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Asthma and Asthma Exacerbation Exists in Infants (<1 year) and Can be Treated Effectively with Inhaled Corticosteroids

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Abstract

Overview: the diagnosis of asthma in infants is difficult .This study provides evidence that asthma exists in infants and that asthma exacerbations can be treated effectively with inhaled corticosteroids.

Methods: The sample included 1500 children aged <5 years with asthma exacerbation that failed to be controlled in the community. All were treated with inhaled corticosteroids according to similar protocols, adjusted to the severity of the exacerbation: inhalers + spacer, inhalation, or inhalation + azithromycin.

Results: Almost one-third of the children (31%) were infants. The percentage of boys, frequency of asthma in the family, number of emergency department visits, number of hospitalizations, duration of asthma symptoms and use of beta-2 agonists and oral corticosteroids were similar for infants and older children. All children were coughing during their first visit, but only 45% were wheezing. During the treatment period, the rate of emergency department visits decreased by 99%, and of hospitalizations, by 91%; the use of oral corticosteroids decreased by 100%. Most patients (88%), with or without wheezing, responded well to treatment, with no significant differences between infants and older children.

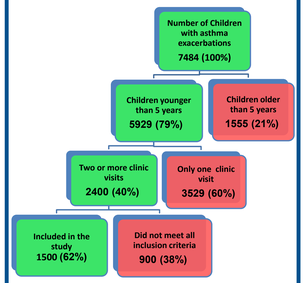
Conclusion: Asthma exists in infants (<1 year) and has the same clinical characteristics as in older children (1-5 years). In both age groups, asthma exacerbations respond equally good to inhaled corticosteroids, regardless of the presence of wheezing.

Inclusion criteria

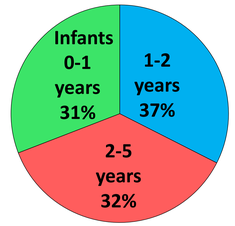
- Age 0-5 years
- History of continuous cough (at least 3 weeks) or wheezing
- Asthma exacerbation uncontrolled in the community by anti-asthma treatment
- Parental compliance with instruction to watch asthma educational video
- Cough during the first visit
- Returned for a follow-up visit

Educational video
www.volovitz.co.il

Study population



Groups of children



Treatment protocols for asthma exacerbation

When the first symptom of asthma exacerbation appears - start with the 4-day inhaler protocol using a spacer.

Inhaler protocol

4-day protocol	(Puffs X times / day)			
Day of treatment	day 1	day 2	day 3	day 4
Inhaled salbutamol (100 mcg)	2 x 4	2 x 3	0	0
Inhaled fluticasone (125 mcg)	2 x 4	2 x 3	2 x 3	1 x 2

If the first day of treatment was not associated with at least 50% reduction of symptoms move to day 2 in the 8-day protocol.

8-day protocol	(Puffs X times / day)							
Day of treatment	day 1	day 2	day 3	day 4	5 day	6 day	day 7	day 8
Inhaled salbutamol (100 mcg)	2 x 4	2 x 4	2 x 3	2 x 3	0	0	0	0
Inhaled fluticasone (125 mcg)	2 x 4	2 x 4	2 x 3	2 x 3	2 x 3	2 x 3	1 x 2	1 x 2

If day 2 treatment with the 8-day protocol was not associated with more than 50% reduction of asthma symptoms move to:

Inhalation protocol

Step 1 - Inhalation treatment	(Inhalations / day)		
Days of treatment	day 1	day 2	day 3
Salbutamol (0.3-0.5 ml / 1.5 Saline)	Every 2 - 4 hours		
Budesonide suspension (1mg/2ml)	Every 2 - 4 hours		

→ *

Step 2 - Inhaler treatment	(Puffs X times / day)					
Days of treatment	day 1	day 2	day 3	day 4	day 5	day 6
Fluticasone (125 mcg)	2 x 4	2 x 4	2 x 3	2 x 3	2 x 2	2 x 2

* Move to step 2 of the Inhalation protocol when treatment is associated with more than 50% reduction of asthma symptoms.

If 1-2 days treatment with the inhalation protocol was not associated with more than 50% reduction of symptoms move to:

Inhalation + Azithromycin protocol

Repeat the inhalation protocol from day 1 and add Azithromycin syrup 5-10 mg/kg/day, for 5 days

Results - 1

Characteristics of the study population

Characteristic	Parameter	Percent
Male sex		66%
History of asthma in the family		75%
First asthma symptom occurrence	> 1 year	84%
	> 2 year	97%
Number of asthma exacerbations in the year prior to the first visit	1 - 4	42%
	5 - 9	25%
	> 10	33%
Use of medication in the year prior to the first visit	$Beta_2$ - agonists	93%
	Oral corticosteroids	48%
Wheezing detected on physical examination in the first visit		45%
Reported pneumonia lung x-ray		18.5%

