

ASSOCIATION BETWEEN IGE SERUM LEVEL AND SEVERITY OF ASTHMA IN CHILDREN

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INTRODUCTION

Asthma is an inflammatory chronic process involving respiratory tract wall and cause limited airflow with increased of respiratory tract reactivity. It is a respiratory disease that is more common in children. Definition of asthma from Global Initiative Asthma (GINA), asthma is a heterogeneous disease, usually marked by chronic inflammation respiratory tract. Asthma causes symptoms such as wheezing, shortness of breath, chest tightness and cough that vary over time, in their occurrence, frequency and intensity (GINA, 2016). International Consensus on (ICON) Pediatric Asthma, asthma is a chronic inflammation disorder which correlate with respiratory tract obstruction that clinical manifestation wheezing, cough and shortness of breath (Rahajoe et al, 2015). Estimate prevalence of asthma in the world is 7.2% (6% adults and 10% children) (Rahajoe, 2015).

The pathogenesis, immunopathology, genetic, clinical manifestation, diagnosis and therapy for asthma had much progress. Therefore, it's can't be sure which one comes first because the complexity of both factor (Rahajoe, 2015). In many case, especially children and young adult, asthma is correlated with manifestation of atopy in Ig-E-dependent mechanism (Rahajoe, 2013). There was no different of asthma mechanism in pediatric and adult. Although there was some problem in asthma pediatric there was not found in adult because of the pathology, lack of good scientific evidence, difficulties in determining of diagnosis and therapy and also variation of remodeling response of therapy that could not predicted before. This condition especially for children under five year old (Rahajoe, 2015).

In population, atopy factor give contribute 40% asthma patient pediatrics and adult. Atopy, the genetic predisposition for the development of an Immunoglobulin E (IgE)-mediated response to

common aeroallergens, is the strongest identifiable predisposing factor for developing asthma (Rahajoe, 2013). Asthma has an inheritable component to its expression, but the genetics involved in the eventual development of asthma (Ober, 2005). The role of genetics in IgE production, airway hyperresponsiveness, and dysfunctional regulation of the generation of inflammatory mediators has appropriately captured much attention. Asthma is an effect from histamine in bronchial muscle. Histamine release together with IgE which mediated mast cell degranulation and make quickly constriction and bronchioles muscle spasm (Boyce, 2003). Ig E attaches to cell surfaces via a specific high-affinity receptor. The mast cell has large numbers of IgE receptors; these, when activated by interaction with antigen, release a wide variety of mediators to initiate acute bronchospasm and also to release pro-inflammatory cytokines to perpetuate underlying airway inflammation (Sporik, et al. 1995). In laboratory findings, pediatric patients with asthma show increased IgE serum levels compared to normal individuals without asthma. Ig E serum level is specific for allergic status. It is useful to identified risk factor or triggers of asthma. That is Ig E responsible for allergic attack (Rahajoe, 2013). However, lack of evidence of the association between IgE serum levels and severity of asthma in children. This study aims to determine the association between IgE serum levels and severity of asthma in children.

METHODS

Study design

The study design was cross sectional. The participants were all asthma patients (n=131) who were threated at Pediatric Outpatient Clinic of Saiful Anwar Hospital Malang, Indonesia since January 2014 to December 2015. The participants are

children age less than 18 year old. They were boys (83, 63.4%) and girls (48, 36.6%).

We collect their medical records than divided them in two groups the severity of asthma (intermittent and persistent asthma). The Ig E serum level were taken from their laboratory finding records. Inclusion criteria was pediatric asthma patient with laboratory finding and exclusion criteria was pediatric asthma patient with incomplete laboratory finding.

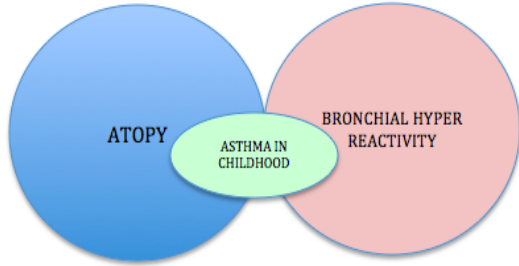


Figure 1: Diagram correlation between atopy, bronchial hyper reactivity and asthma (Rahajoe, 2013)

Statistical analysis

In this study, severity of asthma was variable independent and Ig E serum level was variable dependent. Data was taken from medical record of pediatric asthma patients. Sample were 131 asthma patients, 55% (n=73) intermittent asthma patient and 45% (n=58) persistent asthma patient. To

analyze the association between variables we using SPSS 16.0.

Table 1. Gender Frequency Distribution

Sample	Frequency (n)	Percentage (%)
Boys	83	63.4
Girls	48	36.6
Total	131	100

To know how is the association between IgE and severity of asthma we input the variabel dependent (IgE) compare with variable independent (severity of asthma) using independent t-test in SPSS 16.0. Asthma persistent (n=73) (p 0.001) and asthma persistent (n=58) (p 0.001). The data shows that in asthma persistent we could found IgE higher than asthma intermittent in pediatric.

