

Gastroesophageal Reflux: Are There Differences of Characteristic in Infants and Children?

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ABSTRACT

Background: Gastroesophageal reflux (GER) is an involuntary passage of gastric contents into the esophagus. GER in infancy is usually a physiologic reflux whereas GER in children more than 12 months old is often considered as a pathologic reflux although without any clinical complications. This consideration may lead over-treatment of GER in children. The objective of this study was to find out the difference of GER characteristic in 'healthy' infants and children.

Method: Cross sectional study in children age 0-36 months at Cipto Mangunkusumo Hospital Jakarta during 2005-2007 with inclusion criteria: clinically healthy, regurgitations/vomits ≥ 4 times/day, well nourished and other etiologies of vomiting had been excluded. The characteristic of GER was evaluated by esophageal pH monitoring (pH-metri) included number of reflux episodes, reflux duration > 5 minutes, and reflux index.

Results: Sixty children were enrolled in the study; consisting 30 infants (age 0-12 months) and 30 children (age 13-36 months). The median number of reflux in infants was 18 (range 1-19), whereas the median in children was 17 (range 3-27) ($p = 0.47$). The median number of reflux > 5 minutes was 2 (range 0-2), whereas the median in children was 3 (0-30) ($p = 0.85$). The median reflux index in infants was 4.5% (range 0.6%-22.9%) whereas the median in children was 6.35% (0.1%-87.%) ($p = 0.34$).

Conclusion: The characteristic of GER in 'healthy' infants and children were not significantly different; however reflux index $> 5\%$ (pathologic GER) was seen in children age 13-36 months. Clinical course monitoring are important in infants and children with GER.

Keywords: gastroesophageal reflux, regurgitation, infant, children, pH monitoring

INTRODUCTION

Gastroesophageal reflux (GER) is best defined as the involuntary passage of gastric contents into the esophagus.¹ GER is a normal physiologic process that can progress to gastroesophageal reflux disease (GERD) when GER is associated with undesirable symptoms and complication. It is therefore appropriate to think GER as a normal, benign physiologic process that precedes GERD, a pathologic process.² GER occurs frequently during the first year of life with a peak incidence of 67% at age 4 months, but infants typically outgrow this problem by one year of age.³ Symptoms suggestive of GER are not rare in

childhood. A survey done by the Pediatric Practice Research Group found that individuals between the ages of 3 to 17 years found that 1.8-8.2% experienced symptoms of GER.⁴ The gold standard for the diagnosis of GERD is the 24-hour esophageal pH monitoring (pH metri).⁵

In clinical practice, GER in infancy is usually a physiologic reflux whereas GER in children more than 12 months old is often considered as a pathologic reflux although without any clinical complications such as anaemia, haematemesis and melena, dysphagia, weight loss or failure to thrive, epigastric or retrosternal pain, and GER related to chronic respiratory disease. This consideration may lead over-treatment of GER in children. The aim of this study was to find out the difference of GER characteristic in 'healthy' infants and children.

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METHOD

Children age 0-36 months visited Division of Gastroentero-hepatology in Cipto Mangunkusumo hospital Jakarta during 2005-2007 who met inclusion criteria were included in this cross sectional study. The subjects should be clinically healthy, well nourished, having regurgitations/vomits ≥ 4 times/day and other etiologies of vomiting had been excluded. They were classified into two groups; infants (age 0-12 months) and children (age 13-36 months).

A 24 hours esophageal pH monitoring with a semidisposable monocrysal antimony pH catheter with 1 external Ag/AgCl cutaneous reference electrode are used to diagnose GER. The characteristics of GER were evaluated by 24 hour-esophageal pH monitoring included total number of episodes with pH below 4, the number of episodes lasting more than 5 minutes with a pH below 4.00 and the percentage of time related to the total duration of the investigation with a pH below 4.00 (reflux index). The pH-test started after the probe has been located correctly for at least 30 minutes, to avoid the influence of hypersalivation as a consequence of the pharyngeal presence of the probe. Patients should be encouraged to live their normal lifestyle. Informed consent was obtained from the subjects and data analysis with SPSS 13 were done.

