IJIMM, Volume 3, Issue 5, 2025 ISSN: 2995-5319
http://medicaljournals.eu/index.php/IJIMM/issue/view/3

INTERNATIONAL JOURNAL OF INTEGRATIVE AND MODERN MEDICINE

Role of Dexamethasone in the Treatment of Acute Bronchiolitis

Murtadha Mohammed Jassim Alnabhan
M.B.Ch.B.-F.I.B.M.S-D.C.H.Ped, AL-Diwaniya health directors, AL-Diwaniya maternity and children hospital, Iraq

Dhaigham nazar Hameed Alobaidi
M.B.Ch.B.-F.I.B.M.S-D.C.H.Ped, AL-Diwaniya health directors, AL-Hussain pediatric hospital, Iraq

Montadhar Hashim Suhail
F.I.B.M.S.C.A.B..PM.B.Ch.B .Ped, DI-QAR health directors, Al - Rifai teaching Hospital, Iraq

Annotation: Background: Bronchiolitis is a lower respiratory tract infection that occurs in children younger than two years old. It is usually caused by viruses, Bronchiolitis is a common cause of illness and is the leading cause of hospitalization in infants and young children. Bronchiolitis diagnosed clinically and can be treated by adequate fluids and oxygen therapy

Aim of the study: to assess the efficacy of dexamethasone in the treatment of acute bronchiolitis.

Patients Methods: A case control study was done at the pediatrics department of the AL-Diwaniya maternity and children hospital on 100 children aged below 24 months, with a clinical diagnosis of acute bronchiolitis, who were admitted during the period from the 1st of October 2013 to the 31th of March 2014.The patients enrolled in the study were divided in two groups: group 1 (48 patients) that received dexamethasone and group 2 (52 patients) that did not receive dexamethasone. All hundred patients have the same baseline characteristics of admission and treatment except for that of dexamethasone then a comparison between the two groups was done.

Results: Most of the cases 22 (78.5%) in group 1 started to improve within the 1st to 2nd day of admission while in group 2 most of cases 24 (46.1) started to improve within the third and fourth day of admission. P-values were 0.79 (non-significant). In Group 1,the mean and standard deviation for heart rate were decreased by 20.2±1.1, respiratory rate decreased by 11±2.1 and the mean SpO2 Increased by 3.4±0.3. In Group 2 there was a similar change after 24 hours with mean heart rate decreased by 19±1, mean respiratory rate falling by 11.6±0.7, and mean SpO2 increasing by 2.5±0.3. On analysis, there was no significant changes in the HR, RR, SpO2 between the two groups. Most of the cases in both groups discharged within 3rd-6th days of admission 28 cases (58.3%) in group 1 and 29 cases (55.7%) in group 2, p values were 0.99 (non-significant).

Conclusion: the clinical trials of Dexamethasone show no significant beneficial effect in the treatment of bronchiolitis.

Keywords: dexamethasone, acute bronchiolitis, dyspnea.

Introduction

Bronchiolitis is the predominant lower respiratory tract infection in infants throughout their first year of life (1). In the United States, bronchiolitis results in 234,000 emergency department visits and 140,000 hospital hospitalizations each year among children under 2 years old, with an estimated cost of $1.73 billion in 2009. It is characterized by significant inflammation and edema of the airways, increased mucus production, and desquamation of airway epithelial cells (4). The traditional clinical manifestation of bronchiolitis commences with symptoms indicative of a viral upper respiratory infection, including low-grade fever, rhinorrhea, and nasal congestion, which subsequently progress to the lower respiratory tract over several days. The course of symptoms may differ, although a defining characteristic of bronchiolitis is the minute-to-minute variation in clinical manifestations, as mucus

and debris in the airways are expelled by coughing or as the child's state shifts from sleep to agitation. Although other definitions of bronchiolitis exist, the term is typically used to denote the initial occurrence of wheezing in infants under 12 months of age.

