

Cliniques universitaires Saint-Luc
Service de Médecine Physique et de Réhabilitation - Prof. H. NELLENS

15th JOURNÉE DE MISES AU POINT EN KINÉSITHÉRAPIE
le samedi 11 octobre 2008
8h30 - 13h00
AUDITOIRES "RESTO 60" AV. ROUQUIER - 1200 BRUXELLES

KINÉSITHÉRAPIE RESPIRATOIRE
Accueil des participants 8h30 - 9h00

LA BRONCHOLITE
Physiopathologie et pathogénèse : Dr H. DE WALLE
La prise en charge de l'enfant, en externe ou en interne : Dr SOPHIE
La prise en charge hospitalière, de la nuit à l'urgence aux soins ambulatoires : Dr MICHMAN
Néonatalogie, précoce : Dr REYD-LIJF
Passez votre nuit 10h30 - 11h00

L'OBÉSITÉ
Prise en charge par la kinésithérapie : Dr H. DE WALLE
Indications de la CMAP et de la ventilation en externe ou en interne : Dr DELEUZE
Techniques kinésithérapiques et diététiques : Dr H. DE WALLE
Passez votre nuit 10h30 - 11h00

SYNDROME POSITIONNEL CHEZ LE NOUVEAU-NÉ
Dr G. FORTIN, L. FORTIN
Revalidation post-natale : Dr FORTIN
L'impact du BIPAP : Dr DELEUZE
Travail des muscles respiratoires : Dr BALAS

Accueil 13h00

Aérosolthérapie Pour ou contre?

Gregory Reyckler
Service de Médecine Physique
Cliniques universitaires Saint-Luc

Double problématique



La nébulisation est elle efficace chez l'enfant?

Quel matériel doit-on utiliser?

L'interface

Drug delivery from jet nebulisers

Mark L. Everard, Andrew R. Clark, Anthony D. Milner
Archives of Disease in Childhood 1992; 67: 586-591

Distance du masque par rapport au visage (cm)	Dose inhalée (mg)
0	~1.2
1	~0.5
2	~0.2

Vt = 50 mL
Sodium cromoglycate (20mg/2mL)

Nebuliser hood compared to mask in wheezy infants: aerosol therapy without tears!

I Amirav, I Balanov, M Gorenberg, D Groshar, A S Luder
Arch Dis Child 2003; 88: 719-723

- Sujets**
 - 15 enfants (8m ± 5m) (5F) hospitalisés, nécessitant des bronchodilatateurs
- Critères d'inclusion**
 - Wheezing depuis moins de 48h
 - Age >4 sem et <2 ans
 - SaO2 > 92%
- Critères d'exclusion**
 - Pathologies cardiopulmonaires ou mucoviscidose

Nebuliser hood compared to mask in wheezy infants: aerosol therapy without tears!

I Amirav, I Balanov, M Gorenberg, D Groshar, A S Luder
Arch Dis Child 2003; 88: 719-723

Outcome	Hood		Mask	
	Pre	Post	Pre	Post
Oxygen saturation (%)	92.6 (1.7)	95.4 (2.8)*	93.2 (1.7)	95.4 (1.4)*
Respiratory distress score	5.6 (8.3)	4.7 (9.1)*	5.7 (8.7)	4.4 (8.1)*
Heart rate (beats/min)	144.2 (18.8)	137.1 (16.7)**	139.6 (13.3)	134.4 (14.9)**

There was no significant difference between the hood and mask treatments for any of the outcome measures. Values are mean (SD). *p<0.05 pre vs post. **p<0.05 hood vs mask.

Stress moindre (p=0.01) et meilleure acceptation des parents (p<0.01) pour la tente

Nebuliser hood compared to mask in wheezy infants: aerosol therapy without tears!

