

MINISTRY OF EDUCATION AND TRAINING

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HAI PHONG UNIVERSITY OF MEDICINE AND PHARMACY

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**STUDY CLINICAL, SUBCLINICAL
CHARACTERISTICS AND RESULTS OF
ASTHMA CONTROL IN CHILDREN
UNDER 5 YEAR OLD IN PHENOTYPES**

Major: Pediatric

Code: 62 72 01 35

SUMMARY THESIS DOCTOR

HAI PHONG, 2018

INTRODUCTION

Bronchial asthma is a heterogeneous disease, usually characterized by chronic airway inflammation. It is defined by the history of respiratory symptoms such as wheeze, shortness of breath, chest tightness and cough that vary over time and in intensity, together with variable expiratory airflow limitation.

The disease is common at all ages, both children and adults. It is estimated that there are about 358 million people worldwide with asthma, the incidence of which is still increasing. Another estimation shows that with urbanization rising from 45% to 59% by 2025, the world will have an additional 100 million people with asthma.

Asthma mortality is also rising, according to the Global Initiative for Asthma (GINA), with one in every 250 deaths due to asthma. This reflects an increased incidence of asthma and severe asthma in the general population. In Vietnam, epidemiological studies on asthma in the community are still very few. It is not until 2010 we could investigate the prevalence of asthma in adults across the country; with the rate of 4.1% of people with asthma. The situation of asthma control in children in our country is more alarming as more than 80% of children with asthma under 15 years old have not been treated appropriately.

In order to reduce the incidence of asthma in children under 5 years old and evaluate the control of asthma in young children, we conducted this study: Clinical, subclinical characteristics and results of asthma control in children under 5 year old in all phenotypes in the respiratory department at Nghe an obstetrics and pediatrics hospital. There are 2 main purposes of this study:

1. To study the clinical, subclinical characteristics in children under 5 year old in all phenotypes in the respiratory department at Nghe an obstetrics and pediatrics hospital.

2. To evaluate the efficacy of asthma control with Flixotide and Leukotriene receptor antagonist (Singulair) for infants under 5 years old.

The urgency of the study:

The clinical and subclinical characteristics of asthma in children are different

from those of adults: clinical symptoms are unclear and atypical, respiratory function tests including peak flow test is also difficult to perform in children, so the diagnosis is difficult, easily confused with bronchitis, bronchopneumonia,... Many patients are diagnosed lately, not treated promptly. Viral respiratory infections cause the outbreak of asthma is not noted. Overuse of antibiotics is occurred in the outbreak of bronchial asthma. So, we need to study the clinical and laboratory characteristics of viral respiratory infections during the outbreak of asthma, which will help to diagnose, treat and predict disease. This is an urgent and important topic.

New contributions of the study:

Studying the clinical and laboratory characteristics of all phenotypes of asthma in children under 5 years of age, this helps pediatricians in the diagnosis, treatment, prognosis, prevention of the disease early and properly.

We used PRACTALL to classify asthma, then compared to GINA classification to find out which one is more accurate.

Evaluation of asthma control efficacy in two regimens : (1) Flixotide and (2) Leukotriene receptor antagonist for patients under 5 years of age in all phenotypes. We then made recommendations on the treatment of bronchial asthma in children under 5 years of age using the drugs available on the market effectively.

The structure of the thesis:

The thesis consists of 122 pages:

1. Introduction: (2 pages)
2. Chapter 1: Literature review (36 pages)
3. Chapter 2: Methodology (21 pages)
4. Chapter 3: Results (35 pages)
5. Chapter 4: Discussion (25 pages)
6. Conclusions (2 pages)
7. Recommendation (1 page)

The thesis has 32 tables, 6 graphs, 10 pictures. It has 111 references, of which 29 are in Vietnamese and 82 are in English.

CHAPTER 1

LITERATURE REVIEW

1.1. Definition of asthma (GINA 2016)

Bronchial asthma is a heterogeneous disease, usually characterized by chronic airway inflammation. It is defined by the history of respiratory symptoms such as wheeze, shortness of breath, chest tightness and cough that vary over time and in intensity, together with variable expiratory airflow limitation.

1.2. Diagnosis of asthma

1.2.1. *Symptoms and signs*

Symptoms:

Coughing: dry cough at the beginning and then wet cough; persistent; without cycle; get worse at night and in early morning.

Wheezing: recurrent, occur during sleeping time or because of stimulatory factors: action, laugh, cry...

Shortness of breath: mainly occur when exhale, long exhalation, shortness of breath on exertion (mild cases), irritability- severe cough- shortness of breath- use of accessory muscles (severe cases).

Signs: wheezes, rhonchus, decreased or absent breath sounds (severe airway obstruction).

1.2.2. *Tests*

Complete blood count: Eosinophilia (eosinophils infiltrate the surface of the airway).

