

Original Research Article

A cross-sectional study on prevalence of gastro esophageal reflux disease in regurgitant infant and children with evaluation of IGERQ score

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Received: 03 January 2018

Accepted: 05 February 2018

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ABSTRACT

Background: Gastro Esophageal Reflux Disease (GERD) is the most common esophageal disorder in children of all ages. GER becomes pathological when reflux increase in frequency and intensity, associated with esophageal and respiratory symptoms. Thus, the study was determined to assess the prevalence of GERD in regurgitant children of age 6 to 24 months with evaluation of IGERQ score (Infant Gastro Esophageal Reflux Questionnaire).

Methods: A descriptive study was conducted in Gastroenterology Department, Institute of child Health and Hospital for Children, Egmore, Chennai from September 2007 to September 2009. 123 regurgitant children of age 6-24 months were enrolled. Clinical examination and validated questionnaire with total score of 25 was used. Data analysis was aided by EPI info programme. Chi square with P value <0.05 was considered statistically significant. IGERQ score was evaluated by calculating sensitivity, specificity, positive predictive value and negative predictive value.

Results: The prevalence of GERD in regurgitant infant and children is 30.8%. Refusal of feeds and poor weight in regurgitant children significantly correlated with GERD. sensitivity was 84%, specificity was 96%, positive predictive value was 91%, negative predictive value was 93%

Conclusions: Clinical diagnosis of GERD is sufficient in most instances and a questionnaire may aid in diagnosis the disease. IGERQ score is easily adaptable. IGERQ score >5 has high specificity positive and negative predictive value but reproducibility in our population need further evaluation.

Keywords: GERD, IGERQ score, Infant and children, Prevalence

INTRODUCTION

GERD is the most common oesophageal disorder in children of all ages. Physiological GER becomes pathological when reflux increase in frequency and intensity and is associated with oesophageal and respiratory symptoms.¹ Most infants have minor degree of reflux which does not require extensive investigations and medications.² Frequent regurgitation is defined as regurgitation that occurs more than three times a day,

which resolves by 10 months in 55%, by 18 months in 60-80% and by 24 months in 98%.³

The incidence of significant reflux and associated complications in infants is about 1:300 to 1:1000. The incidence decreases as age advances, so that infants with significant symptoms improves at 8-10 months when it starts to sit upright and transition to solid diet. Symptoms in older children tend to be chronic, with waxing and waning course.³

In most instance GERD can be diagnosed clinically and investigations were required only in special situations like atypical presentation and unresponsive to conventional therapy. To avoid unnecessary investigations, a clinical evaluation standardized by a questionnaire was taken and its role in diagnosing the disease was evaluated.

METHODS

A descriptive study was designed and conducted in Gastroenterology department, outpatient and inpatient department, Institute of child Health and Hospital for Children, Egmore, Chennai from September 2007 to September 2009. A convenient sample of 123 regurgitant children of age 6-24 months were enrolled. The study was approved by the Institutional Ethical Committee.

Children with complaint of vomiting 2 times per day, more than 3 weeks were included. Acutely ill child, children with bronchial asthma, neurological disorder, any gastrointestinal surgery or already on treatment for GERD were excluded from the study. Those who deferred consent for endoscopy/biopsy were also excluded. Eligible children were considered for further study and detailed history regarding the symptoms suggestive of GERD was elicited.

Clinical examination including basic anthropometry and systemic examination were done. Then mother was interviewed with a preformed validated questionnaire containing 11 items of total score of 25 and assigned a GERD score. A possible clinical diagnosis was made, if necessary after a trail of empirical anti reflux therapy for 2 weeks. Before the investigations, again the mother was interviewed by another independent observer and assigned a GERD score. Basic investigations like Hb,

total count, differential count, motion for occult blood, chest X-ray were carried out. Barium meal study was done to rule out upper gastro intestinal anatomical abnormality.

Children with symptoms suggestive of GERD were subjected to upper GI endoscopy after informed consent and looked for any macroscopic changes. Biopsy was restricted to children with atypical symptoms, complications and normal endoscopy.

Biopsies were taken from 3 cm above GE junction, preserved in 10% formalin and sent for histo-pathological examination. Children were observed for 24 hours, none of them had any problem after the procedure.

Statistical analysis

Data analysis was aided by EPI info programme. Chi square, Odds ratio, p value was calculated for each variable. The Infant GER Questionnaire (IGERQ) score was evaluated by calculating sensitivity, specificity, positive predictive value and negative predictive value. $P < 0.05$ was considered statistically significant.⁴

RESULTS

Prevalence of GERD in regurgitant children = Total number of children with GERD / Total number of children studied $\times 100 = 38 / 123 \times 100 = 30.80\%$.