I Amirav, I Balanov, M Gorenberg, D Groshar, A S Luder

Arch Dis Child 2003;88:719-723

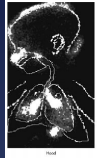


Table 1 Individual deposition rates (%) for the whole right lung (total), for the central region of the right lung (central), and for the URT and GIT during both treatments modalities

Pt no.	Total right lung		Central right lung		URT and GIT	
	Hood	Mask	Hood	Mask	Hood	Mask
1	1.20	1.18	0.53	0.55	15.90	23.36
2	0.87	0.49	0.44	0.26	2.44	2.21
3	2.12	0.48	0.99	0.25	13.65	12.25
4	0.65	0.58	0.21	0.38	5.51	4.80
5	0.74	0.50	0.22	0.29	9.94	3.86
6	1.78	1.52	0.94	0.55	10.80	8.84
7	2.26	2.70	1.00	1.23	3.50	4.75
8	1.52	0.66	0.77	0.39	7.78	2.77
9	1.87	0.96	0.87	0.36	10.52	6.92
10	0.95	2.10	0.56	1.40	1.73	2.13
11	0.97	1.78	0.39	0.80	8.33	11.84
12	1.47	1.59	0.89	0.81	2.16	8.53
13	0.85	0.92	0.57	0.46	7.09	16.15
14	1.09	0.75	0.55	0.38	7.79	7.58
Mean	1.32	1.18	0.64	0.58	7.42	8.36
SD	0.52	0.64	0.27	0.36	4.26	5.84



AEROSOL DELIVERY IN RESPIRATORY SYNCYTIAL VIRUS BRONCHIOLITIS: HOOD OR FACE MASK?

ISRAEL AMIRAV, MD, ANAT ORON, MD, GUY TAL, MD, KARINE CESAR, MD, AMI BALANOV, MD, SION HOURI, MD, LARSA NAUGOLNY, MD, AND AVIGDOR MANDELBERG, MD



Table II. Baseline clinical characteristics

	Hood group (n = 25)	Mask group (n = 24)	P value
Age (mo)	2.7 ± 2.2	2.8 ± 2.3	NS
Female/male	8/17	7/17	NS
Baseline clinical severity scores	7.12 ± 1.16	6.8 ± 1.21	NS
Days of illness at admission	5.7 ± 3.7	4.5 ± 3.4	NS
Baseline saturation (%)	93 ± 4.2	93 ± 3.7	NS

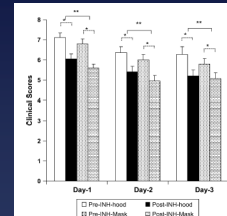
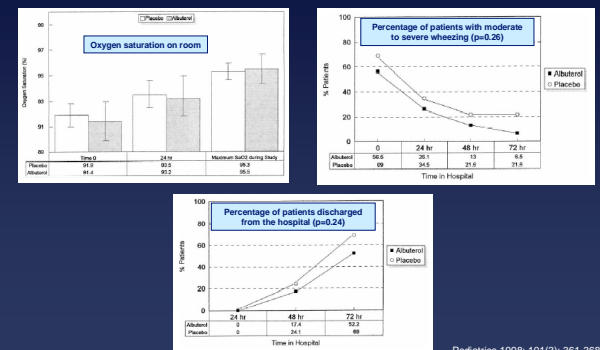


Figure 2. Clinical severity scores in hood and mask groups. Decreases in the clinical score after the inhalation therapy was significant ($P < .001$) in both groups on the first, second, and third days after hospital admission. There was no significant difference between the two groups on any day ($^{**}P < .05$, INSL, inhalation).

Bronchodilators

The Use of Albuterol in Hospitalized Infants With Bronchiolitis

Joseph V. Dobson, MD; Susan M. Stephens-Groff, MD; Shawn R. McMahon, MD; Margaret M. Stemmer, MD; Susan L. Brallier, DO; and Curtis Bay, PhD†



Bronchodilators for bronchiolitis

AM Gadomski, AL Bhasale

Cochrane Database of Systematic Reviews 2008 Issue 2 (Status: Unchanged)
Copyright © 2008 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd
DOI: 10.1002/14651858.CD001266.pub2. This version first published online: 19 July 2006 in Issue 3, 2006



Main results

Twenty-two clinical trials with 1428 infants with bronchiolitis were included in this review. In eight trials, with 468 infants, there was no improvement in clinical score for 43% of those treated with bronchodilators compared to 57% of those treated with placebo (odds ratio (OR) for no improvement 0.45, 95% confidence interval (CI) 0.15 to 1.29). There was a statistically significant but clinically modest improvement in the overall average clinical score (standardized mean difference (SMD) -0.48, 95% CI -0.62 to -0.33). However there was no statistically significant improvement in oxygenation overall (weighted mean difference (WMD) -0.57, 95% CI -1.17 to 0.03).