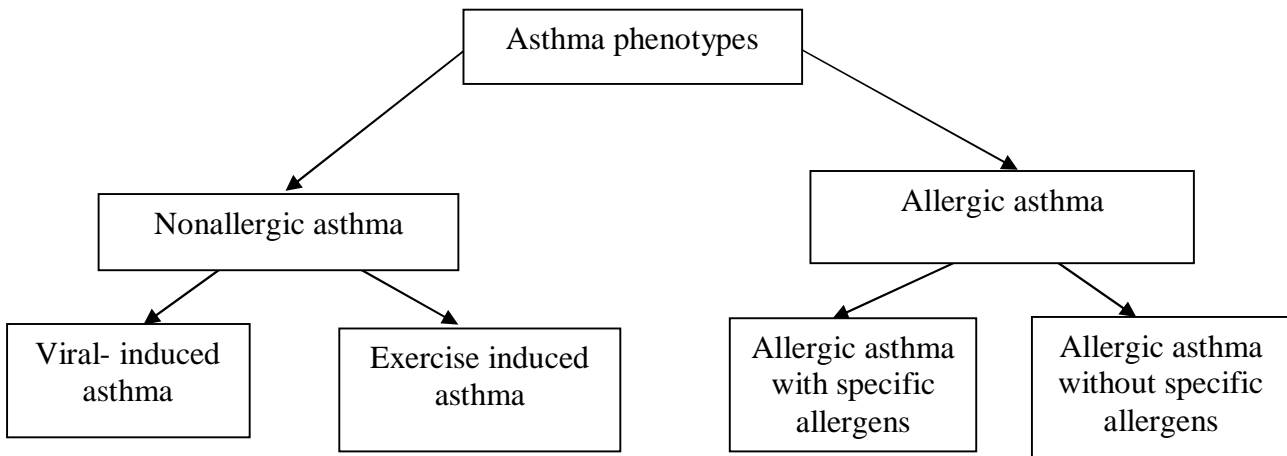
Allergy tests: skin prick test, IgE test.

Chest x ray: air trapping in asthma attack.

Pulmonary function test: we can do this test for children who are 4- 5 years of age if we have experienced technicians and good equipmen.

1.3. Classifications of asthma

PRACTALL classification



Allergic bronchial asthma is caused by an allergic reaction to allergens such as pollen or animal dander (from hair, skin, or feathers). Typically, children with asthma have a family history of allergy, such as allergic rhinitis or hay fever, and/or eczema. Seasonal bronchial asthma, a form of allergic bronchial asthma, can be triggered by plants, or flowers that release pollen into the air and mold from the leaves can cause asthma.

Allergic bronchial asthma includes:

- Allergic asthma with specific allergens: occur when exposed to allergens which have allergy test (+).
- Allergic asthma without specific allergens: common in children with a history of allergies or a family history of allergies such as eczema, urticaria, allergic rhinitis

Non- allergic bronchial asthma includes:

- Exercise- induced bronchial asthma: usually occurs in children during and after an physical exertion.
- Viral- induced bronchial asthma: often have high fever, sneezing running nose.

Age is one of the most important factors in the classification of childhood bronchial asthma according to the phenotype. Age groups are important for the design of strategies for the diagnosis and management of asthma in children. PRACTALL classifies asthma in children by age groups:

1. Infants : 0- 2 years old
2. Preschool children: 2- 5 years old
3. Children: 6- 12 years old
4. Juvenile

1.4. Clinical classification of asthma

- Allergic asthma
- Nonallergic asthma
- Aspirin- induced asthma
- Infection induced asthma
- Inflammation markers in bronchial asthma
- Exercise induced asthma
- Wheezing asthma
- Severe bronchial asthma
- Bronchial asthma with restless ventilation.

CHAPTER 2

METHODOLOGY

2.1. Subject of the study

All patients (309 patients) were under 5 years old who were diagnosed with asthma, treated at Nghe an obstetrics and pediatrics hospital from September 2014 to January 2017 (including both inpatients and outpatients).

2.2. Methods of the study

2.2.1. *Research design*

Descriptive study and clinical trial.

2.2.2. *Sample size*

309 patients with asthma .

2.2.3. *Contents*

- Clinical studies: epidemiological factors, history of present illness, past history, living conditions, systemic status, respiratory system and other system examinations

- Subclinical studies: complete blood count test (CBC), C- reactive protein (CRP), eosinophil count test, Erythrocyte Sedimentation Rate (ESR), chest x ray.

- Evaluation of clinical and laboratory findings.

- Evaluation of the efficacy of Flixotide and Singulair in treatment of bronchial asthma after 1 month, 3 months and 6 months through: severity, clinical signs and symptoms, number of asthma attacks, subclinical indices,...

2.3. Data processing

Using SPSS 16.0 to analyze data.

Comparison of the differences between the study groups and the p value, the difference was statistically significant with $p < 0.05$.

