difference.

Conclusion Single-dose dexamethasone was at least as effective as 5-day course of prednisolone in controlling asthma, while dexamethasone for 2 days was non-inferior to 5 days of prednisolone in children with asthma exacerbation.

INTRODUCTION

Asthma is a heterogeneous disease, usually characterised by chronic airway inflammation. It is defined by a history of respiratory symptoms, such as cough, wheeze, shortness of breath and chest tightness, which vary over time and in intensity, together with variable expiratory airflow limitation.[1] It is one of the most prevalent chronic respiratory diseases and a common reason for emergency department (ED) visits and hospitalisation.[2] Exacerbations of asthma are episodic, with each episode characterised by a progressive increase in symptoms and progressive decrease in lung function—that is, it represents a change from the patient's usual status that is sufficient to require a change in treatment.[3]

Asthma is underdiagnosed and undertreated, especially among children of poorer families. In the USA, at least 5–10% of the population has asthma (a total of 23.4 million people, of whom seven million are children).[4] The prevalence of asthma was 7.7% among school children in the Nile Delta region, Egypt.[5]

An expert group formed by the National Institutes of Health agreed to define acute asthma as 'a worsening of asthma requiring the use of systemic corticosteroids to prevent a serious outcome'.[6] Traditionally, the duration and choice of systemic steroid has been 5 days of oral prednisolone, which is a relatively intermediate-acting glucocorticoid with a half-life of 12–36 hours, thereby requiring daily dosing.[7] Although a 5-day course of oral prednisone or prednisolone has become the most commonly used regimen, dexamethasone has also been used for a shorter duration (1 or 2 days), which might improve compliance and palatability.[8] Studies have shown that dexamethasone in single doses (0.3 mg/kg) or multiple doses (0.6 mg/kg for 2 days) is comparable to a 5-day course of prednisone/prednisolone (1.5 mg/kg) in the treatment of acute asthma exacerbations.[9]

Our study aimed to evaluate different doses of dexamethasone compared with the standard dose of prednisolone in controlling acute exacerbation of asthma in Egyptian paediatric patients.

SUBJECTS AND METHODS

Study design

This double-blind, randomised clinical trial was carried out after approval from the ethical committee of the research centre of Tanta University, and written parental consent was obtained. Our study included 157 children with acute exacerbation of asthma, with ages ranging from 2 to 11 years, who attended Tanta University Hospital between March 2016 and October 2017.

Inclusion criteria: children with a history of bronchial asthma,[1] who presented with an asthma exacerbation, which was defined as a decrease in expiratory airflow that could be documented and quantified by simple measurement of lung function (spirometry or peak expiratory flow (PEF)); the severity depended on objective measures. In general, milder exacerbations may be managed 'at home' (ie, outside the healthcare system),

To cite: Elkharwili DA, Ibrahim OM, Elazab GA, *et al*. *Eur J Hosp Pharm* 2020;**27**:151–156.

whereas more serious exacerbations may require an unscheduled ('urgent') office visit, an ED visit, or hospital admission.[10] Children included were aged from 2 to 11 years, and male or female.

Exclusion criteria: children aged <2 years, or >11 years, children with intubation history for previous asthma exacerbations, active varicella or herpes simplex infection in the past 3 weeks, documented concurrent infection with respiratory syncytial virus, use of oral or intravenous corticosteroids in the previous 4 weeks, concurrent stridor, known patients with tuberculosis and the presence of other significant comorbidities, such as cardiac, immune, liver, endocrine, neurological and psychiatric disorders.

The following procedures were followed for all the study groups during the screening phase:

- A complete history was obtained, including age, weight, duration of asthma symptoms, history of allergy, family history of asthma and level of exposure to household smoke.
- A thorough clinical examination was carried out with a Paediatric Respiratory Assessment Measure (PRAM) and a Modified Pulmonary Index Score (MPIS), which were recorded at the time of presentation and then repeated after 5 days.
- A safety assessment for adverse events associated with the administration of corticosteroids was made.
- Oxygen saturation and pulmonary function tests—PEF, inspiratory-to-expiratory flow ratio, forced expiratory volume in 1 s/forced vital capacity (FEV1/FVC) ratio)— were documented before and after the corticosteroid regimen.

