

The role of Corticosteroids in infants less than 6 months with sever Bronchiolitis

دور الستيرويدات عند الرضع الأقل من ستة أشهر المصابين بالتهاب القصبيات الشديد.

Dr. Faris M. Al-Haris (MB.ch.B, DCH , CABP)

Abstract

A comparative study was done on 160 children aging ≤ 6 months with sever bronchiolitis admitted to Al- Zahraa maternity and children and Al-Hakeem hospital in AL- Najaf from the period between 1st January - 1st April 2006 , 80 of them received steroid and the other received placebo .The average days of improvement in those who received steroid was (4.122)while in placebo was (4.386) so the difference was(-0.264). In other wards the use of steroid in sebronchiolitis is not associated with statistically significant shortening of the clinical course of the disease .

الخلاصة

دراسة مقارنة أجريت على 160 رضيع بأعمار مساوية أو أقل من 6 اشهر يعانون من حالات شديدة من التهاب القصبات الحادة و الذين تم إدخالهم إلى مستشفى الزهراء للأطفال ومستشفى الحكيم العام في مدينة النجف في الفترة من الأول من كانون الثاني إلى الأول من نيسان عام (2006) , 80 رضيع أعطي مادة الستيرويد بينما الباقين أعطي لهم مادة غير فعالة .معدل أيام التحسن في الحالة المرضية للرضع الذين أعطي لهم الستيرويد (4.122) بينما الذين استلموا المادة الغير فعالة كان (4.386) لذلك كان الفرق (-0.264) وهذا يعني أن استعمال الستيرويد في حالات التهاب القصبات الحاد لا يؤدي إلى نتائج إحصائية مهمة (معتبرة) في تقصير السيرة السريرية لهذا المرض.

Introduction:

Acute bronchiolitis is a common disease of the lower respiratory tract infection in infants , resulting from inflammatory obstruction of the small airways . By the age of 2 years , nearly all children have been infected while sever disease occur in 1-3 mo of age (1)

Etiology:

Predominantly a viral disease.

RSV is responsible for more than 50%, other agent parainfluenza, adenovirus, mycoplasma , influenza virus and rhino virus.(1) .

Clinical manifestation

The infant first develop mild upper RTI with mild fever. Then gradual respiratory distress ensues with

paroxysmal wheezy cough ,dyspnea ,irritability and poor feeding. More common in males and in those who have not been breast fed .

Physical examination reveal nasal flaring , tachypnea ,intermittent cyanosis, retractions, prolonged expiratory phase , wheeze , cracks in the chest .

acute symptoms last 5-6 days , recovery is complete in day 12 . (2)

Diagnosis

Diagnosis of bronchiolitis is based on clinical findings and on knowledge of the epidemiology of viral illnesses prevalent in the community .

RSV may be identified from nasopharyngeal secretion by PCR , culture or antigen assay. (2) WBC count , differential is usually normal.

CXR reveals hyper inflated lungs with patchy atelectasis. (1)

Treatment

Those with respiratory distress should be hospitalized and receive.

- 1-cool humidified oxygen.
- 2- sitting with head and chest elevated at 30 degree angle with neck extended.
- 3- parenteral fluids and if severe respiratory distress feeding through NG tube or NOP.
- 4- trial of bronchodilators B₂- agonist or may be more effective racemic epinephrine.
- 5- ribavirin .
- 6- Antibiotic for secondary bacterial infection .(1)

Patient and Method

Comparative study was done on 160 children with severe bronchiolitis , only 80 of them received IV dexamethasone 0.4 mg / kg /day divided 12 hourly. data collected from all cases whose clinical signs and symptoms start 1-2 day from admission and include :-

- 1- name. 2-age. 3-sex. 4-family history of asthma(which should be negative). 5-first attack i.e. any case with previous attacks of wheezy chest was excluded .

The clinical study and the follow up of the children was based on respiratory rate and signs of respiratory distress (sub costal recession, intercostals recession, grunting , cyanosis.....etc).