The prevalence of GERD in regurgitant children was found to be 30.80%. Out of 38 children with GERD, 60% were male and 40% female. Out of 38 children with GERD 65.8% were from urban and 34.2% were from rural area (Table1).

Table 1: Age and sex wise distribution of GERD.

		GERD present		GERD absent		Total	
		n	%	n	%	n	%
Age in months	6-11	18	47.4	45	52.9	63	51.2
	12-18	9	23.7	24	28.2	33	26.8
	19-24	11	28.9	16	18.8	27	22
Sex	Male	23	60	57	68	80	65.04
	Female	15	40	28	32	43	34.96
Epidemiological distribution	Urban	25	65.8	59	69.4	84	68.3
	Rural	13	34.2	26	30.6	39	31.7

In this study, the prevalence of GERD was found to be 28.5% in age group of 6-11 months, 27.2% in 12-18 months and 40.7% in 19-24 months of age (Table 2). There was a significant association between poor weight gain, refusal to feed and recurrent pneumonia to GERD with a significant association of P value $< .0001$ (Table 3).

Out of 38 regurgitant children with GERD, 58% were diagnosed based on clinical grounds. Barium contrast study showed features of GERD in 8 cases (22%). Out of 38 regurgitant children with GERD, 47% had mucosal changes suggestive of GERD in upper GI endoscopy (Table 4).

Table 2: Prevalence of GERD.

Age group (months)	Prevalence
6-11	28.5% (18/63)
12-18	27.2% (9/33)
19-24	40.7% (11/27)

This study clinically failed to detect GERD in 16 (42%) of regurgitant children.

Esophageal biopsies were taken in these 16 regurgitant children of which 14 had histological features suggestive of GERD (88.6%).

Table 3: Correlation of poor weight gain, refusal of feeds and irritability to GERD.

		GERD present		GERD absent		Total		P value
		N=38	%	N=85	%	N=123	%	
Poor weight gain	Present	17	44.7	6	7.1	23	18.7	<0.0001
	Absent	21	55.3	79	92.9	100	81.3	
Refusal of Feeds	Present	17	44.7	9	10.6	26	21.1	<0.0001
	Absent	21	55.3	76	89.4	97	78.9	
Recurrent Pneumonia	Present	8	21.1	1	1.2	9	7.3	<0.0001
	Absent	30	78.9	84	98.8	114	92.7	

Table 4: Clinical diagnosis, barium study and upper GI endoscopy in GERD.

		GERD present		GERD absent		Total	
		N=38	%	N=85	%	N=123	%
Clinical Diagnosis	Present	22	57.9	1	1.2	23	18.7
	Absent	16	42.1	84	98.8	100	81.3
Barium study	Present	8	21.1	1	1.2	9	7.3
	Absent	30	78.9	84	98.8	114	92.7
Upper GI endoscopy	Abnormal	18	47.3	6	7.1	24	19.5
	Normal	20	52.7	79	92.1	99	80.5

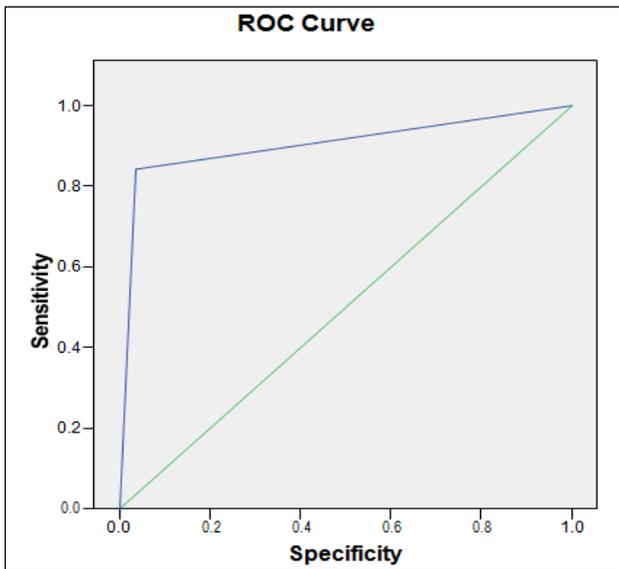


Figure 1: Receiver operating characteristic curve, diagonal segments are produced by ties.

IGERQ score correlation

Each subject was interviewed by two independent observers separately and score 1 and 2 were obtained.