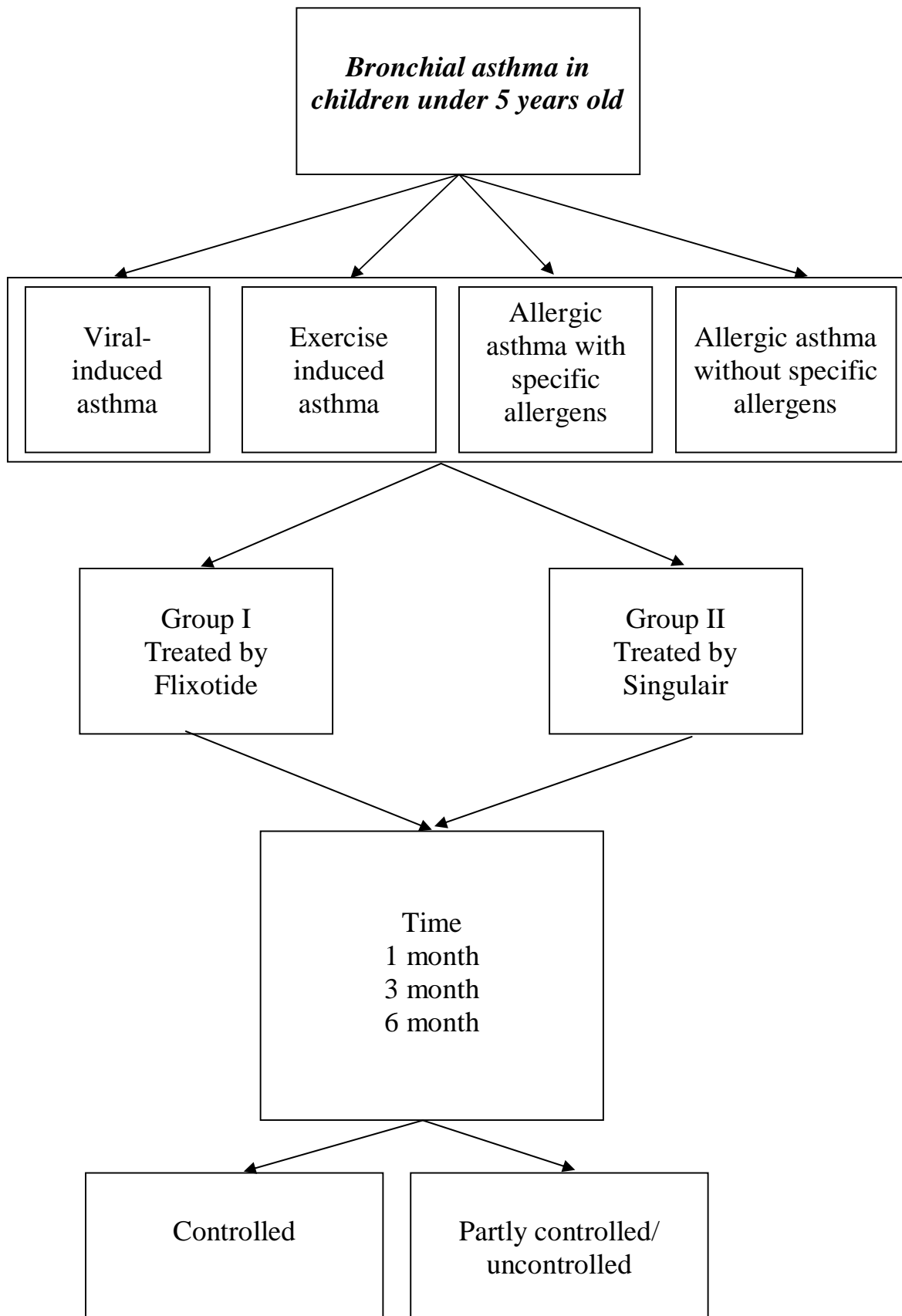
RESEARCH DATABASE

Figure 2.10. Diagram of bronchial asthma in children under 5 years old

CHAPTER 3

RESULTS

3.1. Clinical and laboratory characteristics

3.1.1. Distribution of patients by age and gender

Table 3.1 Distribution of patients by age and gender

Age \ Gender	male		female		OR (95% CI)	P
	n	(%)	n	(%)		
< 2 (n = 184)	131	60,1	53	58,2	1,1	(p=0,76)
2- 5 (n = 125)	87	39,9	38	41,8	(0,7 - 1,8)	
Total	218	100	91	100		

The proportion of boys under 2 years old is 60.1%. The proportion of boys from 2 to 5 years is 39.9% of the 218 male children participating in the study.

The proportion of girls under 2 years old is 58.2%. The proportion of girls from 2 to 5 years is 41.8% of the total 91 female participants.

3.1.2. Relationship between gender and phenotypes

Table 3.2. Relationship between gender and phenotypes

Phenotype \ Gender	Viral induced and exercise induced asthma		Allergic asthma		OR (95% CI)	P
	n	(%)	n	(%)		
male (n = 218)	130	65,7	88	79,3	2,0	P=0,01
Female (n=91)	68	34,3	23	20,7	(1,12- 3,62)	
Total	98	100	11	100		

The proportion of male patients who have viral- induced asthma and exercise induced asthma were 65.7%, 34.3% of the 198 male patients.

The proportion of male patients in the group of allergic asthma is 79.9%. The

proportion of female patients is 20.1% of the total 111 patients involved in research with allergic asthma.

