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Research Article

ROLE OF ORAL STEROIDS (DEXAMETHASONE) IN CHILDREN WITH BRONCHIOLITIS IN RELATION TO DURATION OF HOSPITAL STAY

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ABSTRACT
Objective of the study was to determine whether treatment with oral dexamethasone in bronchiolitis helps in earlier recovery and reduces return visits in children with bronchiolitis with family history of asthma in comparison with salbutamol alone. Four hundred children with bronchiolitis and family history of asthma were studied. They were randomized into two groups of 200 each (group1 and group 2). In group 1, Dexamethasone was prepared at a dose of 1mg/kg for the first day, followed by 0.6 mg/kg. Children in both the groups received 0.15mg/kg/dose salbutamol nebulization until clinical improvement and daily for 4 days. Improvement of disease will be assessed by "Wang respiratory clinical score" and variables will be analyzed. The duration of hospital stay, readmissions were compared between the two groups and analyzed. In group 1 the mean duration of hospital stay was significantly less than group 2 (p=0.014). The number of readmissions was also found to be significantly less in group 1 compared to group 2 (p=0.02) although follow up is only up to one week without significant side effects. Treatment with oral dexamethasone in children with family history of asthma and repeated with bronchiolitis, not only reduced the duration of hospital stay without significant side effects but also decreased number of readmissions.

Keywords: *Bronchiolitis, Steroids*

INTRODUCTION
Bronchiolitis is the most common cause of LRTI in children, of age group less than 2 years requiring inpatient treatment (Coffin, 2005). The evidence linking atopic asthma to bronchiolitis is complex (Everald, 1999). The standard guidelines of managements are mainly supportive like close monitoring of vital signs, oxygen, hydration and nutrition as bronchiolitis is predominantly a viral disease. Attempts have been made to treat with antivirals with no significant results (Ambalavanam and Carlo, 2011). Similarly, treatment first attack of asthma and subsequent wheezing is known to be triggered by viral LRTI. A shorter stay and possibly a lower chance of needing return visits or readmissions are desirable goals of better bronchiolitis therapy. Some studies have been done to assess the role of steroids in acute bronchiolitis in a child at risk for asthma with varying results (Scarfone *et al.,* 1993). Hence, the present study was done to evaluate the role of oral dexamethasone in the treatment of bronchiolitis with family history of asthma in terms of reduction of duration of hospital stay and readmissions.

Aims and Objectives of Study
To determine whether treatment with oral dexamethasone in bronchiolitis helps in earlier recovery and reduces return visits in children with bronchiolitis with family history of asthma in comparison with salbutamol alone.

Review of Literature
A number of agents have been proposed as adjunctive therapies for bronchiolitis. Bronchodilators can produce modest short term improvement in clinical features, but the statistical improvement in clinical scoring systems seen with them is not always clinically significant. Several studies have included both infants with first-time and recurrent wheezing, complicating interpretation of the data.

A study done by Plint *et al.*, (2009) in Canada, on 800 infants of 6-12 months of age with Brochiolitis concluded that treating infants with bronchiolitis using a combined therapy of dexamethasone and epinephrine may clinically reduce hospital admission.

In a study done by Alansari *et al.,* (2013) in Qatar, 200 previously healthy infants diagnosed with bronchiolitis, with a median age of 3.5 months were enrolled. He concluded that dexamethasone with salbutamol shortened time to readiness for infirmary discharge during bronchiolitis episodes in patients with eczema or family history of asthma in a first degree relative.

Schuh *et al.*, (2002) did a double blinded placebo controlled trial in Canada, on 17 school going children less than 24 months old. The study concluded that outpatients with moderate to severe bronchiolitis derive significant clinical and hospitalization benefits from oral dexamethasone treatment in the initial four hours of therapy.

Corneli *et al.,* (2007) conducted a double blinded randomized trial, on 600 children (2 to months). The study concluded that in infants with acute moderate to severe brochiolitis, a single dose of 1mg/kg oral dexamethazone did not alter the rate of hospital admission or the respiratory status after 4 hours of observation.

MATERIALS AND METHODS

Inclusion Criteria

1. All children from age of 2 months to 2 years with bronchiolitis requiring hospital admission.
2. Child with positive h/o eczema or positive family h/o asthma.

Exclusion Criteria

1. Children who was offered nothing orally due to the severity of illness.
2. Children with any other co-morbid conditions like

a) Children born with low birth weight or preterm delivery

b) Children known to have congenital abnormalities of respiratory system and cardiovascular system.

c) Children having evidence of bacterial infection

d) Children having received antibiotics or steroids prior to admissions

A Randomised controlled study was done on Children attending emergency clinic in MVJ Medical college, a tertiary care Hospital in Rural Bangalore from November 2014 to October 2016 who was diagnosed to be having bronchiolitis with positive h/o eczema or with family h/o asthma. All children fitting into above criteria was taken into two groups by random numbering technique. Group 1 was received oral dexamethasone with salbutamol and Group 2 was received salbutamol only. Dexamethasone was prepared at a concentration of 1 mg/ml and will be administered orally after enrollment at a dosage of 1 ml/kg for the first day, followed by 0.6 ml/kg once daily for 4 days. All patients received 0.15 mg/kg/dose salbutamol nebulization mixed with 2 ml normal saline at 0, 30, 60, and 120 mins and then every 2 hours until clinical improvement and then every 6^{th}-8^{th} hourly until ready for discharge. The delivery was done through a tight-fitted face mask by pressurized oxygen with the flow meter set at 10 L/min. Improvement of disease was assessed by "Wang respiratory clinical score" and two groups were compared in terms of duration of hospital stay and readmissions.

