

## **The efficacy of single dose methylprednisilone in the treatment of acute Bronchiolitis in children.**

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### **Abstract**

Bronchiolitis is an acute, infectious, inflammatory disease of the upper and lower respiratory tract that may result in obstruction of the small airways. A case control study was done at the pediatrics department of the Tikrit Teaching Hospital during the period from the 1<sup>st</sup> of November 2008 to the last of February 2009 on patients diagnosed as acute bronchiolitis to evaluate the effect of single dose long acting methylprednisolone in the treatment of acute Bronchiolitis. Most of the cases were from rural areas 97 (63%) while the urban cases were 57 (37%). Most of the study cases were under the age of 6 months 102 (66.2%). Most of the cases present from the 3<sup>rd</sup> to the 6<sup>th</sup> day of the illness 127 (82.5%). All the patients have dyspnea, cough and rhonchi of examination of chest (100% for each one). Regarding the time needed for weaning from O<sub>2</sub> for the patients after methylprednisolone injection in the both two groups of the study. Most of the cases in the group 1 (received methylprednisolone therapy) weaned from O<sub>2</sub> within 2 days of treatment 61 cases (79.2 %) while in the other group most of the cases weaned from O<sub>2</sub> at the 3<sup>rd</sup> or 4<sup>th</sup> day 41 cases (53.2 %). Most of the cases in the group 1 respond within 2 days of treatment 57 cases (74%) while in the other group most of the cases responded at the 3<sup>rd</sup> or 4<sup>th</sup> day 39 cases (50.6%). Most of the cases in the group 1 discharged within 2 days of treatment 55 cases (71.4%) while in the other group most of the cases discharged at the 3<sup>rd</sup> or 4<sup>th</sup> day 37 cases (48.1%). The study concludes that there is significant effect of using methylprednisolone therapy in the treatment of acute bronchiolitis.

### **Introduction**

Acute viral bronchiolitis is one of the most common causes of hospitalization during infancy in winter and early spring with respiratory syncytial virus (RSV) historically being the major causative agent. Symptoms vary from a mild upper respiratory tract infection to severe bronchiolitis with hyperinflated lungs and hypoxemia (1). Bronchiolitis is an acute, infectious, inflammatory disease of the upper and lower respiratory tract resulting in obstruction of the small airways. Although it may occur in all age groups, the larger airways of older children and adults better accommodate mucosal edema and severe symptoms are usually only evident in young infants (2). Respiratory syncytial virus (RSV) is the most commonly isolated agent in 75% of children less than 2 years of age hospitalized for bronchiolitis. Other agents that cause bronchiolitis include parainfluenza virus types 1 and 3, influenza B, parainfluenza type 2, adenovirus types 1, 2 and 5 and Mycoplasma (primarily in school aged children) (3). Methylprednisilone is in a class of drugs

called steroids. Methylprednisilone reduces swelling and decreases the body's immune response. It is used to treat many conditions including Addison's disease, inflammation, lupus, allergy, asthma, colitis, and certain forms of kidney disease. Methylprednisilone may be used for purposes other than those listed in this medication guide (4). Both animal studies and pathophysiological theory suggest that the anti-inflammatory action of corticosteroids might alleviate the symptoms of and expedite recovery, but the majority of clinical trials have failed to demonstrate this. Although many authors have used this lack of proven benefit to advocate against the use of steroids in bronchiolitis, the studies performed to date have been based on relatively small samples and may have been underpowered to detect possible beneficial effects (5).

### **Patients and methods**

A case control study was done at the pediatrics department of the Tikrit Teaching Hospital during the period from the 1<sup>st</sup> of November 2008 to the last of February 2009 on patients diagnosed as acute bronchiolitis.

Each patient was assessed clinically by a prepared questioner that's includes name, age, sex, residence, and duration of the illness .Each patient was examined for signs of bronchiolitis like:

Tachypnea (the patient considered as tachypneic if his or her RR is more than the normal reference values for respiratory rate of the corresponding ages).

Dyspnoea (means the presence of intercostal, sub costal and suprasternal recession, chest in drawing (not considered alone in patients less than 1 year age because it may be normal findings), flaring alae nasal, and cyanosis.

Rhonchi (by auscultation)

Criptions .

Apnea .

Fever (the patient was considered as febrile if the temperature (taken from the axillary region) was above 38 C. Each patient was send for plain chest X-ray , posteroanterior view, erect posture at full inspiration looking for radiological findings of acute bronchilitis. Each patient was send for Hb level to exclude the presence of anemia as this may affect the percent of deoxygenated Hb in the assessment of hypoxia.

**Inclusion criteria:** The patient diagnosed as acute bronchiolitis if the clinical picture (signs and symptoms of the disease mentioned above) with the radiological findings consistent with bronchiolitis observed by experienced radiologist.

**Exclusion criteria:** Each patient with previous history of asthmatic or wheeze, patients with congenital heart disease, patients with radiological findings of pneumonia and heart problem, presence of anemia and patients who received any form of steroid before admission were excluded from the study.

The included cases were divided into 2 groups :

**Group 1:** Seventy seven patients with acute bronchiolitis who received single dose of long acting intramuscular methyle prednisolon 2 mg/kg in addition to the other lines of treatment of bronchiolitis ( O<sub>2</sub>, 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:** seventy seven 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 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 PaO<sub>2</sub> less than 90 mmHg).

The patients is discharged after normalization of the PaO<sub>2</sub> level and improvement of the clinical condition ( normal RR and no signs of dyspnea).

Statistical analysis is done using the P-value. P- value less than 0.05 is considered significant.

## **Results**

The total number of cases was 154 diagnosed as acute bronchiolitis. Males were 79 (51.3%) and females were 75 (48.7%).

Most of the cases were from rural areas 97 (63%) while the urban cases were 57 (37%).