Investigation done for all cases include :

- 1- c- reactive protein
- 2- WBC count
- 3- CXR

Any case was excluded if :-

- 1- temperature $>39^{\circ}\text{C}$.
- 2- positive CRP.
- 3-WBC count $> 10\,000/\text{cm}^3$
- 4- CXR with patch of pneumonia
- 5- Associated congenital heart diseases or chronic lung diseases.
- 6- Positive clinical and family history of asthma .
- 7- The clinical manifestation of the disease is more than 2 day because the clinical improvement may be due to steroid or the usual clinical course of the disease.
- 8-Any child taken oral steroid as out patient treatment.

Results

160 infants with severe bronchiolitis were included in the study , 93 (58.12%) were males & (47) of them who receive steroid , while 67 (41.78%) were females and (33) of them who receive steroid as shown in table(1).

No. of pt .aging (1-2) ,months were 38 (23.75%)

No. of pt .aging (>2-3) months were 26 (16.25%)

No. of pt .aging (>3-4) months were 33 (20.625%)

No. of pt .aging (>4-5) months were 35 (21.875%)

No. of pt .aging (>5-6) months were 28 (17.5%)

As shown in table(2).

The average days of improvement in those who received steroid was 4.122 days .while in placebo was 4.386 days , so the difference was -0.264.

As shown in table (2) and table (3).

Table (1): show the No. of male and female who received steroid and placebo according to the age groups.

Patient group	Take steroid				Take Placebo			
	Male(47 pt.)		Female(33 pt.)		Male(46 pt.)		Female (34 Pt.)	
	No.	%	No	%	No.	%	No.	%
1-2 month	14	29.78%	9	27.272%	9	19.565%	6	17.647%
>2-3 month	8	17.02%	6	18.181%	8	17.391%	4	11.764%
>3-4 month	7	14.89%	8	24.242%	10	21.739%	8	23.529%
>4-5 month	10	21.27%	6	18.181%	12	26.086%	7	20.588%
>5-6 month	8	17.02%	4	12.121%	7	15.217%	9	26.47%
Total	47	100%	33	100 %	46	100%	34	100 %

Table (2): shows the No. of days of improvement in those taken CS and placebo drugs, classified according to the age groups.

Patient group	No. of patient		NO. of pt .take steroid (80.PT.)		No. of pt. Take placebo (80.pt)		Days of improvement		difference
	NO	%	NO	%	NO	%	TAKE STEROID	TAKE placebo	
							No. of days	No. of days	
1-2 month	38	23.75%	23	28.75%	15	18.75%	4.2	4.6	-0.4
>2-3 month	26	16.25%	14	17.5%	12	15%	4.5	4.33	+0.17
>3-4 month	33	20.625%	15	18.75%	18	22.5%	4	4.5	-0.5
>4-5 month	35	21.875%	16	20%	19	23.75%	4.25	4	+0.25
>5-6 month	28	17.5%	12	15%	16	20%	3.66	4.5	-0.84
Total	160	100%	80	100%	80	100%			-0.264

Table(3): show comparison between different studies

Study	No. of pt.		Age	drug	Days of improvement		
	Treated	Control			Receive steroid	placebo	difference
1-Dabbous	22	22	1.5-18m.	Methylprednisolone(I.M.)	4.16	5.16	-1.00
2-Van woensl	20	19	<24m.	Prednisolone (orally)	7.13	8.30	-1.17
3-de Boeck	14	15	<24m.	Dexamethasone (i.v.)	6.0	6.60	-0.60
4- klassen	35	32	1.5-15m.	Dexamethasone(orally)	3.98	2.78	+1.20
5- Roosevelt	65	53	1-12m.	Dexamethasone(I.M.)	3.18	3.59	-0.41
6- Springer	25	25	1.5-11m.	Hydrocortisone(I.V.)	5.00	5.20	-0.20
7- Present study	80	80	>1-6m.	Dexamethasone(i.v.)	4.122	4.386	-0.264

Discussion

The anti inflammatory action of CS might alleviate the symptoms of bronchiolitis and expect recovery but the majority of clinical trials have failed to demonstrate this (3), (4), and (5).