The unpredictable progression of bronchiolitis and clinicians' failure to ascertain the necessity of supportive care sometimes lead to hospital admissions, even in the absence of severe symptoms. While the clinical features of bronchiolitis caused by several viruses are typically similar, certain discrepancies in illness severity have been documented. Research indicates that rhinovirus-associated bronchiolitis may lead to a reduced duration of hospitalization compared to bronchiolitis caused by respiratory syncytial virus (RSV) (7).

Despite the significant burden of bronchiolitis, identifying optimal care for a young child afflicted with this condition has proven difficult due to the absence of a curative treatment. Beta-2 agonist bronchodilators, epinephrine, corticosteroids, hypertonic saline, supplementary oxygen, antibiotic therapy, antiviral therapy, cold mist or saline spray, suctioning, and chest physiotherapy are contraindicated for treating children with bronchiolitis (8). Clinicians may opt against providing oxygen supplementation when oxyhemoglobin saturation surpasses 90%. Intravenous or nasogastric fluids may be employed for children with bronchiolitis who are unable to sustain hydration orally (9). No existing medication effectively reduces the duration of bronchiolitis or hastens symptom remission. The treatment approach is supportive, and most children with bronchiolitis fare well regardless of the management strategy employed. The degree of pharmaceutical therapies in hospitalized children has been shown to have a little association with the severity of disease (10).

Many guidelines advise against the routine use of bronchodilators for treating bronchiolitis due to a lack of conclusive data. Multiple trials have assessed the efficacy of bronchodilators in treating bronchiolitis, and systematic reviews have shown no consistent advantage. Numerous research have investigated the effect of corticosteroids in the treatment of children with bronchiolitis. These study aimed to to assess the efficacy of dexamethasone in the treatment of acute bronchiolitis.

Methodology

A case control study was done at the pediatrics department of the AL-Diwaniya maternity and children hospital on 100 children aged below 24 months, with a clinical diagnosis of acute bronchiolitis, who were admitted during the period from the 1st of October 2024 to the 31th of March 2025. The following points were included in the history and examination of each patient with acute bronchiolitis: age, sex,residence, family history of atopy (sneezing, eczema, food allergy, dermititis, asthma..), family history of smoking, history and duration of URTI before onset of disease, history and duration of dyspnea before admission, type of feeding, crowding index (no. of persons / no. of rooms), feeding intolerance, cough.

The included cases were divided into 2 groups:

Group 1: forty eight patients with acute bronchiolitis who received I.V. dexamethasone 0.4 mg/kg/day12 hourly for two days in addition to the other lines of treatment of bronchiolitis (O2, beta 2 agonist salbutamol neublizer every 6 hours, intravenous fluid, intravenous antibiotics, keeping the child warm and put him in head up posture).

Group 2: fifty-two patients with acute bronchiolitis who received all the modalities of treatment mentioned above with no steroid therapy.

Both groups were followed for severity (assessment of HR and RR daily, sings of dyspnea mentioned above). Also each patient in both groups were evaluated for the presence of hypoxia using the pulse oxymeter (patient considered as hypoxic if the PaO2 less than 90 mmHg).The patients is discharged after normalization of the PaO2 level and improvement of the clinical condition (normal RR and no signs of dyspnea).

Statistical analysis was done using SPSS version 20 software program, Chi square test was used and a P value < 0.05 was considered significant.

Result

Table (1) the distribution of the cases according to the age and sex of the patients:

Age in months	Male	%	Female	%	Total	%
Less than 6	47	47	20	20	67	67
6 – 12	15	15	12	12	27	27
12 – 24	4	4	2	2	6	6
	66	66	34	34	100	100

The total number of cases was 100 diagnosed as acute bronchiolitis. The age range of patients was 1day - 24months, the mean age was 4.9±3.3 months. Males were 66 (66%) and females were 34 (34%), with male to female ratio of 1.9:1.Table 1 shows the distribution of cases according to the age and sex of the patients. Most of the study cases were under the age of 6 months 67 (67%),other age groups were as follow: 6-12 months were 27 (27%) and 6 (6%) cases more than 12 months.