*Not all cases of acute asthma exacerbations need treatment with a systemic steroid, but such treatment is required in cases of a moderate or severe acute asthma exacerbation or in patients who failed to respond to short-acting β-agonists only.

NB: The FEV_1/FVC ratio, is a ratio used in the diagnosis of obstructive and restrictive lung disease. It represents the proportion of a person's vital capacity that they can expire in the first second of forced expiration (FEV_1) to the full, forced vital capacity (FVC). A reduced FEV_1 may be found with many other lung diseases (or poor spirometric technique), but a reduced ratio of FEV_1 to FVC indicates airflow limitation. The FEV_1/FVC ratio is normally greater than 0.75–0.80, and usually >0.90 in children. Any values less than these suggest airflow limitation. So, the Global Initiative for Asthma (GINA) defines asthma by combining variable respiratory symptoms with variable expiratory airflow limitation, expressed as an FEV_1/FVC ratio.

After the initial screening (figure 1), 94 eligible patients were assigned and randomised in a 1:1:1 ratio into three groups: group I received a single dose of 0.3 mg/kg oral dexamethasone, with a maximum dose of 12 mg/day for 1 day and continued with a placebo for the other 4 days; group II received 0.6 mg/kg of oral dexamethasone, with a maximum dose of 16 mg/day in three divided doses for two consecutive days and continued with a placebo for the other 3 days; and group III received 1.5 mg/kg oral prednisolone per day for 5 days with a maximum dose of 60 mg in three divided doses. Some patients did not follow the study protocol, so 81 patients completed the randomised phase (figure 1).

Venous blood samples were collected to evaluate blood eosinophilic count and serum immunoglobulin E before the corticosteroid treatment and after 5 days. The primary end point was the change in physical examination, PRAM score, the MPIS, pulmonary function tests, saturated oxygen, blood eosinophilic count and serum immunoglobulin E after 5 days of taking the corticosteroids. Vomiting, gastrointestinal tract (GIT) cramps and relapse rate were recorded as secondary outcomes of the study.

For clinical follow-up to assess the effect of asthma on a patient's life, the Asthma Therapy Assessment Questionnaire (ATAQ) was used on a direct visit or during a telephone call with the parents of the recruited patients 1 month of completion of the corticosteroid course. Twenty-one patients did not complete the follow-up, so 60 patients completed all phases of the study (20 in each group).

Important tasks for the clinical pharmacist include taking patient drug histories, inquiring about current medication and ensuring that the patient is regularly following the prescriptions dispensed. When a treatment plan is ordered for a patient, the pharmacist reviews the medication orders to look for potential drug interactions and advise the medical staff about the method of best delivery. Often, the pharmacist accompanies the medical team on patient rounds to answer questions and provide medication options as needed. Finally, when a patient is discharged, the pharmacist discusses at-home medication use. Close monitoring of the patients is required for collection and analysis of the data.

Statistical analysis

Data were analysed using SPSS software computer program version 22 (SPSS, IBM, USA). Quantitative data were described using mean±SD and studied using analysis of variance. A post hoc analysis by Fisher's least significant difference test was conducted. A Student unpaired t test was used to compare parametric continuous variables within the same group. Categorical variables were compared using the χ^2test. The strengths of association between any two tested variables were assessed with Pearson's r correlation. Different effectiveness of the three regimens was assumed; mean PRAM score in groups I and II at day 5 after the intervention was no more than 1 higher than in the third group, and the effect size was 0.35. Analysis at a p value of 0.05 and a power of 80% showed that a total sample size of 78 patients distributed as 1:1:1 in the three groups was necessary. The level of significance was set at a p value <0.05, while p values of 0.01 and 0.001 were considered highly significant.

RESULTS

A total of 60 patients completed all the study phases (figure 1. The prednisolone and dexamethasone groups had similar baseline characteristics, including age, sex, weight (which during a period of 19 months is normally increased between 2 kg and 3.5 kg with no treatment), height, exposure to smokers, family history of asthma, presence of other allergic diseases and residency (table 1). Baseline characteristics and medical treatment were not significantly different among the studied groups.