The rate of patients with viral induced asthma and allergic asthma is 1.78/1.

3.1.3. Relationship between age and phenotypes

Table 3.3. Relationship between age and phenotypes

Phenotype Age	Viral induced and exercise induced asthma		Allergic asthma		OR (95% CI)	P
	n	(%)	n	(%)		
<2 (n = 184)	133	67,3	51	49,0	2,4 (1,45- 3,99)	P=0,01
2- 5 (n = 125)	65	32,7	60	51,0		
Total	198	100,0	111	100,0		

The proportion of children under 2 years old who have viral induced asthma and exercise induced asthma is 67.3%, so the proportion of the other age group (2- 5 years old) is 32.7%.

The proportion of children under 2 years old with allergic asthma is 49% in 111 children with allergic asthma, so the proportion of the other age group (2- 5 years old) is 51%

3.1.4. Clinical characteristics and phenotypes

Signs and Symptoms	Viral induced and exercise induced asthma (n = 198)		Allergic asthma (n = 111)		P
	N	(%)	N	(%)	
Cough	198	100,0	111	100,0	> 0,05
Shortness of breath	198	100,0	111	100,0	> 0,05
Wheeze	198	100,0	111	100,0	> 0,05

Signs and Symptoms	Viral induced and exercise induced asthma (n = 198)		Allergic asthma (n = 111)		P
	N	(%)	N	(%)	
Symptoms get worsen at night	109	55,1	69	62,2	> 0,05
Symptoms get worse as the weather changes	197	99,5	109	98,2	> 0,05
Cyanosis	36	18,2	29	26,2	> 0,05
Difficulty talking	151	76,3	101	91,0	> 0,05
Irritability	153	77,3	102	91,9	> 0,05
Tachycardia	198	100,0	111	100,0	> 0,05
Tachypnea	198	100,0	111	100,0	> 0,05
Fever	135	68,2	38	34,2	< 0,05
Use of accessory muscles	198	100,0	111	100,0	> 0,05
Wet rale; crepitations (auscultation)	142	71,7	33	29,7	< 0,05
Wheezes (auscultation)	198	100,0	111	100,0	> 0,05

3.1.5. Laboratory characteristics

Chest x ray

Non Allergic asthma group: the proportion of patients in this group with air trapping on chest x ray is 100%.

Allergic asthma group: the proportion of patients in this group with air trapping on x ray is 100%.

Eosinophil count test

Table 3.13. Eosinophil count test with phenotype before treatment

Phenotype Eosinophila	Viral induced and exercise induced asthma		Allergic asthma		OR (95% CI)	P
	n	(%)	n	(%)		
Increase	80	40,4	43	38,7	1,1 (0,6 - 1,8)	p= 0,77
Normal	118	59,6	68	61,3		
Total	198	100,0	111	100,0		

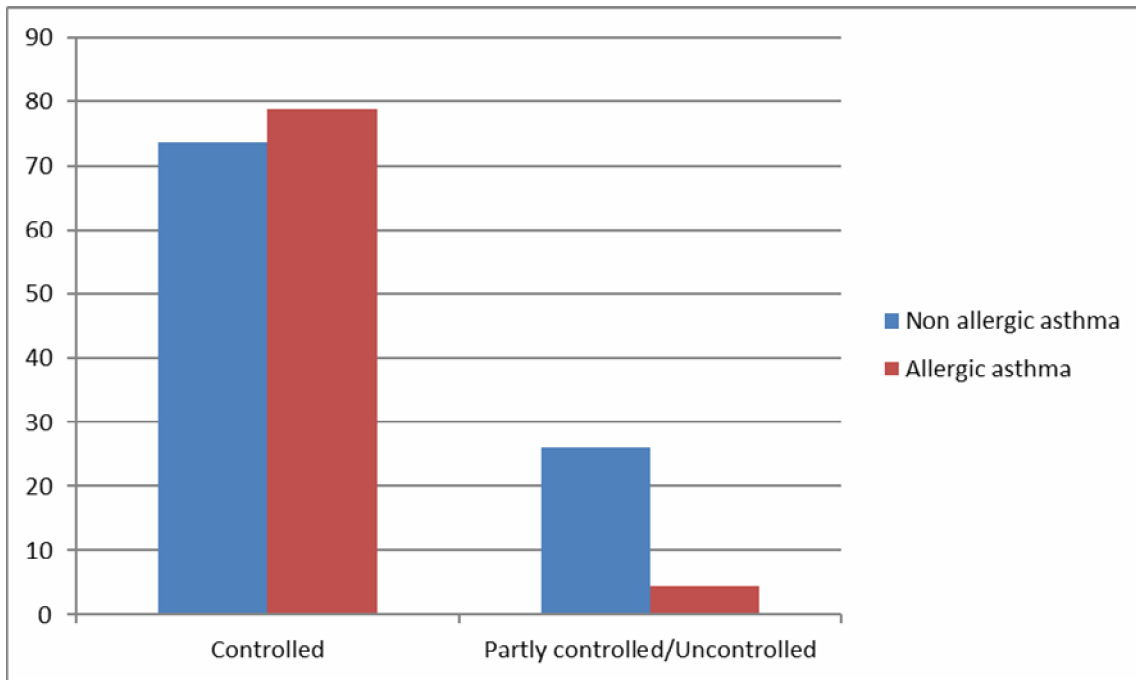
The proportion of patients with eosinophilia in the non allergic asthma group is 40.4%; while in the allergic asthma group is 38.7%.