Table (2) the distribution of cases according to the time of improvement:

Duration (days)		G-1(48)		G-2(52)		
		No.	%	No.	%	P value
1 - 2	<6 m	13	27	11	21.1	0.79
	6 -12m	8	16.6	7	13.5	
	12 – 24	1	2	1	1.9	
	Total	22	45.8	19	36.5	
3 - 4	<6 m	15	31.3	16	30.8	0.81
	6 -12m	4	8.3	6	11.5	
	12 – 24	1	2	2	3.8	
	Total	20	41.6	24	46.1	
5 and more	<6 m	5	10.5	7	13.5	0.68
	6 -12m	1	2	1	1.9	
	12 – 24	0	0	1	1.9	
	Total	6	12.5	9	17.3	

Table (2) shows the distribution of cases according to the time of improvement in clinical presentations in the two groups. Most of the cases 22 (78.5%) in group 1 started to improve within the 1st to 2nd day of admission while in group 2 most of cases 24 (46.1) started to improve within the third and fourth day of admission. P-values were 0.79 (non-significant).

Table (3) the distribution of cases according to the differences in the mean of parameters (HR, RR, SpO2) at admission and after 24 hours

parameters	G-1	G-2	P-value
HR	20.2±1.1	19±1	0.44
RR	11±2.1	11.6±0.7	0.28
SpO2	3.4±0.3	2.5±0.3	0.12

Table (3) shows the mean SD changes in parameters (HR, RR, Spo2) in both groups: In Group 1,the mean and SD for HR were decresed by 20.2±1.1,respiratory rate decreased by 11±2.1 and the mean SpO2 Increased by 3.4±0.3.In Group 2 there was a similar change after 24 hours with mean heart rate decresed by 19±1, mean RR falling by 11.6±0.7, and mean SpO2 increasing by 2.5±0.3. On analysis, there was no significant difference in change of HR, RR, Spo2 between the two groups.

Table (4) the distribution of cases according to the duration of stay in hospital:

Duration (days)		G-1(48)		G-2(52)		
		No.	%	No.	%	P value
1 - 2	<6 m	4	8.3	3	5.8	0.98
	6 -12m	2	4.2	1	1.9	
	12 – 24	1	2	1	1.9	
	Total	7	14.5	5	9.6	
3 - 4	<6 m	18	37.6	19	36.5	0.99
	6 -12m	9	18.7	9	17.3	
	12 – 24	1	2	1	1.9	
	Total	28	58.3	29	55.8	
5 and more	<6 m	10	20.8	13	25	0.44
	6 -12m	3	6.2	3	5.8	
	12 – 24	0	0	2	3.8	
	Total	13	27	18	34.6	

Table (4) shows the total days of hospitalization needed for the patients in the both two groups of the study. Most of the cases in both groups discharged within 3rd - 6th days of treatment 28 cases (58.3%) in group 1 and 29 cases (55.7%) in group 2, P values were 0.99 (non-significant).

Discussion

In this study the mean age was 4.9±3.3 months which is similar to (12), but study (13) found mean age of 6.9 ± 3.4 months) This difference may be due the difference in the sample size. In this study male to female ratio was 1.9:1 and this agree with Seehusen who found male to female ratio was 2.08:1, . (12) and with study of Jawaria who found male to female ratio of 1.8:1) 13(. There was no significant difference in the severity of illness between males and females. Most of the study cases were under the age of 6 months 67 (67%) which agree with several other studies (14,15) which show that infants and mainly those under 6 months age were more prone to acute bronchiolitis. Infants are affected most often because of their small airways, high closing volumes, and insufficient collateral ventilation. Fewer than 5% of hospitalizations occur in the first 30 days of life, presumably because of transplacental transfer of maternal antibody. (16-18)