- Group I showed a highly statistically significant decrease in eosinophilic count (from 8.80±4.98 to 6.75±4.44, p=0.000), and significant increase in saturated oxygen (from 95.40±1.27 to 96.80±1.06, p=0.000), PEF (from 53.10±13.17 to 80.10±10.37, p=0.000) and FEV_1/FVC (from 80.90±5.27 to 86.30±4.61, p=0.000) after taking the single dose of dexamethasone. IgE level was significantly higher in the same group after taking the medication (263.75 mg/dL before treatment, 342.6 mg/dL after treatment, p<0.001) (table 2).
- Group II showed highly statistically significant decrease in eosinophilic count (from 8.25±4.47 to 6.15±3.86, p=0.000), and a significant increase in saturated oxygen

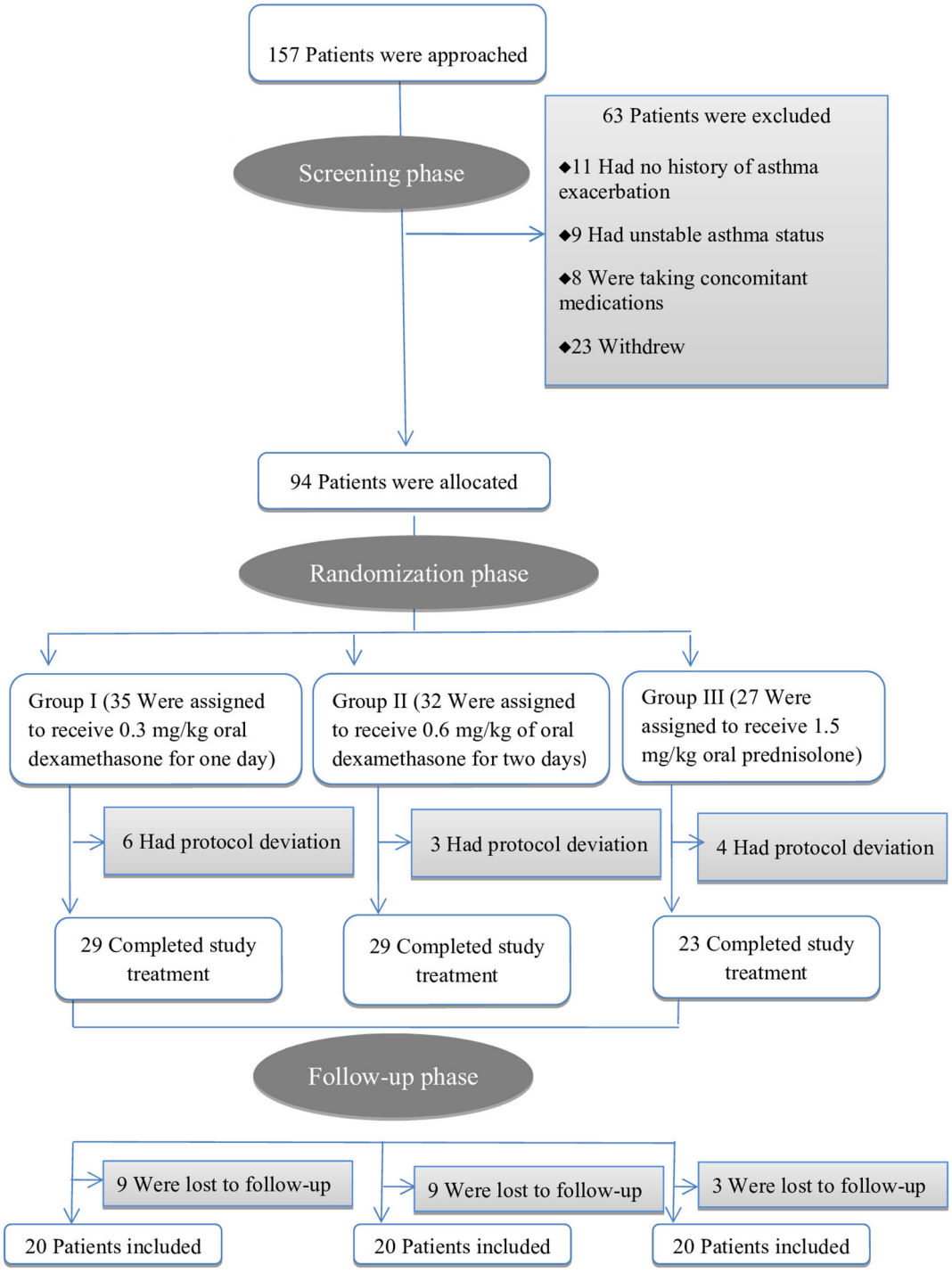

Figure 1 Patient screening, randomisation and follow-up phases.