3.2. The control efficacy of asthma in children under 5 years old

3.2.1. Using Singulair to control asthma (after 6 months)

Table 3.21. Rate patient controlled asthma in group treat by Singulai after 6 month to phenotype

Level controlled	Viral induced and exercise induced asthma		Allergic asthma		OR (95% CI)	P
	n	(%)	n	(%)		
Controlled	68	73,9	26	78,8	0,8 (0,3 - 2,0)	(p= ,65)
Partly controlled/ Uncontrolled	24	26,1	7	21,2		
Total	92	100	33	100		



Non allergic asthma group: the proportion of patients who are controlled is 73.9%

Allergic asthma group: the proportion of patients who are controlled is 78.8%.

3.2.2. Using Flixotide to control asthma (after 6 months)

Table 3.22 Rate patient controlled asthma in group treat by Flixotide after 6 month to phenotype

Level controlled	Viral induced and exercise induced asthma		Allergic asthma		OR (95% CI)	P
	n	(%)	n	(%)		
Controlled	76	71,7	64	82,1	0,6 (0,3 - 1,1)	(p=0,12)
Partly controlled/ Uncontrolled	30	28,3	14	17,9		
Total	106	100	78	100		

Non allergic asthma group: the proportion of patients who are controlled is 71.7%

Allergic asthma group: the proportion of patients who are controlled is 82.1%

3.2.3. Asthma control in non allergic asthma group (after 6 months of treatment)

Table 3.23. The percentage of asthmatic control patients in the viral / post-operative asthma group after 6 months was treated prophylaxis

Level controlled	< 2 age (n = 133)		2- 5 age (n = 65)		OR (95% CI)	P
	n	(%)	n	(%)		
Controlled	96	72,2	48	73,8	0,9 (0,5 - 1,8)	(p=0,87)
Partly controlled/ Uncontrolled	37	27,8	17	26,2		
Total	133	100	65	100		

In this group, the proportion of patients who are controlled is: 72.2 % (<2 years old), 73.8 % (2- 5 years old).

3.2.4. Asthma control in allergic asthma group (after 6 months of treatment)

Table 3.26. The percentage of asthmatic control patients in the allergic asthma group after 6 months was treated prophylaxis

Level controlled	< 2 age		2- 5 age		OR (95% CI)	p
	n	(%)	n	(%)		
Controlled	44	86,3	46	76,7	1,9 (0,7 - 5,2)	(p=0,23)
Partly controlled/ Uncontrolled	7	13,7	14	23,3		
Total	51	100	60	100		

In this group, the proportion of patients who are controlled is: 86.3% (<2 years old), 76.7 % (2- 5 years old).

In the allergic asthma group:

- The group of patients under 2 years old: controlled (86.3%), partly controlled and uncontrolled (13.7%); after 6 months of treatment.

- The group of patients from 2 to 5 years old: controlled (76.7%), partly controlled and uncontrolled (23.3%); after 6 months of treatment.

3.2.5. Laboratory characteristic changings after 6 months of treatment

**Table 3.31 Laboratory characteristic changes
after 6 months of prophylaxis**

Symptoms	Non allergic asthma n= 198		Allergic asthma n= 111		P
	Flixotide n (%)	Singulair n (%)	Flixotide n (%)	Singulair n (%)	
Air trapping on x ray	20 (10.1)	13 (6.6)	8 (7.2)	4 (3.6)	p= (0.74)
Eosinophilia	16 (8.1)	13 (6.6)	11 (9.9)	2 (1.8)	p= (0.61)

The prevalence of air trapping in the group of non allergic asthma after 6 months of treatment: 10.1 % (Flixotide), 6.6 % (Singulair). And here are the results in the allergic asthma group: 7.2 % (Flixotide), 3.6% (Singulair).

The prevalence of eosinophilia in the group of non allergic asthma after 6 months of treatment: 6.6 % (Singulair). And here are the results in the allergic asthma group: 9.9 % (Flixotide), 1.8 % (Singulair).

CHAPTER 4

DISCUSSION

4.1. Clinical and laboratory characteristics

4.1.1. *Distribution of patients by age and gender*

We did physical examination, followed the improvement, gave advices, and made preventative care for 309 participants involved in the study. The participants are divided into 4 groups, depending on: gender (male, female), age group (<2, 2- 5)

The results show that the prevalence of male patients under 2 years old is 60.1%; it is 41.8% for female patients. The rate of 2 age groups: 1.47/1 (2 years old/2- 5 years old), the rate of gender groups: 2.39/1 (male/female).