Table 1 shows the distribution of cases according to the age of the patients. Most of the study cases were under the age of 6 months 102 (66.2%).

Table 2 shows the distribution of cases according to the duration of the illness before admission . most of the cases present from the 3<sup>rd</sup> to the 6<sup>th</sup> day of the illness 127 (82.5%).

Table 3 shows the distribution of cases according to the clinical presentation. All the patients have dyspnea, cough and rhonchi of examination of chest (100% for each one).

Table 4 shows the time needed for weaning from O<sub>2</sub> for the patients after methyleprednisolon injection in the both two groups of the study . Most of the cases in the group 1 weaned from O<sub>2</sub> within 2 days of treatment 61 cases(79.2 %) while in the other group most of the cases weaned from O<sub>2</sub> at the 3<sup>rd</sup> or 4<sup>th</sup> day 41 cases (53.2 %) P-value 0.0003.

Table 5 shows the time needed for response in a patients after methyleprednisolon injection in the both two groups of the study. Most of the cases in the group 1 respond within 2 days of treatment 57 cases(74%) while in the other

group most of the cases responded at the 3<sup>rd</sup> or 4<sup>th</sup> day 39 cases (50.6%) P-value 0.0004.

Table 6 shows the total days of hospitalization needed for the patients after methylprednisolone injection in the both two groups of the study. Most of the cases in the group 1 discharged within 2 days of treatment 55 cases(71.4%) while in the other group most of the cases discharged at the 3<sup>rd</sup> or 4<sup>th</sup> day 37 cases (48.1%)P-value 0.0001.

## **Discussion**

This study done for first time in Tikrit Teaching hospital which show males were nearly equal to that of females .This is goes with Groothuis study (6) which shows that there is no significant difference in the sex distribution of bronchiolitis cases. In spite of that other study by the IM-pact RSV Study Group(7) shows that boys are affected 1.7 times more often than girls; This difference may be due the difference in the sample size.

Most of the cases were from rural areas 97 (63%) while the urban cases were 57 (37%).this is agree with the Groothuis study (6) which shows nearly similar results. This is due to the reason that infants and childrens at the rural areas are more prone to URTI which precede the onset of bronchiolitis.

Most of the study cases were under the age of 6 months 102 (66.2%)which agree with several other studies (6,7,8) 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.(7) All the patients have dyspnea, cough and rhonchi of examination of chest (100% for each one). This is goes with several other studies in which wheezes and shortness of breath were the cardinal signs of presentation in patients with acute bronchiolitis(8,9).

Regarding the time needed for weaning from O<sub>2</sub> for the patients after methylprednisolone injection in the both two groups of the study. Most of the cases in the group 1 weaned from O<sub>2</sub> within 2 days of

treatment while in the other group most of the cases weaned from O<sub>2</sub> at the 3<sup>rd</sup> or 4<sup>th</sup> day. This is goes with Prince, G. A., A. Mathew's study which shows that most of the patients who treated with steroid were weaned from O<sub>2</sub> earlier than that with the classical treatment alone. May be due to the fact that the use of steroid will decrease the inflammatory process at the bronchiolar level (decrease mucosal edema and inflammatory cell infiltrates) and this will decrease the severity of bronchospasm (10).

My study for the first time in Iraq which show most of the cases in the group 1 respond within 2 days of treatment while in the other group most of the cases responded at the 3<sup>rd</sup> or 4<sup>th</sup> day Most of the cases in the group 1 discharged from hospital within 2 days of treatment while in the other group most of the cases discharged at the 3<sup>rd</sup> or 4<sup>th</sup> day , this goes with other similar studies which show that the use of steroid decrease the severity and the morbidity from acute bronchiolitis(9,10).

However other study by Super, D. M., (11) 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. Beta-agonists and ipratropium bromide, an aerosolized anticholinergic agent, have not shown effectiveness in the management of infants with respiratory syncytial virus (RSV) and wheezing.

## **Conclusions**

This study prove the efficacy of single dose of methylprednisolone in acute bronchiolitis which show most of the cases in the group 1 received methylprednisolone therapy, weaned from O<sub>2</sub> within 2 days of treatment 61 cases(79.2 %) while in the other group most of the cases weaned from O<sub>2</sub> at the 3<sup>rd</sup> or 4<sup>th</sup> day 41 cases (53.2 %),and also most of the cases in the group 1 respond within 2 days of treatment 57 cases(74%) while in the other group most of the cases responded at the 3<sup>rd</sup> or 4<sup>th</sup> day 39 cases (50.6%).

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**Table (1):** The distribution of cases according to the age of the patients.

Age	No	%
< 6 months	102	60.2
6-12 months	45	29.2
More than 12 months	7	4.5
Total	154	100

**Table (2) :**The distribution of cases according to the duration of the illness before admission.

Duration (days)	No.	%
< 2	24	15.6
3-6	127	82.5
7 and more	3	1.9
Total	154	100

**Table (3) :** The distribution of cases according to the clinical presentation.

Clinical features	No.	%
Tachypnea	87	56.5
Dyspnea	154	100
Cough	154	100
Fever	33	21.4
Decrease feeding	57	37
Irritability	31	20.1
Diarrhea	17	11
Vomiting	42	27.3
Runny nose	111	72.1
Apnea	4	2.6
Wheezes	154	100
Cription	124	80.5

**Table (4) :**The time needed for weaning from O2 for the patients after methyleprednisolon injection in the both two groups of the study .

Time (days)	G1	G2	Total
1 2	61(79.2%)	21(27.3%)	82(53.2%)
3-4	17(22%)	41(53.2%)	58(37.7%)
5 and more	-(0%)	15(19.5%)	15(9.7%)
Total	77(100%)	77(100%)	154(100%)