(from 95.30 ± 1.63 to 97.05±1.10, p=0.000), PEF (from 52.80±14.14 to 79.95±11.32, p=0.000) and FEV_1/FVC (from 80.65 ± 7.17 to 88.10±4.38, p=0.000) after 2 consecutive days of dexamethasone treatment. The IgE level was significantly higher in the same group after taking the medication (255.45 mg/dL before treatment, 334.35 mg/dL after treatment, p<0.001) (table 3).

- Group III showed a highly statistically significant decrease in eosinophilic count (from 8.15±4.63 to 6.15±3.76, p=0.000), and a significant increase in saturated oxygen (from 95.55±1.28 to 97.05±1.05, p=0.000), PEF (from 54.25±13.20 to 80.70±10.25, p=0.000) and FEV_1/FVC (from 80.90±4.77 to 86.90±4.22, p=0.000) after taking the multidose prednisolone regimen. The IgE level was significantly higher in the same group after taking the medication (255.83 mg/dL before treatment, 330.35 mg/dL after treatment, p<0.001) (table 4).

There was no statistically significant difference in weight gain and blood sugar before and after 5 days of treatment within the same group. After 5 days of treatment, pairwise comparison showed a significant difference in blood sugar level only between group II and group III (p=0.004).

After 5 days of treatment, comparison of the participants showed that there was highly statistically significant difference in

Table 1 Baseline demographic and clinical characteristics data among the studied groups

Variables	Group I	Group II	Group III	P values
Age (years)	5.93±2.37	6.52±2.64	6.15±2.75	0.763
Weight (kg)	21.78±7.54	25.78±9.61	22.43±7.76	0.275
Height (cm)	115.33±15.11	118.14±16.29	116.05±16.45	0.846
Gender				
Female	12 (60)	10 (50)	9 (45)	
Male	8 (40)	10 (50)	11 (55)	0.63
Residency				
Rural	12 (60)	13 (65)	13 (65)	
City	8 (40)	7 (35)	7 (35)	0.93
Allergy				
Yes	9 (45)	9 (45)	11 (55)	0.77
Family history of asthma				
Positive	10 (50)	13 (65)	10 (50)	
Negative	10 (50)	7 (35)	10 (50)	0.55
Negative smokers				
Yes	11 (55)	12 (63)	11 (55)	0.84
Regular medications				
Inhaled steroid	12 (60)	13 (65)	13 (65)	0.93
LABA	2 (10)	4 (20)	3 (15)	0.67
LTRA	8 (40)	6 (30)	7 (35)	0.80
Salbutamol	15 (75)	16 (80)	18 (90)	0.45

Data are presented as N (%).
LABA, long-acting β_2 agonist; LTRA, leukotriene receptor antagonists.

MPIS, oxygen needs, duration of hospital admission and PRAM within the three groups (p<0.001).

After 30 days, ATAQ showed no significant differences among the three studied groups. There was no statistically significant difference among the three studied groups for missed days of school.

Safety outcome

Some side effects related to dexamethasone and prednisolone were documented in our study. Vomiting was reported in three patients in group I, four in group II and seven in group III. GIT cramps also were recorded in one patient in group I, four in group II and three in group III. The relapse rate was higher in group I than in group II and group III but with no statistically significant difference (relapse in 7, 6 and 4 patients, respectively, p=0.56) (table 5).

Table 2 Effects of single-dose dexamethasone (group I) on clinical data

Clinical data*	Before taking the drug	After 5 days	P values
Weight gain (kg)	21.78±7.54	21.83±7.52	0.163
Fasting blood sugar (mg/dL)	99.75±39.85	86.00±11.89	0.097
Eosinophilic count (%)	8.80±4.98	6.75±4.44	0.000
IgE level (mg/dL)	377.7±263.72	535.25±342.68	0.000
PEF (%)	53.10±13.17	80.10±10.37	0.000
FEV1/FVC (%)	80.90±5.27	86.30±4.61	0.000

Data are presented as mean ±SD.
*All measures were taken during daytime to avoid fluctuation during night and sleep (for all three drugs).
FEV_1, forced expiratory volume in 1 s; FVC, forced vital capacity; PEF, peak expiratory flow.