Statistical Analysis

Means of quantitative variables between the two independent groups was analyzed using unpaired-t test or Wilcoxon rank sum tests and the association between two or more qualitative and categorical variables was assessed using the chi-square test.

RESULTS AND DISCUSSION

Results

Patients were randomized in to two groups of 200 each. The basic characteristic data of the two groups were compared. There were no significant differences between the two groups regarding the mean age, gender distribution, family history of asthma, mean saturation and mean baseline Wang score. Thus, the groups were comparable. The mean duration of hospital stay was found to be significantly lesser in the children of group 1(37.74 hrs) than group2 (42.9hrs). The percentage of readmissions was also found to be significantly less in group1 (11.5%) compared to group 2 (21%) although follow up is only up to

week. There were no significant side effects in both the groups apart from vomiting (6.5%) in group 1 and tachycardia (5%) in both the groups.

Table 1: Comparison of Mean Duration of Hospital Stay in between the Two Groups

	Group 1	Group 2	p value
Geometric mean of duration of hospital stay	38.6±17.5	42.9±17.7	0.014

Table 2: Comparison of Readmissions

	Group 1 (200)		Group 2 (200)		p Value
	N	%	N	%	
Readmissions	23	11.5	42	21	0.02

Table 3: Comparison of Adverse Effects

	Group 1	Group 2
Vomiting	6.5%	-
Tachycardia	5%	5%

Discussion

Duration of Hospital Stay

In our study the mean time taken for discharge from the hospital was 37.74 hrs in group 1 which was significantly lesser than 42.9 hrs in group 2 (p value=0.014). These findings are in concurrence with the study done by Alansari (2013).

In the study done by Alansari *et al.,* (2013) in Qatar on 200 infants diagnosed with bronchiolitis in patients with family history of asthma or eczema, it was concluded that group1 (18.6 hrs) has shorter duration of hospital stay than in group 2(27.1 hrs).

In Corneli *et al.,* (2007) study on 600 children, the mean length of stay for hospitalized patients was 2.55 days in the dexamethasone group and 2.27 days in the placebo group (P= 0.10). They found that treatment did not significantly alter the rate of hospital admission or the respiratory status after 4 hours of observation and these results were not modified by presence or absence of history of asthma.

In a study done by Plint *et al.,* (2009) in Canada, on 800 infants of 6-12 months of age with brochiolitis, the median duration of hospital stay in group 1 (oral dexamthasone and nebulised epinephrine) was slightly shorter than that for group 4 (placebo) which was 4.6 and 5.3 hours respectively (unadjusted P = 0.02), whereas neither group 3 (only dexamethasone) which was 5.1 hours, nor group 2 (nebulized epinephrine) which was 4.9 hours differed from group 4 on this measure. These results were did not get modified by the presence or absence of a history of asthma.

Schuh *et al.,* (2002) study done on outpatients with acute bronchiolitis, had observed reduced number hospitalisations in oral dexamethasone treatment group after initial four hours of therapy.

Readmissions in different Studies

In our study the percentage of patients readmitted in group 1 was 12.5% and where as in group 2 it was 21% (p=0.02)

In the study done by Alansari *et al.,* (2013) in Qatar, there were no readmissions but children came for clinical visits.

Corneli *et al.,* (2007) study showed that dexamethasone group had 39.7% and placebo group had 41% readmissions and in their subgroup analysis dexamethasone did not affect the subsequent admissions or unscheduled medical visits.

In the study done by Plint *et al.,* (2009) as mentioned above, 95 patients (47.7%) in group 1, 93 (47.0%) in group 2, 106 (53.3%) in group 3, and 86 (42.8%) in group 4 returned to the hospital for bronchiolitis symptoms and they concluded that treating infants with bronchiolitis using a combined therapy of

dexamethasone and epinephrine may clinically reduce hospital admission rate and in their subgroup analysis the results were not modified by the presence or absence of history of asthma.

Adverse Effects of our Study with Other Studies

In our study, vomiting was the adverse effect observed in 8 children (6.5%) in group 1. Whereas tachycardia, the other side effect was observed in 10 children (5%) in group 1 and 10 children (5%) in group 2.

In Plint *et al.*, (2009) study, pallor was reported in 76 infants (9.5%), tremor in 15 (1.9%), and vomiting in 14 (1.8%), with no significant differences among the groups.

In Corneli *et al.*, (2007) study, vomiting occurred in 5.5% of the dexamethasone group and 4.7% of the placebo group.

In our study, vomiting was attributed to oral dexamethasone and tachycardia was due to salbutamol whereas in other studies tremors were due to inclusion of epinephrine in different groups.

Conclusion

In the present study, we have reported the efficacy of early steroid administration in children presenting with bronchiolitis with family history of asthma, in terms of early discharge and lesser readmissions without any significant side effects probably due to synergistic effect of salbutamol and dexamethasone.

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