In our study, the proportion of male patients is higher than that of females. Thus, gender also influences the prevalence of asthma in children under 5 years of age. The results of our study are higher than those of previous authors such as:

The study of Nguyen Tien Dung (2005) showed the ratio of male / female is 1.3 / 1.

The study of Le Thi Hong Hanh (2002) on pediatric asthma at Vietnam National Children's Hospital showed that the prevalence of asthma was higher than that of females with a male / female ratio of 1.7.

The study of Le Thi Hong Hanh (2011) found that the male / female ratio was 1.5 / 1.

The ratio of patients under 2 years of age / patients aged 2- 5 years is 1.47/1. Thus, in our study children under 2 years of age had a higher incidence of asthma than children aged 2 to 5 years. Diagnosis of bronchial asthma in children under 2 years old is very difficult because of unclear clinical and laboratory characteristics but the incidence is clearly higher. Therefore, we need to try to detect, diagnose and treat this illness early in children under 2 years old so that they can develop physically and physiologically; in order to reduce burdens for family and society. In fact, many parents are only interested in stopping asthma attacks, with mild bronchial asthma treated only at home without taking preventive care at the hospital due to the social prejudice of asthma. This makes asthma worse.

4.1.2. Disease distribution by age, gender

Our study is the first study applying Vietnamese classification of asthma to diagnose, treat early and appropriately.

Results show the prevalence of male patients in the group of non allergic asthma is 65.7%, so it is 34.3% in female patients.

The prevalence of male patients in the group of allergic asthma is 79.9%, so it is 20.7% in female patients.

The ratio between non allergic asthma and allergic asthma is 1/78 ($p < 0.05$).

The prevalence of patients in the group of non allergic asthma under 2 years old is 67.3%. It is 32.7% in the other age group.

The prevalence of patients in the group of allergic asthma under 2 years old is 49 %. It is 51 % in the other age group.

In the group of non allergic asthma, the prevalence of children under 2 years of age is higher. For children under 2 years of age due to weakened immune system, the body's ability to protect against external factors is lower than that of children from 2 to 5 years old. In the group of allergic asthma, the incidence of children in two age groups under 2 years of age and 2 to 5 years of age is the same.

4.1.3. Clinical symptoms according to phenotypes

The results from Table 3.5 show that 100% of children in both groups (allergic asthma and non allergic asthma) have symptoms: cough, shortness of breath, wheezing, tachycardia, and tachypnea. These are the classic symptoms of bronchial asthma when children have acute asthma. Our study found that for children under 5 years of age, these symptoms were examined by parents and pediatricians when a child has an acute asthma. This indicates that parents' basic understanding of asthma is essential for proper initial treatment.

Symptoms get worse as the night

The percentage of nighttime symptoms in the non- allergic asthma group was 55.1%, in the asthmatic group was 62.2%, the rate of nighttime symptoms in the asthma group was higher than in the non- allergic group.

Symptoms get worse as the weather changes

The percentage of children have symptoms get worse as the weather changes in the non allergic asthma group was 99.5%, in the allergic asthma group was 98.2%; so the results in the two groups are similar.

Cyanosis

The percentage of children with cyanosis was 18.2% for non- allergic asthma, 26.2% for allergic asthma.

Difficulty talking

The percentage of children with difficulty talking in the non- allergic group was 76.3%, in the allergic asthma group was 91%. During the physical examination we found that we cannot use difficulty talking to evaluate infants because they are not communicating well and some other reasons.

Irritability

The percentage of children have irritability in the non- allergic group was 77.3% in the allergic asthma group was 91.9%. This is a very important symptom, showing the need of oxygen to brain. However it is hard to evaluate when the child is unconscious.

Fever

The percentage of children have fever in the non- allergic group was 68.2 % in the allergic asthma group was 34.2%. This is also a sign to classify bronchial asthma for children under 5- year- old (Practall).

Wet crepitation

The percentage of children have wet crepitation in the non- allergic group was 66.3% in the allergic asthma group was 42.4%. This is a common sign because of infection. Antibiotics are useful in these cases.

4.1.4. Associated allergies and phenotypes

From the results of Table 3.8, we found that the incidence of non allergic asthma patients with a history of allergy was 23.7%; it was 63.1% for the allergic asthma group ($p < 0.05$). So, hypersensitivity is an important risk factor.

From the results of Table 3.9, we found that the rate of non allergic asthma

patients had a family history of allergies at 32.8%. The percentage of children with allergic asthma with a history of allergy in the home is 30.6%. So we see that a family history of allergies is not related to the prevalence of non allergic asthma and allergic asthma.

4.2. Laboratory characteristics

Testing is one of the factors contributing to the diagnosis and prognosis, monitoring the progression of bronchial asthma in children, but it is difficult for children under 5 to carry out tests: respiratory function, chest x ray, taking blood sample...

Table 3.12 shows that 100% patients have air trapping in both 2 groups.

Table 3.13 shows that: 40.4% patients in the group of non allergic asthma and 38.7% in the other group have eosinophilia. This difference between 2 group had not a statistically significance ($p>0.05$). A number of significant studies address this issue: studies of Nguyen Tien Dung (2005), Le Hong Hanh (2011), Tran Thuy Hanh and Nguyen Van Doan (2013).