Subgroup analyses showed a slightly greater effect size in outpatient studies, where there were shorter follow up durations, than in inpatient studies for both oximetry (outpatients WMD -0.84, 95% CI -1.59 to -0.10 versus inpatients WMD -0.25, 95% CI -1.18 to 0.67) and average clinical score (outpatients SMD -0.68, 95% CI -0.87 to -0.49 versus inpatients SMD -0.23, 95% CI -0.44 to -0.01). Bronchodilator recipients showed no improvement in the rate of hospital admission after treatment as outpatients (18% versus 28%, OR 0.70, 95% CI 0.36 to 1.35) or duration of hospitalization for inpatients (WMD 0.02, 95% CI -0.32 to 0.36). The inclusion of studies that enrolled infants with recurrent wheezing may have biased the results in favor of bronchodilators.

Authors' conclusions

Bronchodilators produce small, but not statistically significant, improvements in clinical scores. The small benefit is...

Anticholinergic drugs for wheeze in children under the age of two years (Review)

Everard ML, Bara A, Kurian M, N'Diaye TM, Ducharme F, Mayowe V



Main results

Six trials involving 321 infants in three different settings were included. Compared with beta2-agonist alone, the combination of ipratropium bromide and beta2-agonist was associated with a reduced need for additional treatment, but no difference was seen in treatment response, respiratory rate or oxygen saturation improvement in the emergency department. There was no significant difference in length of hospital stay between ipratropium bromide and placebo; or between ipratropium bromide and beta2-agonist combined compared with beta2-agonist alone. However, combined ipratropium bromide and beta2-agonist compared to placebo showed significantly improved clinical scores at 24 hours. Parents preferred ipratropium bromide over inhaled water or placebo for relief of their children's symptoms at home. A further updated search conducted in June 2005 did not yield any new studies.

Authors' conclusions

The combination of ipratropium bromide and beta2-agonist compared with beta2-agonist alone showed significantly improved clinical scores at 24 hours. Parents preferred ipratropium bromide over inhaled water or placebo for relief of their children's symptoms at home. A further updated search conducted in June 2005 did not yield any new studies.

Epinephrine

Effet potentiel

- Diminution des sécrétions respiratoires
- Diminution de l'œdème de la muqueuse
- Relaxation des muscles lisses
- Inhibition de la réponse inflammatoire

Efficacy of Nebulized Epinephrine Versus Salbutamol in Hospitalized Infants With Bronchiolitis

Pablo Bertrand, MD, Hector Aranibar, MD, Edelmira Castro, MD, and Ignacio Sánchez, MD*
Pediatric Pulmonology 31:284-288 (2001)

TABLE 2—Characteristics of Patients on Admission

Variable	Salbutamol (n=14)	Epinephrine (n=30)	P-value
Male	7 (50%)	9 (50%)	0.73
Age (months ± SEM)	3.7 ± 0.6	3.9 ± 0.4	0.64
Age < 3 months	6 (43%)	10 (67%)	0.28
Duration of illness (days)	2.2 ± 0.8	2.4 ± 0.4	0.81
Family history of atopy	6 (29%)	7 (44%)	0.06
Passive tobacco smoke exposure	4 (29%)	9 (50%)	0.12
Kerosene heater exposure	8 (57%)	11 (89%)	0.5
RSV (+)	13 (93%)	13 (83%)	0.35

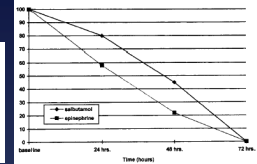


Fig. 1. Evolution of clinical score in both groups. Note that epinephrine produced a decrease in basal clinical score to less than 5 more rapidly than did salbutamol (log-rank test, $P < 0.02$).

TABLE 4—Comparison of Clinical Score in Salbutamol- and Epinephrine-Treated Infants During First Days of Study

Pre	Baseline		At 24 hr		At 36 hr	
	Pre	Post	Pre	Post	Pre	Post
Epinephrine (n=10)	5.1 ± 0.4	4.2 ± 0.4*	4.0 ± 0.6	3.8 ± 0.8	4.0 ± 0.5	4.4 ± 0.5
Salbutamol (n=14)	5.8 ± 0.5	5.5 ± 0.4	5.7 ± 0.7	5.2 ± 0.6	5.2 ± 0.5	4.6 ± 0.2

*Significant change, $P = 0.025$.