Table 3 Effects of dexamethasone for 2 consecutive days (group II) on clinical data

Clinical data	Before taking the drug	After 5 days	P values
Weight gain (kg)	25.78±9.61	25.79±9.55	0.881
Fasting blood sugar (mg/dL)	96.30±37.84	80.95±9.08	0.065
Eosinophilic count (%)	8.25±4.47	6.15±3.86	0.000
IgE level	369.8±255.04	526.75±334.33	0.000
PEF (%)	52.80±14.14	79.95±11.32	0.000
FEV1/FVC (%)	80.65±7.17	88.10±4.38	0.000

Data presented as mean ±SD.
FEV_1, forced expiratory volume in one second; FVC, forced vital capacity; PEF, peak expiratory flow.

DISCUSSION

Asthma is a chronic inflammatory pulmonary disorder that is characterised by reversible obstruction of the airways. The characteristics of asthma are airway inflammation and peripheral airway spasm, resulting in shortness of breathing, chest tightness, cough, wheezing and limitations to physical activity. The occurrence, frequency and intensity of effects may vary according to the GINA guidelines on asthma. Bronchial asthma is a serious global health problem, affecting people of all ages. Uncontrolled asthma can place severe limitations on daily life and may occasionally be fatal.[3] Corticosteroids are the standard treatment for asthma exacerbations and reduce the rate of hospitalisation and relapse.[11] Dexamethasone is an attractive alternative to prednisolone because of its longer duration of action and shorter treatment period, leading to better compliance and improved clinical outcomes.[12]

In this study, eosinophil count decreases significantly in group I (from 8.8 cells/mm^3 to 6.75 cells/mm^3, p<0.001), in group II (from 8.25 cells/mm^3 to 6.15 cells/mm^3, p<0.001) and in group III (from 8.15 cells/mm^3 to 6.15 cells/mm^3, p<0.001) after taking any regimen of corticosteroids. These results are similar to that reported by Fukakusa *et al*,[13] who suggested that prednisolone, 40 mg/day, effectively and significantly reduces lung eosinophilia (from around 32 cells/mm^3 to around 11 cells/mm^3, p<0.05) in asthmatic patients. Such a reduction is usually associated with favourable clinical response and was explained by the inhibition of eotaxin, monocyte chemotactic protein (MCP)-3,and MCP-4 production in the airway epithelium, inflammatory cells in the sub mucosa, or by both mechanisms.[13]

Corticosteroids have a detrimental effect on the allergic process by increasing the production of IgE from B lymphocytes stimulated with interleukin 4 (IL-4).[14] Zieg *et al*,[15] found that after 1 week of treatment with oral prednisolone, there was a small, but significant, rise in IgE (2.9 kU_A/L to 4.93 kU_A/L, p<0.001) in

Table 4 Effects of prednisolone for 5 days (group III) on clinical data

Clinical data	Before taking the drug	After 5 days	P values
Weight gain (kg)	22.43±7.76	22.42±7.75	0.793
Fasting blood sugar (mg/dL)	101.50±29.52	93.45±13.95	0.269
Eosinophilic count (%)	8.15±4.63	6.15±3.76	0.000
IgE level (mg/dL)	370.43±255.84	469.35±330.34	0.023
PEF (%)	54.25±13.20	80.70±10.25	0.000
FEV1/FVC (%)	80.90±4.77	86.90±4.22	0.000

Data presented as mean ±SD.
PEF, peak expiratory flow; FEV_1, forced expiratory volume in one second; FVC, forced vital capacity; PEF, peak expiratory flow.

Table 5 Effect of different drugs` regimens on some clinical data of the patients

Clinical data	Group I (n=20)	Group II (n=20)	Group III (n=20)	P values
Weight gain (kg)	21.83±7.52	25.79±9.55	22.42±7.75	0.275
Blood sugar (mg/dL)	86.00±11.89	80.95±9.08	93.45±13.95	0.006
Eosinophilic count (%)	6.75±4.44	6.15±3.86	6.15±3.76	0.863
IgE level	342.6±184.70	334.35±196.83	330.35±179.07	0.972
PEF (%)	80.10±0.37	79.95±11.32	80.70±10.25	0.973
FEV1/FVC (%)	86.30±4.61	88.10±4.38	86.90±4.22	0.426
PRAM score	1.35±1.09	1.45±1.10	1.35±1.14	0.947
MPIS	2.10±1.62	2.45±1.79	2.20±1.67	0.798
Side effects				
Vomiting	3 (15)	4 (20)	7 (35)	0.31
GIT cramps	1 (5)	4 (20)	3 (15)	0.32
Relapse of symptoms	7 (35)	6 (30)	4 (20)	0.56
ATAQ score after 30 days	2.95±2.19	3.35±2.01	3.05±2.09	0.822