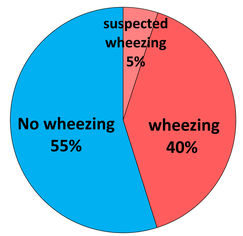
Results - 2

Similar asthma characteristics in infants (<1 year) and older children (1-5 years)

Asthma characteristic	<1 year	1-5 years	P value
History of asthma in the family	76%	65%	0.750
Asthma exacerbation needing visit to the emergency department	47%	55%	0.959
Asthma exacerbation requiring hospitalization	23%	30%	0.454
In the 12-week period prior to the first clinic visit:			
- Use of $beta_2$. agonists	92%	93%	0.908
- Use of oral corticosteroids	48%	48%	0.997
- Duration of asthma symptoms, wks/child (mean±SD)	8.4±3.0	8.5±2.8	0.666
- Duration of $beta_2$-agonist use, wks/child (mean±SD)	4.0±3.1	3.9±2.9	0.490
- Duration of oral corticosteroid use, days/child (mean±SD)	5.9±6.0	6.2±5.5	0.463
- Mean No. of episodes requiring oral corticosteroid use/child	1.6	1.7	0.389

Results - 3

Wheezing on physical examination (first visit)



Results - 4

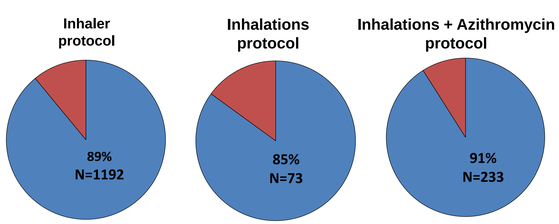
Similar asthma characteristics in children with or without wheezing

Characteristic	No wheezing	Wheezing*	P value
Number of children	822 (55%)	678 (45%)	<0.001
Age, yr. (mean)	1.9	1.6	NS
Male sex	63%	70%	<0.01
History of asthma in the family	73%	76%	NS
In the 12-week period prior to the first visit:			
- Duration of asthma symptoms, wks/child (mean±SD)	8.23±2.87	8.38±2.86	NS
- Duration of beta2-agonist use, wks/child (mean±SD)	3.94±2.99	3.99±2.98	NS
- Duration of oral corticosteroid use, days/child (mean±SD)	6.06±1.12	6.12±1.22	NS
Since the first asthma symptom, percent of children who:			
- Visited the emergency department	24%	23%	NS
- Were hospitalized	10%	8%	NS

*Wheezing and suspected wheezing in the first visit

Results - 5

The majority of children exhibit good response to treatment* with inhaled corticosteroids using all treatment protocols



*Good response to treatment with inhaled corticosteroids = Complete cessation of asthma symptoms + At least 7 days without asthma symptoms

Results - 6

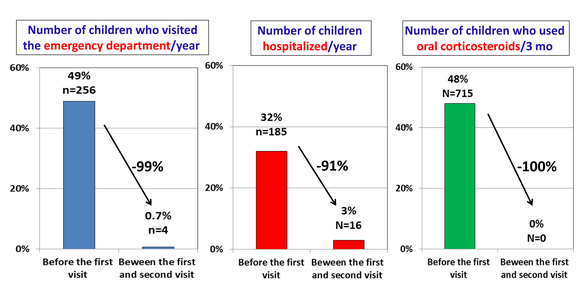
Similar response of asthma exacerbations to inhaled corticosteroids in infants and older children, with or without wheezing

	Age < 1 year (%)		Age 1-5 years (%)		P value
Treatment protocol	No wheezing	Wheezing*	No wheezing	Wheezing*	
Inhalers	87%	86%	88%	89%	NS
Inhalations	89%	93%	89%	89%	
Inhalations + Azithromycin	94%	86%	88%	95%	

*Wheezing and suspected wheezing

Results - 7

Significant reduction in emergency department visits, hospitalizations and oral corticosteroid use



Summary

(1) Asthma is present in infants and has the same clinical characteristics (Result 2) and same response to treatment (Result 6) as in older children (1-5 years old).

(2) Children with prolonged cough should be considered as having asthma even in the absence of wheeze because they have similar clinical characteristics (Result 4) and similar good response to treatment with inhaled corticosteroids (Result 6) as children with wheezing.

(3) Inhaled corticosteroids are very effective in controlling asthma exacerbations in children (Result 5), equally in infants and older children (Result 6).

(4) Azithromycin plays an important role in the treatment of uncontrolled asthma exacerbations (Results 5,6).

(5) Our treatment with inhaled corticosteroids, without oral corticosteroids, is associated with fewer adverse effects, fewer visits to the emergency department and fewer hospitalizations (Result 7), which reduces the burden of asthma.

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