The clinical scores of severity and mean duration of hospitalization were similar between those used dexamethasone and those not used dexamethasone. This result is in agreement with the result of(18) same study which showed that neither intravenous dexamethasone against placebo had differences between the study groups for outcomes such as duration of hospitalization or time to resolution of clinical symptoms(19,20), but this is in disagreement with (21) who performed a meta-analysis of randomized, placebo-controlled trials of systemic corticosteroids and extracted data for length of stay, duration of symptoms and clinical scores for hospitalized infants with mild to moderate disease. The mean duration of hospitalization of infants with bronchiolitis in our study was 4.24days (ranging between 2-11 days) and the mean duration of hospitalization for Group1 4 days while 4.4 days for Group 2.with insignificant P value. These results are in agreement with DeBoek et al(19) were control aging <24 months and the clinical score is the same in addition to pO2 and PFT , the difference was -0.6,Roosvelt et al (20) who used IM dexamethasone on infants younger than 12 months with mean difference of- 0.4. In study (22) study who used oral dexamethasone in 35 of cases aging(1.5 - 15)months the difference was +1.2 i.e. the patient who received placebo drug get better improvement than steroid receivers.this is due to the difference in sample size and this study enrolled only cases of moderate to severe bronchiolitis. However other study (23) shows that despite the prominent role that inflammation plays in the pathogenesis of airway obstruction, corticosteroids have not proven beneficial in improving the clinical status of patients with bronchiolitis in a large, controlled multi-institutional study.

Conclusion

The clinical trials of it show no significant beneficial effect in the treatment of acute bronchiolitis, duration of hospitalization when using dexamethasone and changes in heart rate, respiratory rate and SpO2 when using dexamethasone

Conflict of interest

The authors decelerate that there are no any conflict

Reference

1. Bawazeer M, Aljeraisy M, Albanyan E, Abdullah A, Al Thaqafi W, Alenazi J, Al Ghaihab M. Effect of combined dexamethasone therapy with nebulized r-epinephrine or salbutamol in infants with bronchiolitis: A randomized, double-blind, controlled trial. Avicenna Journal of Medicine. 2014 Jul;4(03):58-65.
2. Dahmash DT. *Medication Administration Challenges Among Children and Young People Aged 0 to 18 Years Old (A mixed method approach)* (Doctoral dissertation, Aston University).
3. BNF (2016). *Paediatric Formulary Committee. British National Formulary for Children September 2016-17*. London: British Medical Association, Royal Pharmaceutical Society, the Royal College of Paediatrics and Child Health, and the Neonatal and Paediatric Pharmacists Group.
4. Meissner HC. Viral bronchiolitis in children. New England Journal of Medicine. 2016 Jan 7;374(1):62-72.
5. Fretzayas A, Moustaki M. Etiology and clinical features of viral bronchiolitis in infancy. World Journal of Pediatrics. 2017 Aug;13:293-9.
6. Jartti T, Smits HH, Bønnelykke K, Bircan O, Elenius V, Konradsen JR, Maggina P, Makrinioti H, Stokholm J, Hedlin G, Papadopoulos N. Bronchiolitis needs a revisit: distinguishing between virus entities and their treatments. Allergy. 2019 Jan;74(1):40-52.
7. Petrarca L, Nenna R, Frassanito A, Pierangeli A, Leonardi S, Scagnolari C, Antonelli G, Papoff P, Moretti C, Midulla F. Acute bronchiolitis: Influence of viral co-infection in infants hospitalized over 12 consecutive epidemic seasons. Journal of Medical Virology. 2018 Apr;90(4):631-8.
8. Caballero MT, Polack FP, Stein RT. Viral bronchiolitis in young infants: new perspectives for management and treatment. Jornal de pediatria. 2017;93(suppl 1):75-83.
9. Smith, D. K., Seales, S., and Budzik, C. (2017). Respiratory syncytial virus bronchiolitis in children. *Am. Fam. Physician* 95, 94–99.
10. Shein SL, Rotta AT, Speicher R, Slain KN, Gaston B. Corticosteroid therapy during acute bronchiolitis in patients who later develop asthma. Hospital Pediatrics. 2017 Jul 1;7(7):403-9.
11. Momand B, Aksoy M, Ararat E. Acute Asthma Outcomes Comparison: Low and Medium Dose Inhaled Corticosteroids After Hospitalization. InC31. WHAT'S NEW IN CLINICAL ASTHMA 2024 May (pp. A5277-A5277). American Thoracic Society.
12. Seehusen DA, Runde D. Bronchodilators for bronchiolitis. American family physician. 2015 Sep 1;92(5)
13. Jawaria, Masood, Anjum Zahid Mahmood, Taseer Ali Asgher, and Ayesha Hina. "Treatment of Bronchiolitis; role of inhaled beta-agonists in infants and children." (2015): 1126-1131.
14. Masood J, Anjum ZM, Taseer AA, Ayesha H. TREATMENT OF BRONCHIOLITIS: ROLE OF INHALED β-AGONISTS IN INFANTS AND CHILDREN. The Professional Medical Journal. 2015 Sep 10;22(09):1126-31.