In this study there are 160 of cases aging ≤ 6 months, 80 of them received I.V. dexamthasone and the difference in the day of improvement between the 2 groups was -0.264 while in Dabbous et.al study were 44 of cases aging 1.5 –18 months 22 of them receiving methyl prednisolone I.M. and differences between the 2 groups were -1.0 . In Dabbous study the same clinical score is used as in our present study in addition to pco₂ level .

Other study like Springer et.al. where the pt no. were 50 cases aging 1.5 –11 months, 25 of them received hydrocortisone IV and the difference was -0.2. the clinical score is the same to our present study but in addition to it they use PFT for assessment of improvement .

Other study like de Boeck et.al 14 of the cases received dexamethasone IV and (15) were control aging <24 months and the clinical score is the same in addition to po₂ and PFT , the difference was -0.6 . In Klassen *et al.* (1997) 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.

In fact this meta analysis raises some interesting questions regarding the possibility that benefit of CS might depend on disease severity and timing of therapy initiation . It is possible that CS efficacy may be questionable in treating infant with bronchiolitis .

In all these studies ,the treatment was initiated at least several days into the course of the disease . CS therapy might be more or less effective if initiated at the onset of symptoms .

Conclusions and Recommendations

Theoretically the anti inflammatory action of CS may improve the clinical symptoms of bronchiolitis but the clinical trials of it shows no significant beneficial effect.

Abbreviations

I.V . Intra venous
WBC . white blood cell
CXR . chest-x-ray
CRP . C- reactive protein
RSV . respiratory syncytial virus
RTL Respiratory tract infection
RCR . polymerase chain reaction
NG. Nasogastric
NPO. Nil by mouth
C S . corticosteroid
Pt. patient
PFT . pulmonary function test
No . number

References

- 1 Goodman,D .(2004). Nelson text book of pediatrics .17th Edition. chapter 378.2 p. 1415 - 1417
- 2- Kercsmar ,C.M. (2002). Nelson essential of pediatrics .4th Edition, chapter 12,p. 540.
- 3- Bunch, C. and Hoffman, R . (1998). Prednisone drug dex drug evaluation . micro medex health care ser.100
- 4- Katzung , B. G. (1998). Basic and clinical pharmacology. Stamford , ct :Appleton and Lange.

- 5- Thomas, L.H. ; Stott, E.J. and Collins, A.P. (1984) Infection of gnotobiotic calves with a bovine and human isolate of respiratory syncytial virus : modification of the response by dexamethasone . Arch. viral.;79:67-77 .
- 6-Van Woensel, J.B.; Wolfs, T.F. and Van Aalderen . (1997) . Randomized double blind placebo controlled Trial of prednisone in children admitted to hospital with respiratory syncytial virus bronchiolitis . Thorax. ;52:634 - 637.
- 7- De Boeck, k. ; Van Der, A. N. and Van Lierdes . (1997). Respiratory syncytial virus bronchiolitis: double blind dexamethasone efficacy study . J. pediatr . 131 :919- 921.
- 8- Klassen ,T.P. ; Sutcliffe,T. and Watters, L.K .(1997). Dexamethsone and salbutamol-treated in patients with acute bronchiolitis: a randomized controlled trial . J. pediatr . 130:191-196.
- 9- Da Bbous, I.A. ; Tkachyk , J.S. and Stamm S.J. (1966). Adouble blind study on the effects of CS in the treatment of bronchiolitis . pediatri. 37:477-484.
- 10- Berger, l. ; Argaman , Z. and Schwartz , S.B.(1998). Efficacy of CS in acut bronchiolitis : short term and long term follow up . pediater. pulmonol. 26:162-166.