Data presented as mean ±SD or N (%).
ATAQ, Asthma Therapy Assessment Questionnaire; FEV_1, forced expiratory volume in one second; FVC, forced vital capacity; GIT, gastrointestinal tract; MPIS, Modified Pulmonary Index Score; PEF, peak expiratory flow; PRAM, Paediatric Respiratory Assessment Measure.

asthmatic patients.[15] This is in accord with our study that shows a statistically significant increase in the level of IgE after corticosteroid treatment (263.75, 255.45 and 255.83 mg/dL to 342.6, 334.35 and 330.35 mg/dL, p<0.001) in group I, group II and group III, respectively.

In this study a highly statistically significant increased oxygen saturation was observed in group I, group II and group III (95.4%, 95.3% and 95.55% to 96.8%, 97.05% and 97.05%, respectively, p<0.001) after corticosteroid treatment. This is in agreement with Evensen,[16] who found that systemic corticosteroids prolong the time to subsequent exacerbation, decrease the rate of treatment failure, shorten hospital stays and improve hypoxemia and FEV_1.[16]

In the three studied groups, FEV_1/FVC showed a significant increase in group I (80.9% to 86.3%, p<0.001), group II (80.65% to 88.1%, p<0.001) and group III (80.9% to 86.9%, p<0.001). Significant increases were also recorded for PEF in group I (53.1% to 80.1%, p<0.001), group II (52.8% to 79.95%, p<0.001) and group III (54.25% to 80.7%, p<0.001). Razi *et al*,[17] quantified the response to treatment by measuring the percentage improvement in pulmonary function in FEV_1 (68.5% to 87%, p<0.001), FVC (79.9% to 94.9%, p<0.001) and PEF (48.02% to 78%, p<0.001), which showed that short-term oral glucocorticoid treatment in an acute asthmatic attack was effective.[17]

Similar to our study, Qureshi *et al*,[18] performed the largest study to date on 533 patients comparing 2 days of oral dexamethasone treatment and 5 days oral prednisone and found that there was no significant difference in relapse rates and symptoms in children at the end of 10 days of follow-up.[17] Using a similar regimen, Greenberg *et al*,[19] conducted a prospective, randomised, double-blind study on children admitted to the ED with a history of asthma, randomised to 0.6 mg/kg of dexamethasone or 2 mg/kg of prednisone and evaluated by a paediatric asthma score. The patients/families were contacted by telephone 10 days later and asked about relapse. They found no significant difference in relapse rates between the dexamethasone and the prednisone groups.[19]

Kravitz *et al*,[20] concluded that a 2-day course of oral dexamethasone is at least as effective as 5 days of oral prednisone for adult patients (aged 18–45 years), with a return to daily activities at 3 days as determined by a telephone follow-up visit after 2 weeks; the two groups had similar relapse rates.[20]

In our study, the relapse of symptoms after 5 days was higher in group I than in group II and group III (35, 30% and 20%, p=0.56 respectively) but with no statistically significant difference. Gries *et al*,[21] conducted a prospective, randomised, investigator-blinded study in patients aged 6 months to 7 years. There was no difference between the two groups in the proportion of patients who returned to baseline levels based on asthma scoring performed on day 5 or who had a 'relapse' within 1 month. One of this study's major limitations, in addition to the small sample size, was the inclusion of children aged <2 years, who might have had bronchiolitis and for whom steroids do not have a demonstrated benefit.[21]

Gordon *et al*[22] performed a prospective, randomised trial on paediatric patients who received either a single dose of intramuscular dexamethasone phosphate or 5 days of oral prednisolone. Investigators compared the initial ED clinical asthma score and the score measured after 4 days' follow-up. They found no significant difference in mean asthma score.[22]