RESULTS

Sixty children were enrolled in the study; consisting 30 infants (age 0-12 months) and 30 children (age 13-36 months). Due to abnormal distribution of the data, we prefer to use median to means to describe the characteristics of the subjects and we analyze the data with Mann-Whitney test. Table 1 shows the characteristics of GER in infants and children in this study.

Table 1. The characteristics of GER in infants and children

Characteristics	Infants (n = 30)	Children (n = 30)	P (Mann- whitney test)
Number of reflux (median)	18 (1-19)	17 (3-27)	0.47*
Number of reflux more than 5 minutes(median)	2 (0-12)	3 (0-30)	0.85*
Reflux index (median)	4.5% (0.6%-22.9%)	6.35% (0.1%-7.7%)	0.34*

* not significant

DISCUSSION

GER is commonly found in infants. Whereas infants typically outgrow regurgitation by 1 year of age, the prevalence of GERD symptoms in those aged 3 to > 18 years ranges from 1.8% to 22%.⁶ Lee et al⁷ found

that pathologic GER was found in 32 of 87 patients (36.8%), and the age incidence included 32.5% in infants < 6 months old, 13.3% in infants aged 6 months-1 year old, 61.5% in children aged 1-2 years old, 14.3% in children age 2-3 years old and 66.7% in children > 3 years old. This result supports the fact that clinicians often consider GER in children as pathologic reflux although without any clinical complications. The consideration may lead over-treatment of GER in children.

Number of reflux of the infants and children in this study were normal. In a study of 509 normal infants, 0-11 months of age, there were 31 ± 21 episodes of acid reflux per day and the upper limit of normal was 73 episodes daily.⁸ In 3 studies of 48 children, 0 to 9 years of age, the mean upper limit of normal was 25 daily.^{9,10,11} The reflux index (RI) is now the most important criterion for measurement of refluxes. The mean upper limit of normal of the RI was 11.7% in infants 0-11 months and 5.4% in 0-9 year.^{9,10,11} These studies indicate that acid reflux is a physiologic process that is more common in normal infants in the first year of life than it is in normal older children and adult. Based on the above studies, Pediatric Gastroesophageal Reflux Guidelines recommends that the upper limit of normal of the reflux should be defined as up to 12% in the first year of life and up to 6% thereafter.² In this study RI of infants covered physiologic and pathologic GER, whereas RI of most children (13-36 months) were pathologic (median 6.35%). Lee⁷ reported that in pathologic GER patients, the RI was $17.7 \pm 11.6\%$ for the patient < 1 year old and 7.8 ± 2.9 for those ≥ 1 year old. These suggest that clinical course monitoring is important in dealing with infants and children with GER.

This study showed that the RI of GER in 'healthy' infants and children was not significantly different. Conversely, Lee et al⁷ found that in physiologic GER patients, there was significant difference of RI between those < 1 year old and those ≥ 1 year old, ($p = 0.02$), the RI was $3.7 \pm 2.9\%$ for the patients < 1 year old and $1.8 \pm 1.5\%$ for those ≥ 1 year old group. The insignificant result in this study perhaps due to limited number of subjects compared to Lee's study (87 subjects). However, reflux index > 5% (pathologic GER) in this study was seen in children age 13-36 months. Although the subjects were clinically 'healthy', this result supports Lee's study that the frequency of pathologic GER was higher in age group of 1-2 years old (61.5%) and 14.3% in children age 2-3 years old (14.3%).

CONCLUSION

The characteristic of GER in 'healthy' infants and children were not significantly different. However reflux index > 5% (pathologic GER) was seen in

children age 13-36 months. Therefore clinical course monitoring is important in dealing with infants and children with GER.

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