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Original Research Article

EFFICACY OF ORAL PREDNISOLONE IN MANAGEMENT OF BRONCHIOLITIS: A PLACEBO-CONTROLLED STUDY

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Abstract: *Acute bronchiolitis is a common and deadly condition in infants described as a respiratory infection due to inflammatory obstruction of bronchioles. This study was designed to assess prednisolone's efficacy in treating bronchiolitis in children aged >2 years. A retrospective study was conducted in the Department of peadiatrics in different hospitals from February 2022- February 2023. A total of 80 children aged > 2 years with acute bronchiolitis were included in the study. The patients were divided into groups A and B. Group A (n=40) was administered salbutamol combined with prednisolone, and Group B (n=40) was administered salbutamol alone. The outcomes of both treatments were evaluated. The average age in group A and B was 6.9± 4.5 months and 5.5 ± 3.9 months, respectively. 65 patients (81.2%) belonged to middle-class families, and 20 (25%) came from crowded households. 10 patients (12.5%) had a preterm delivery, and 12 (15%) had low birth weight. A significant difference was observed in Group A after 3 days of treatment (p <0.05), and a reduction in hospital stay was also noted (p<0.001) in contrast with Group B. Based on the results, it can be concluded that the prednisolone is an effective drug in the management of bronchiolitis by reducing hospital stay and disease severity in children > 2 years*

Keywords: Prednisolone, bronchiolitis, infants, placebo

Introduction

Acute bronchiolitis is a common and deadly condition in infants described as a respiratory infection due to inflammatory obstruction of bronchioles (Piedra and Stark, 2020). The health and treatment cost of bronchiolitis is impractical for the patients, and this cost is even higher for patients with co-morbidities like pneumonia (Bozzola et al., 2021). Most infants and young children brought to the outpatient department for respiratory problems are diagnosed with bronchiolitis (Tejedor-Sojo et al., 2019). Most of these patients are 6 months or younger, and the modal age is 3 years. In Pakistan, 10% of pediatric ward admissions are due to bronchiolitis (Ali et al., 2017). Acute bronchiolitis is mostly caused by Respiratory Syncytial Virus, accounting for 50-90% of cases (Bylsma et al., 2022). All children are infected by this virus 2 years after birth, and most infants recover independently. About 0.5-2% suffer from more serious infections such as bronchiolitis and require hospitalization. A number of studies have been conducted to devise improved treatments, but they don't report strong evidence for their benefits. Supportive therapy with oxygen and assisted feeding is the primary treatment currently. Recently, corticosteroids have been proposed for treating acute bronchiolitis in infants. In our study, we assessed prednisolone's efficacy in treating bronchiolitis in children aged >2 years.

Methodology

A retrospective study was conducted in the Department of Pediatrics in different hospitals from February 2022- February 2023. A total of 80 children of both genders, aged > 2 years, with acute bronchiolitis were included in the study. The study did not include children with congenital heart disease, bronchopneumonia, and history of asthma and attacks of cough and wheezing, and secondary bacterial infection. Informed consent from guardians was taken to include their children in the analysis. The ethical board approved the study of the hospital. The patients were divided into two Group A and B. Group A (n=40) were administered 0.15 mg/kg body weight salbutamol in dilution with 3ml nebulized saline combined with 1mg/kg oral prednisolone for 3 days, and Group B (n=40) was administered same dose of salbutamol alone every 8 hours. Patients of both groups received assisted feeding orally or through IV

and oxygen therapy. The response to treatment was noted every day for 3 days. The discharge date was also noted to calculate stay length.

All the data was evaluated by SPSS 23. T-test was performed to assess continuous parameters, while the x2 test assessed the non-continuous variables. A probability of 0.05 was taken as statistically significant.

Results

A total of 80 patients with acute bronchiolitis were included in the study. No significant difference was observed in terms of respiratory rate between both groups, A and B, on day 1 of treatment (63.48 vs. 63.77/ minute). However, a significant difference was observed on day 3 (42.82 vs. 48.84/ mint). No significant difference in oxygen saturation was noted on day 3 between both groups (97.18 ± 0.59 vs. 97.05 ± 0.76) (Table I).