4.3. Effectiveness of preventive treatment

4.3.1. Clinical characteristics and phenotypes

After a 6- month course of treatment, parents took their children to the hospital for a follow- up visit. We reviewed the level of asthma according to GINA and the level of response to asthma medications. We also conducted the tests again to compare with the previous results. We then synthesized the data and ended the study, and patients continued to be monitored and treated according to GINA.

From the results of Table 3.20, we found that:

- In the non allergic asthma group, the prevalence of patients who are controlled after 6 months of treatment with Singulair and Flixotide: 72.7%, partial controlled and uncontrolled: 27.3%
- In the allergic asthma group, the prevalence of patients who are controlled after 6 months of treatment with Singulair and Flixotide: 81.1%, partial controlled and uncontrolled: 18.9%

It is easy to see that allergic asthma had a higher prevalence of completely

control compared to non- allergic asthma. So, the allergic asthma group responds to medication well.

From the results of Table 3.21, we found that

- In the group of non allergic asthma, the prevalence of fully controlled bronchial asthma after 6 months of treatment with Singulair : 73.9%, partial control and no control : 26.1%

- In the group of allergic asthma, the prevalence of fully controlled bronchial asthma after 6 months of treatment with Singulair : 78.8 %, partial control and no control : 21.2 %

Based on the results, we found that the efficacy of asthma medication in both groups for Singulair was similar in 6 months. So when children with asthma, the prevention of asthma with Singulair results in similar results between the non allergic asthma and allergic asthma

From Table 3.22, it was found that in non allergic asthma group, complete control of asthma after 6 months of treatment with Flixotide was 71.7%, partial control and no control of asthma was 28.3%

In the allergic asthma group, complete control of asthma after 6 months of treatment with Flixotide: 82.1%, partial control and no control: 17.9%

From the results of the study we found that in prophylaxis with flixotide, allergic asthma has a significantly higher prevalence of complete control compared to non- allergic asthma. So when children have allergic asthma, Flixotide is better Singulair.

After 6 months of treatment with Flixotide and Singulair although the percentage of patients who are controlled are quite high, there is still a small percentage of patients with uncontrolled asthma.

Many patients who do not adhere to treatment: parents forget to remind their children to take medicine, spray using is not as the right way, especially it is more difficult to control the use of drugs for children at school, many people are afraid of long- term use of drugs, the time of control over holidays, so it is really difficult to control the drug use of children.

After studying 309 patients, we found that the effect of asthma treatment in children under 5 years old with Flixotide and Singulair was the same. Therefore, to limit the side effects of prophylaxis for children with Corticoid (Flixotide) can use Singulair as a substitute. Particularly for allergic asthma patients, Flixotide prophylaxis for higher efficacy, so we propose to prevent allergic asthma with Flixotide to achieve the best prevention effect.

4.3.2. Effective control of asthma with age, prophylaxis and phenotypes

In our study, in addition to studying the effects of medications in phenotypes, we also looked at the age of the children, including children under age 2 and children aged 2 to 5 years.

Table 3.23

The results in Table 3.23 show:

- In non allergic asthma group, the prevalence of patients under 2 years of age who are controlled: 72.2%, who are partly controlled and uncontrolled: 27.8% after 6 months of treatment with Singulair and Flixotide.

- In non allergic asthma group, the prevalence of patients from 2 to 5 years of age who are controlled: 73.8%, who are partly controlled and uncontrolled: 26.2% after 6 months of treatment with Singulair and Flixotide.

Therefore, effective control of asthma in non allergic asthma group by Singulair and Flixotide has the same effect in both age groups.

Table 3.26

The results in Table 3.26 show:

- In allergic asthma group, the prevalence of patients under 2 years of age who are controlled: 86, 3%, who are partly controlled and uncontrolled: 13.7% after 6 months of treatment with Singulair and Flixotide.

- In allergic asthma group, the prevalence of patients from 2 to 5 years of age who are controlled: 76, 7%, who are partly controlled and uncontrolled: 23,3% after 6 months of treatment with Singulair and Flixotide.

Therefore, effective control of asthma by Flixotide and Singulair in the allergic asthma group has the better effect in the under 2 years of age group after 6 months of treatment.

4.3.3. Laboratory characteristics changes after prophylaxis

After 6 month - treatment

Table 3.32 shows:

Chest x ray:

- The prevalence of non allergic asthma patients have air trapping on chest x ray dropped to 10.1% (with Flixotide medication), 6.6% (with Singulair medication) after 6 months of treatment.

- The prevalence of allergic asthma patients have air trapping on chest x ray dropped to 7.2 % (with Flixotide medication), 3.6 % (with Singulair medication) after 6 months of treatment.

Eosinophil test:

In the non- allergic asthma group, Eosinophilia decreased to 8.1 % (Flixotide), 6.6 % (Singulair) after 6 months of treatment.