Altamimi *et al*[23] compared a single dose of oral dexamethasone with 5 days oral prednisolone in a prospective, randomised, double-blind study. Owing to insufficient enrolment, the results did not reach statistical significance but suggested similarity in patient self-assessment scores of return-to-baseline levels on re-evaluation at day 5.[23]

Cronin *et al*,[24] conducted a randomised, open-label, non-inferiority trial comparing a single dose of oral dexamethasone with 3 days of prednisolone in children with acute exacerbations of asthma. A single dose of oral dexamethasone was found to be non-inferior to a 3-day course of oral prednisolone as measured by the mean PRAM score on day 4.[24]

The meta-analysis study conducted by Cross*et al*[25] stated that there is growing evidence that a shorter course of dexamethasone is as efficacious as prednisone in the treatment of mild to moderate asthma exacerbations in children presenting to the ED.[25]

The results of all the studies mentioned above were in agreement with ours, finding no statistically significant difference between a single dose of oral dexamethasone and 5 days of oral prednisolone.

In contrast, Rehrer *et al*,[26] did not support these conclusions.[26]

In the present study, side effects, especially hyperglycemia, weight gain, vomiting and GIT cramps, were evaluated. We found no significant difference between single-dose dexamethasone,

2 days of dexamethasone and 5 days of prednisolone for hyperglycemia (p=0.097, p=0.065 and p=0.269, respectively); weight gain (p=0.163, p=0.881 and p=0.793, respectively); vomiting (15%, 20% and 35%, respectively; p=0.31) and GIT cramps (5%, 20% and 15%, respectively; p=0.32). Vomiting was the chief side effect in many studies which compared 2 days of dexamethasone with 5 days of prednisolone. Similar to our results, Qureshi *et al*,[18] and Greenberg *et al*,[19] demonstrated that there was no difference in rate of vomiting between patients given prednisone and dexamethasone in the ED (p=0.17 and 0.24, respectively). Moreover, a meta-analysis by Keeney *et al*,[12] in a randomised controlled trial found that in paediatric patients aged <18 years who present to the ED with an acute exacerbation of asthma, oral or intramuscular dexamethasone decreased vomiting in the ED and at home as compared with a 5-day course of prednisone/prednisolone.[12] In a contrast, Gordon *et al*,[22] found 13% of their prednisolone group vomited at least once after taking the home medication.[22]

Study limitations

This study's limitations included small sample size. Furthermore, using spirometry for children aged <4 years might be inaccurate since results depend on patient cooperation, effort and comprehension to follow the instructions given, which is difficult at that age.

CONCLUSION AND RECOMMENDATION

This study showed that single dose of oral dexamethasone (0.3 mg/kg) is at least as effective as 5-day course of oral prednisolone (1.5 mg/kg/day) in controlling asthma. Additionally, 2 days of oral dexamethasone (0.6 mg/kg/day) is non-inferior to 5 days of prednisolone in children with asthma exacerbation as measured by PRAM and MPIS on day 5. Large-scale trials are needed to confirm that dexamethasone is a good alternative to prednisolone.

What this paper adds

What is already known on this subject

- Asthma is one of the most prevalent chronic respiratory diseases, which leads to frequent emergency department visits.
- Historically, corticosteroids, especially prednisolone, are the preferred drug for controlling asthma exacerbations. We tested dexamethasone as an alternative to prednisolone.

What this study adds

- A single dose of oral dexamethasone (0.3 mg/kg) is at least as effective as a 5-day course of oral prednisolone (1.5 mg/kg/day) in controlling asthma but with higher relapse of symptoms.
- Two days of oral dexamethasone (0.6 mg/kg/day) is non-inferior to 5 days of prednisolone in children with asthma exacerbation but with a higher rate of gastrointestinal cramps.

Acknowledgements The authors thank all children and their families and all staff of the Pediatrics Department, Tanta University Hospital.

Contributors DAE-K: prepared the remedies at the correct dose, wrote the manuscript, carried out the statistical analysis, followed up the patients. OMI, GAE: prepared the remedies at the correct dose, conceived the idea for the research, supervised the research, revised and approved the manuscript. SME: recruited patients, followed up the patients, supervised the research, revised and approved the manuscript.

Funding This study was self-funded.

Competing interests None declared.

Patient consent Not required.

Ethics approval Ethical committee of the research center of Tanta University.

Provenance and peer review Not commissioned; internally peer reviewed.

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