15. Groothuis, J. R., E. A. F. Simoes, M. J. Levin, C. B. Hall, C. E. Long, W. J. Rodriguez, J. Arrobio, H. C. Meissner, D. R. Fulton, R. C. Welliver, D. A. Tristam, G. R. Siber, G. A. Prince, M. Van Raden, V. G. Hemming, and the Respiratory Syncytial Virus Immune Globulin Study Group. 1993. Prophylactic administration of respiratory syncytial virus immune globulin to high-risk infants and young children. N. Engl. J. Med. 329:1524-1530.
16. Vlašić Lončarić Ž, Savić-Jovanović T, Turkalj M. Acute bronchiolitis. Liječnički vjesnik. 2023 Apr 17;145(Supp 1):97-109
17. Al-Shawwa B, Al-Huniti N, Weinberger M, Abu-Hasan M. Clinical and therapeutic variables influencing hospitalisation for bronchiolitis in a community-based paediatric group practice. Primary Care Respiratory Journal. 2007 Apr;16(2):93-97.
18. Corneli HM, Zorc JJ, Holubkov R, Bregstein JS, Brown KM, Mahajan P, Kuppermann N, Bronchiolitis Study Group for the Pediatric Emergency Care Applied Research Network. Bronchiolitis: clinical characteristics associated with hospitalization and length of stay. Pediatric emergency care. 2012 Feb 1;28(2):99-103.
19. Levin DL, Garg A, Hall LJ, Slogic S, Jarvis JD, Leiter JC. A prospective randomized controlled blinded study of three bronchodilators in infants with respiratory syncytial virus bronchiolitis on mechanical ventilation. Pediatric Critical Care Medicine. 2008 Nov 1;9(6):598-604.
20. De Boeck K, Van der Aa N, Van Lierde S, Corbeel L, Eeckels R. Respiratory syncytial virus bronchiolitis: a double-blind dexamethasone efficacy study. The Journal of pediatrics. 1997 Dec 1;131(6):919-21.
21. Fernandes RM, Oleszczuk M, Woods CR, Rowe BH, Cates CJ, Hartling L. The Cochrane Library and safety of systemic corticosteroids for acute respiratory conditions in children: an overview of reviews. Evidence-Based Child Health: A Cochrane Review Journal. 2014 Sep;9(3):733-47.
22. Sharmim MS, Mollah AH, Rahman E, Afroz S, Alam MR, Khasru AA, Alam M, Nine SZ. Comparative Efficacy of Nebulized Salbutamol with Single-Dose Parenteral Dexamethasone Versus Nebulized Salbutamol Alone in Infants with Acute Bronchiolitis: A Randomized Control Trial. Paediatric Nephrology Journal of Bangladesh. 2024 Jul 1;9(2):78-83.
23. Syamkumar S, Jani S, Browning Carmo K. Management and referral of acute laryngotracheitis–Croup: The New South Wales Neonatal and Paediatric Emergency Transport Service experience. Journal of Paediatrics and Child Health. 2022 Mar;58(3):415-21.