A Multicenter, Randomized, Double-Blind, Controlled Trial of Nebulized Epinephrine in Infants with Acute Bronchiolitis

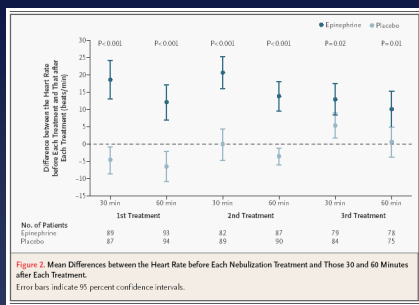


Figure 2. Mean Differences between the Heart Rate before Each Nebulization Treatment and Those 30 and 60 Minutes after Each Treatment. Error bars indicate 95 percent confidence intervals.

Wainwright, N Engl J Med 2003;349:27-35.

A Multicenter, Randomized, Double-Blind, Controlled Trial of Nebulized Epinephrine in Infants with Acute Bronchiolitis

Table 3. Length of the Hospital Stay, Time until the Infant Was Ready for Discharge, and Time Supplemental Oxygen Was Required, According to the Use or Nonuse of Supplemental Oxygen and Intravenous Fluids.

Variable	Epinephrine (N=99)	Placebo (N=95)	Ratio of Means of Epinephrine and Placebo Groups		P Value
			mean (95% confidence interval)		
Length of hospital stay (hr)					
Overall	58.8 (49.4-70.0)	69.5 (59.3-81.4)	0.85 (0.67-1.07)	0.16	
No oxygen	25.8 (21.4-31.0)	31.5 (27.5-40.8)	0.77 (0.59-1.01)	0.06	
Oxygen only	85.9 (71.3-100.9)	98.0 (81.6-117.7)	0.88 (0.69-1.12)	0.29	
Oxygen and intravenous fluids	147.4 (107.9-201.5)	109.6 (87.1-138.0)	1.34 (0.91-1.90)	0.14	
Time until ready for discharge (hr)					
Overall	46.5 (38.3-56.5)	47.2 (39.0-58.3)	0.98 (0.74-1.29)	0.86	
No oxygen	18.6 (15.2-22.9)	16.3 (11.1-20.3)	1.14 (0.85-1.55)	0.39	
Oxygen only	68.5 (57.5-81.7)	81.5 (68.4-102.0)	0.82 (0.63-1.07)	0.15	
Oxygen and intravenous fluids	135.9 (96.6-191.1)	80.2 (62.0-105.3)	1.70 (1.11-2.60)	0.02	
Time supplemental oxygen required (hr)					
Overall	54.0 (40.9-71.2)	58.1 (46.2-72.8)	0.92 (0.64-1.31)	0.64	
Oxygen only	43.6 (31.2-57.2)	56.1 (41.2-76.4)	0.78 (0.52-1.17)	0.22	
Oxygen and intravenous fluids	121.0 (71.4-205.2)	63.2 (42.9-93.3)	1.91 (0.99-3.68)	0.06	

CONCLUSIONS

The use of nebulized epinephrine did not significantly reduce the length of the hospital stay or the time until the infant was ready for discharge among infants admitted to the hospital with bronchiolitis.

Wainwright, N Engl J Med 2003;349:27-35.

Solutions hypertoniques

Nebulized 3% Hypertonic Saline Solution Treatment in Hospitalized Infants With Viral Bronchiolitis*

Avighor Mandelberg, MD, Guy Tol, MD, Michaela Witzling, MD, Eli Semack, MD, Sion Hours, MD, Ami Balin, MD, and Israel E. Fried, MD, FCCP

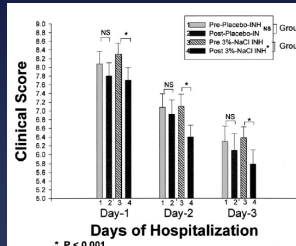


FIGURE 2. The clinical severity scores in group 1 and group 2. The fall of the clinical score after the first 3 days of hospitalization was similar in both groups. There were no significant differences in the clinical scores between the two groups on each of these days. IN, intranasal.