All the patients had rhonchi on day 1, which decreased in both groups on day 3. By day 3, 32 patients had rhonchi in group A and 38 in group B. The prednisolone treatment had a great effect on chest indrawing. Only 6 patients in group A had chest drawings on day 3 (Table II). Similarly, the disease severity score was reduced more effectively in the prednisolone group, i.e., 1.99 ± 0.59 on day 3 (Table III). The hospital stay in group A was 3.33 ± 0.55 days, and 4.55 ± 1.15 days in group B.

Table I: Change in oxygen saturation and respiratory rate

Number of days	Group A	Group B	P value
Mean Oxygen saturation (SD)			
Day 1	89.97 ± 2.46	89.98 ± 2.42	0.967
Day 2	96 ± 1.45	95.7 ± 1.40	0.515
Day 3	97.18 ± 0.59	97.05 ± 0.76	0.147
Respiratory rate/min			
Day 1	63.48	63.77	<0.001
Day 2	51.0	55.21	
Day 3	42.82	48.84	

Table II: Effect on Rhonchi and chest indrawing

Number of days	Group A	Group B	X2	P value
Rhonchi				
Day 1	40 (100%)	40 (100%)	4.58	0.02
Day 2	38 (95%)	39 (97.5%)		
Day 3	32 (80%)	38 (92.5%)		
Chest indrawing				
Day 1	40 (100%)	40 (100%)	12.75	0.001
Day 2	20 (50%)	34 (85%)		
Day 3	6 (15%)	22 (55%)		

Table III: Assessment of severity of disease

Number of days	Group A	Group B	P value
Day 1	6.88 ± 0.78	6.99 ± 0.68	<0.001
Day 2	2.50 ± 0.66	3.26 ± 0.89	
Day 3	1.99 ± 0.59	2.95 ± 0.78	

Discussion

We assessed the efficacy of prednisolone in infants with acute bronchiolitis. Prednisolone combined with salbutamol showed better results in reducing hospital stay, disease severity, and related factors than salbutamol alone.

The baseline respiratory rate was noted at 3 days of treatment in both groups. On day 1, no significant difference was observed, but on day 3, the results in groups A and B differed significantly (42.82 vs. 48.84/ mint) (p<0.001). Other studies have drawn similar conclusions (Gelbart et al., 2022; Hasan et al., 2021).

Regarding oxygen saturation, although the improvement was gradual in both groups, the difference was insignificant (97.18 ± 0.59 vs. 97.05 ± 0.76). Other studies have also reported comparative results (Baig et al., 2019; Korppi et al., 2019). All the patients in both groups had rhonchi, but this symptom gradually reduced on day 3. In comparison to both groups, the prednisolone group showed more gradual

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improvement. 32 patients (80%) had rhonchi on day 3 vs. 38 patients (92.5%) in group B. This effect of prednisolone on rhonchi was also seen in other studies as it reduces edema and inflammation of airways, resultantly getting rid of rhonchi (Fernandes et al., 2019).

A significant difference between both groups was observed as to the effect of drugs on chest indrawing. On day 3, only 6 (15%) patients in group A had a chest indrawing as compared to 22 (555) in group B ($p=0.001$). These results are similar to other studies (Foster et al., 2018). Prednisolone significantly reduced the duration of hospital stay, i.e., 3.33 ± 0.55 days, compared to 4.55 ± 1.15 days in group B ($p<0.001$). Other studies have noted similar results (Shaw and Wisner, 2022).

The severity score did not differ significantly on the day of treatment (6.88 ± 0.78 vs. 6.99 ± 0.68), but a reduction in severity was observed in group A on day 3, i.e., 1.99 ± 0.59 as compared to a relatively high score in group B, i.e., 2.95 ± 0.78. Similar results were reported by a local study (Ahmad et al., 2019)

Our study had some limitations. A small sample was selected for the study conducted in a single center. A large population multicenter study may yield better results.

Conclusion

Prednisolone is an effective drug in managing bronchiolitis by reducing hospital stay and disease severity in children > 2 years.

Conflict of interest

The authors declared absence of conflict of interest.

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