Table 2. IgE Serum Level in Severity of Asthma

	IgE serum level (n=131)	P value
Intermittent Asthma	708.24 (n=73)	.001
Persistent Asthma	1365.24 (n=58)	.001

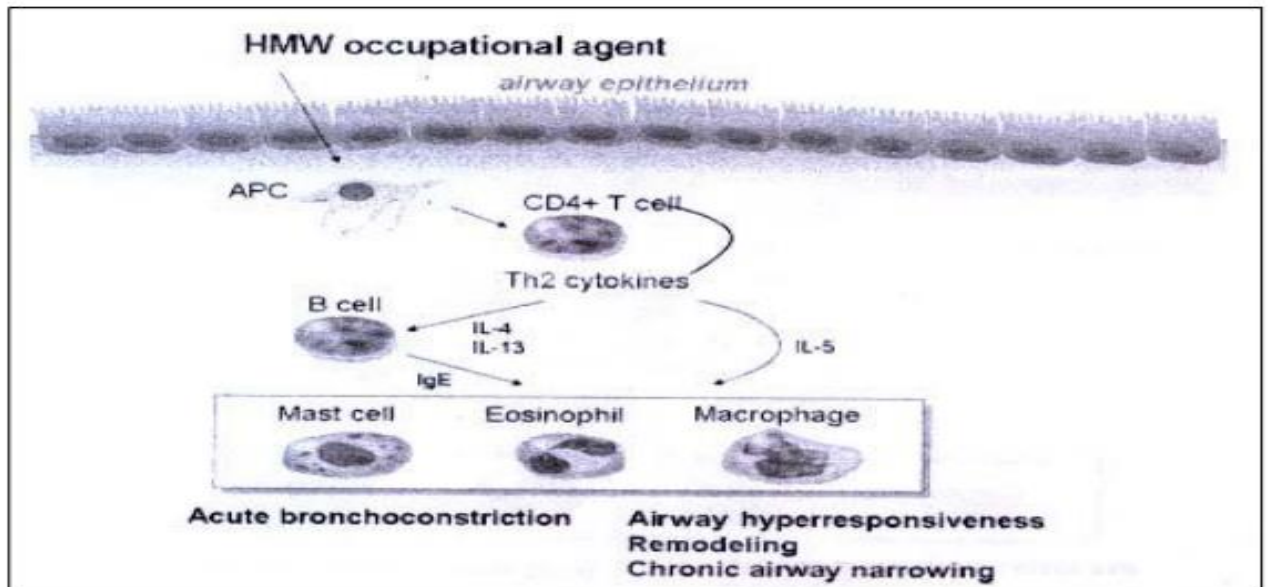


Figure 2: Pathophysiology of asthma IgE-dependent (Maestrelli, 2006)

RESULT

In total medical records of pediatric asthma patients, 131 were analyzed. Seventy-three samples were in group A (intermittent asthma) and fifty-eight samples were in group B (persistent asthma). The

level of IgE serum in persistent asthma was higher significantly than in intermittent group (p 0.001).

DISCUSSION

Pathophysiology of asthma involve hyper-response of respiratory tract after exposed one or more

trigger of asthma. Asthma is an effect from histamine in bronchial muscle. Histamine release together with IgE which mediated mast cell degranulation and make faster constriction and bronchioles muscle spasm. That is Ig E responsible for allergic attack. Early phase reaction of inflammation is a result of cells activities which sensitive with allergen specific IgE, especially mast cell and macrophage. The mast cell has large numbers of IgE receptors; these, when activated by interaction with antigen, release a wide variety of mediators to initiate acute bronchospasm and also to release pro-inflammatory cytokines to perpetuate underlying airway inflammation (Rahajoe, 2013).

A prospective cohort study in which followup began at birth revealed that, in children whose asthma-like symptoms began before 3 years of age, deficits in lung growth associated with asthma occurred by 6 years of age (Martinez et al. 1995). Baseline data from the Childhood Asthma Management Program (CAMP) study support the finding that the individual's age at the time of asthma onset influences declines in lung function growth. At the time of enrollment of children who had mild or moderate persistent asthma at 5–12 years of age, an inverse association between lung function and duration of asthma was noted (Zeiger et al. 1999).

Asthma bronchial commonly happen at boys (Audrey, 2011). From this study the prevalence of asthma higher in boys. According Horwood, the prevalence of asthma is higher in boys at early life but when puberty, however, the sex ratio shifts, and asthma appears predominantly in women (Horwood et al, 1985). Our data shows that in pediatric asthma patients persistent group has higher IgE serum level than intermittent group. It could be happen because of in persistent asthma has several times asthma attack from allergens or another trigger of asthma and makes the IgE serum level be more reactive. But in this study we can not show data for the relation of age and the IgE serum level.

In this study we only found association of the IgE serum level with the severity of asthma. Further study is needed to found association of the IgE with sex or age and severity of asthma.

CONCLUSION

Asthma is an inflammatory chronic process cause limited airflow with increased of respiratory tract reactivity. In population, atopy factor give contribute 40% asthma patient pediatrics and adult. Asthma is an effect from histamine in bronchial muscle. There was no different of asthma mechanism in pediatric and adult. Boys commonly had asthma bronchial than girls. Histamine release together with IgE which

mediated mast cell degranulation and make quickly constriction and bronchioles muscle spasm. Ig E serum level is specific for allergic status. Early phase reaction of inflammation is a result of cells activities which sensitive with allergen specific IgE, especially mast cell and macrophage. Children with asthma may present higher Ig E serum level than healthy children. Although in diagnostic for asthma is from clinical manifestations but it's also important to know how Ig E serum level correlate with severity of asthma. Lack of evidence of the association between IgE serum levels and severity of asthma in children. In this study we could show the association between IgE serum levels and severity of asthma in children. The level of IgE serum in persistent asthma was higher significantly than in intermittent group (p 0.001) using independent t-test SPSS.

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