N=52 bronchiolites (2.9 ± 2.1 mois) hospitalisés

1.5mg d'épinephrine dans 4mL de sérum physiologique (0.9% NaCl) ou dans 4mL sérum hypertonique (3% NaCl)

3nébulisation / jour

Mandelberg, Chest 2003; 123:481-487

Nebulized 3% Hypertonic Saline Solution Treatment in Hospitalized Infants With Viral Bronchiolitis*

Avigdor Mandelberg, MD, Guy Tal, MD, Michaela Witzling, MD, Eli Soneck, MD, Sim Hour, MD, Ami Balin, MD, and Israel E. Fried, MD, FCCP

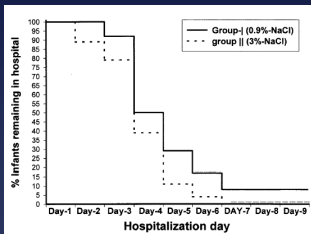


FIGURE 1. The percentage of infants remaining in the hospital each day for each group.

N=52 bronchiolites (2.9 ± 2.1 mois) hospitalisées

1.5mg d'épinéphrine dans 4mL de sérum physiologique (0.9% NaCl) ou dans 4mL sérum hypertonique (3% NaCl)

3nébulisation / jour

Mandelberg, Chest 2003; 123:481-487

Nebulized 3% Hypertonic Saline Solution Treatment in Ambulatory Children With Viral Bronchiolitis Decreases Symptoms*

E. Michael Sarrell, MD, Guy Tal, MD, Michaela Witzling, MD, Eli Soneck, MD, Sim Hour, MD, Herman A. Cohen, and Avigdor Mandelberg, MD

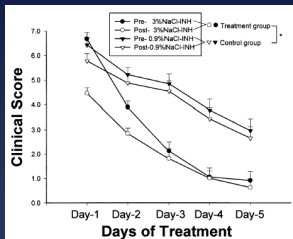


FIGURE 1. After the baseline measurement on the first day, the CS score differed significantly between the two groups for both 0.9% NaCl (treatment group) vs terbutaline/0.9% NaCl (control group) (*P < 0.05, P < 0.01 = reduction).

N=65 bronchiolites (12.5 ± 6 mois) hospitalisées

0.5ml (5mg) de terbutaline dans 2mL de sérum physiologique (0.9% NaCl) ou dans 2mL sérum hypertonique (3% NaCl)

3nébulisation / jour / 5j (intervalle 8h)

Pas d'effets secondaires

Variables	0	1	2	3
Respiratory rate (breaths/min)	<30	31-40	>40	>50
Wheezing (4-point scale)	None	Minimal wheezing (1-2)	Clear wheezing (3-4)	Excessive wheezing (5-6)
Retractions (4-point scale)	None	Minimal retractions (1-2)	Clear retractions (3-4)	Excessive retractions (5-6)
Stridor (4-point scale)	None	Increased stridor	Decreased	None
SpO ₂ (4-point scale)	Normal	Increased stridor	Decreased	None

Sarrell, Chest 2002; 122:2015-2020

DNase

Etude multicentrique (RCT) sur 225 enfants oxygène-dépendants et hospitalisés

2.5mg DNase (2x/j) / 2.5mg placebo

Boogaard, Chest 2007; 131:788-795

Recombinant Human Deoxyribonuclease in Infants With Respiratory Syncytial Virus Bronchiolitis*

Ruben Boogaard, MD, Anthon R. Habermann, MD, PhD, Lesnick van Veen, MD, Anja A. P. H. Vissers-Verbeke, MD, PhD, Ton Ni Yip, MD, Arnon J. Spijij, MD, Geert Broekhoven, MD, Barbara Sikkink, MD, Tom Hendriks, MD, Sander W. W. Foth, MD, Carsten R. Looze, MD, PhD, Annelies E. Brommelus, MD, PhD, Paul L. P. Brand, MD, PhD, Wim C. J. Hop, PhD, Matthijs de Hoog, MD, PhD, and Peter J. F. M. Merkus, MD, PhD

Table 2—Baseline Characteristics of the Infants at Admission to the Hospital*

Characteristics	rDNase (n = 111)	Placebo (n = 111)
Male:female gender, No.	55:56	30:52
Gestational wk	36.5 (35-42)	40.0 (38-43)
Birth weight, kg	3.3 (1.5-4.8)	3.5 (1.4-5.0)
Actual weight, kg	3.1 (2.6-3.8)	3.2 (2.7-3.9)
Age, mo	2.1 (0.4-11.2)	2.3 (0.3-12.8)
Days sick	35 (31.7)	33 (29.7)
0-2	20 (18.0)	19 (17.1)
3-5	20 (18.0)	12 (10.8)
≥ 6	21 (18.8)	10 (9.1)
Prenatal smoking mother	14 (95 (13)	19 (95 (17)
Parental smoking		
Neither parent	69 (92 (75)	57 (90 (84)
One or both parents	23 (20 (23)	32 (30 (36)
Age in the oxygen volume	23 (94 (56)	46 (57 (90)
Mean symptom score	3.97 ± 1.88	3.65 ± 1.79
Symptom score ≥ 3	49 (109 (43)	36 (108 (52)
Symptom score ≥ 4	60 (109 (27)	32 (108 (48)
Drinking medications	52 (109 (8)	61 (111 (55)