In the allergic asthma group, Eosinophilia decreased to 9.9 % (Flixotide), 1.8% (Singulair) after 6 months of treatment.

LIMITATIONS OF THE STUDY

After the study was completed, we found out the following limitations:

The study was conducted at Nghe an obstetrics and pediatrics hospital so the facilities and equipments for research were lacking.

Many families do not agree to provide home - based preventive care after having acute asthma treatment at hospital.

Pediatricians and residents lack knowledge about bronchial asthma. Many parents believe that asthma is a disease that needs to be hidden because of social prejudice.

Although the medical staff have been carefully instructed but many parents have not done well yet.

Many children are admitted to the hospital in the late stages of the disease, some of which are: financial problem, distance.

Some important tests are not available: IgE test, allergy tests.

This is a new study on all phenotypes of asthma in children under 5 years old- the first Vietnamese study conducted with the resources of physicians and nurses and parents and completed during the study period.

With the results achieved in the study, the limitations are remained. We hope there will be many further studies on asthma in children under 5 years of age to serve for diagnosis, treatment.

CONCLUSION AND PROPOSAL

1. Conclusion

Through clinical- subclinical researches and clinical intervention in 309 asthmatic patients aged ≤ 5 years old at Nghe an obstetrics and pediatrics hospital during a period of 6 months. Some conclusions are as follows:

1.1. Clinical and laboratory characteristics of asthma in children under 5 years old

The prevalence male patients under 2 years old and from 2 to 5 years old: 60.1%, 39.9%. The prevalence female patients under 2 years old and from 2 to 5 years old: 58.2%, 41.8%. The rate of patients under 2 years old/patients 2- 5 years old: 1.47/1. The rate of male/female: 2.39/1

The prevalence of male patients in the non allergic asthma group is 65.7%, while it is 34.3% in female. The prevalence of male patients in the allergic asthma group is 79.9%, while it is 20.7 % in female. So, the rate of non allergic asthma/allergic asthma: 1.78/1

The prevalence of patients under 2 years old who have non allergic asthma is 67.3%; it is 32.7% in the other age group. The prevalence of patients under 2 years old who have allergic asthma is 49%; it is 51% in the other age group.

100% patients in the study have cough, wheeze, tachycardia, tachypnea, use of accessory muscles. 58.7% patients in under 2 year - old group have symptoms get worsen at night, while it is 56% in the other age group.

28.9% male patients in the study have a history of allergy, while it is 27.5% in female.

25% patients under 2 years old have a history of allergy; it is 33.6% in the other age group. The prevalence of patients with non allergic asthma have a history of allergy is 23.7%, while it is 63.1% in the group of allergic asthma.

100% patients have air trapping on x ray. 40.4% patients in the group of non allergic asthma have eosinophilia; it is 38.7% in the group of allergic asthma.

1.2. Efficacy of asthma management

In the non- allergic asthma group, 72.7% of patients are controlled after 6 months of treatment; (partly controlled+ uncontrolled) is 27.3%. But in the allergic asthma group, 81.1% of patients are controlled after 6 months of treatment; (partly controlled+ uncontrolled) is 18.9%

After 6 months of treatment, 72.2% patients in the group of non allergic asthma under 2 years old are controlled, while 73.8% patients of this group from 2 to 5 years old are controlled.

2. Proposal

1. New researches are needed to clarify all phenotypes of asthma in Vietnam (clinical and subclinical characteristics) especially in children under 5 years old.

2. Proper preventative treatment is very important, especially for children under 5 years old by using drugs available on the market.

3. New updated knowledge about asthma for pediatric clinicians, parents is very important ,in order to diagnose and manage the illness properly.

4. All asthmatic patients should be adequately treated after an acute asthma attack, to prevent recurrence of asthma, and to improve the quality of life for the children.

LIST OF PUBLICATIONS RELATED TO THE THESIS

1. Nguyen Tien Dung, **Bui Kim Thuan** (2007), “Clinical and subclinical of bronchial asthma in children ”, *Vietnam journal of Medicine and Pharmacy*, Special issue welcome The Siencific conference on lung disease the second time, Ha Noi.
2. Nguyen Tien Dung, **Bui Kim Thuan** (2007), “Relationship between clinical and Arterial blood gases of bronchial asthma”, *Vietnam journal of Medicine and Pharmacy*, Special issue welcome The Siencific conference on lung disease the second time, Ha Noi
3. Nguyen Tien Dung, **Bui Kim Thuan** (2016), *Pediatric pathology*, volume 1, Medical Publishing House.
4. Nguyen Tien Dung, **Bui Kim Thuan** (2016), *Pediatric pathology*, volume 2, Medical Publishing House.
5. Nguyen Tien Dung, **Bui Kim Thuan** (2016), *Child care*, Medical Publishing House.
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7. Nguyen Tien Dung, **Bui Kim Thuan** (2017), “Results of asthma control in children under 5 years old by use Singulair and Flixotide”, *Journal of Practical Medicine*, issue 1045.

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The thesis can be found at:

- The national library;
- The library of the Hai Phong University of Medicine and Pharmacy.