*Data expressed as median (range). No. (%), No./total (%), or mean ± SD unless otherwise indicated.

Recombinant Human Deoxyribonuclease in Infants With Respiratory Syncytial Virus Bronchiolitis*

Ruben Boogaard, MD, Anthon R. Habermann, MD, PhD, Lesnick van Veen, MD, Anja A. P. H. Vissers-Verbeke, MD, PhD, Ton Ni Yip, MD, Arnon J. Spijij, MD, Geert Broekhoven, MD, Barbara Sikkink, MD, Tom Hendriks, MD, Sander W. W. Foth, MD, Carsten R. Looze, MD, PhD, Annelies E. Brommelus, MD, PhD, Paul L. P. Brand, MD, PhD, Wim C. J. Hop, PhD, Matthijs de Hoog, MD, PhD, and Peter J. F. M. Merkus, MD, PhD

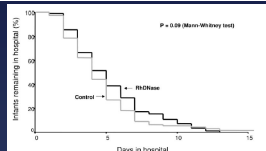


Table 3—Length of Hospital Stay and Time Supplemental Oxygen Was Required, According to the Baseline Symptom Score

Variables	rDNase	No. of Infants	Placebo	No. of Infants	Ratio of Geometric Means of rDNase and Placebo Groups (95% Confidence Interval)	P Value†
Length of hospital stay, d					1.14 (0.87-1.50)	0.11
Overall	4.4 (3.0-6.0)	111	3.9 (3.4-4.3)	111		
Baseline symptom score ≤ 3	3.9 (3.2-4.7)	48	3.4 (3.0-3.9)	50	1.13 (0.90-1.40)	0.27
Baseline symptom score ≥ 4	4.9 (4.2-5.7)	60	4.1 (3.5-5.2)	72	1.12 (0.80-1.62)	0.51
Time supplemental oxygen required, d					1.20 (0.88-1.67)	0.003
Overall	2.0 (1.2-3.1)	106	2.0 (1.5-2.4)	106		
Baseline symptom score ≤ 3	1.0 (1.2-2.7)	45	1.0 (1.2-2.2)	54	1.27 (0.84-1.93)	0.26
Baseline symptom score ≥ 4	3.0 (2.8-3.9)	59	2.8 (2.0-3.3)	71	1.24 (0.91-1.70)	0.16

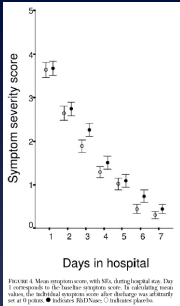
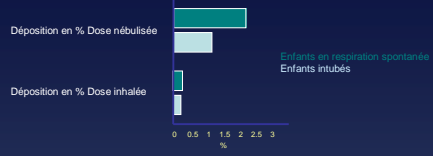


FIGURE 4. Mean symptom score, with SD, during hospital stay. Day 1 corresponds to the baseline symptom score. In calculating mean values, the individual symptom score after delivery was of interest, not of hospitalization. *Indicates that DNase is indicated.

Boogaard, Chest 2007; 131:788-795

Corticoïdes → Aucun effet!

Conclusion



No. of	Patients	Type of Patients Aerosol Device	Deposition (%)
Salmon et al	9 Infants	Nebulizer vs MDI with spacer	0.3-1.5
Chua et al	12 Infants (8 mo)	Nebulizer	0.3-1.6
Chua et al	8 Children (10 y)	Nebulizer	1.6-4.4
Maikol et al	20 Infants	Nebulizer	0.76-2.0
Amirav et al	26 Infants	Nebulizer	1.5-2.6
Tal et al	15 Children (21 mo)	MDI with spacer	1.97
Wildhaber et al	17 Children (2-9 y)	Nebulizer vs MDI with spacer	5.4-11.1

Merci!