The mean score for both was approximately 4 and there was good correlation seen between the two-score taken by two independent observers with a Pearson coefficient of 0.92 (Table 5).

Table 5: Correlation between score 1 and score 2.

	N	Mean	SD	Correlation
Score 1	123	4.24	2.11	0.92
Score 2	123	4.56	2	1

Table 6: Evaluation of IGERQ score.

Score	GERD present		GERD absent		Total	
	n	%	n	%	n	%
>5	32	84.2	3	3.5	35	28.4
<5	6	15.8	82	96.5	88	71.6
Total	38	100	85	100	123	100

From Table 6, the IGERQ score was analyzed for score of >5, and the results as follow

- Sensitivity = $32/38 \times 100 = 84\%$
- Specificity = $82/85 \times 100 = 96\%$
- Positive predictive value = $32/35 \times 100 = 91\%$
- Negative predictive value = $82/88 \times 100 = 93\%$

DISCUSSION

A total of 123 children of age 6-24 months were enrolled for the study, out of which 38 children found to have GERD and the prevalence found to be 30.8%. Poddar in his study reported that children of 1-6 months of age showed a prevalence of 55% regurgitation which dropped with increase in age.⁵

In this study, the prevalence of GERD was found to be 28.5% in age group of 6-11 months, 27.2% in 12-18 months and 40.7% in 19-24 months of age. The prevalence of regurgitation decreases with age, characterizing the benign course of the disorder contrary to GERD, where prevalence increases with age.⁶ De and colleagues reported similar findings in their study.⁷ In the present study male constitutes 60% and female constitutes 40% of children with GERD.

Poor weight gain was observed in 44.7% of regurgitant children with GERD and 7% of regurgitant children without GERD, suggesting poor weight gain was significantly correlated with GERD. Indrio et al reported GERD refers to infants with regurgitation and vomiting associated with poor weight gain.⁸ These results were similar to the study of De et al, where 47% of children with IGERQ score >5 had inadequate weight gain. Orenstein study showed 26% of children with GERD had inadequate weight gain.⁹

Refusal of feeds was seen in 44.7% of regurgitant children with GERD and in 10.6% of regurgitant children without GERD, suggesting refusal of feeds was significantly correlated with GERD. Orenstein data showed 32% of GERD children had refusal of feeds.

Recurrent pneumonia (documented pneumonia >2 episodes) was present in 21% of regurgitant children with GERD and in 1% of regurgitant children without GERD, suggesting recurrent pneumonia was significantly correlated with GERD. Martin et al study suggested an association of GERD with recurrent pneumonia and reactive airway disease.¹⁰

In our study, 58% of GERD were able to diagnose clinically and failed to detect GERD in 42% of regurgitant children. Vandenplas suggested that clinical diagnosis of GERD was sufficient in most instances and investigations are required in typical cases or those not responding to conventional therapy.¹¹

In this study, each subject was interviewed by two independent observers and separate score was obtained for each subject. The mean score was found to be approximately 4 and there was good correlation seen by Pearson correlation of 0.94.

In our study on evaluating the IGERQ score, sensitivity was 84%, specificity 96%, positive predictive value 91%, negative predictive value 93% for score >5. Orenstein

study found to have sensitivity of 86%, specificity of 85%, positive predictive value of 30% and negative predictive value 99%.⁹ The evaluation of IGERQ scoring system was similar to Orenstein study except positive predictive value.

CONCLUSION

The prevalence of GERD in regurgitant infant and children in a tertiary hospital in Chennai was found to be 30.8%. Refusal of feeds and poor weight in regurgitant children significantly correlated with GERD. Recurrent pneumonia in regurgitant children is strongly associated with GERD and hence GERD may be the cause for recurrent pneumonia in older children with vomiting. Clinical diagnosis of GERD is sufficient in most instances and a questionnaire may aid in diagnosis of the disease. Investigations are required only in atypical and doubtful situations. IGERQ score is easily adaptable. IGERQ score >5 has high specificity, positive and negative predictive value but reproducibility in our population need further evaluation.

ACKNOWLEDGEMENTS

Authors kindly acknowledge HOD of Gastro Enterology, Associate professors, Assistant professors of Gastro Enterology, HOD of Pediatrics, Assistant professors of pediatrics, colleagues, the Registrar, statistician, and finally the study participants and their mothers without whom this study would not have been possible.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Kandaswamy E, Andy SK. A cross-sectional study on prevalence of gastro esophageal reflux disease in regurgitant infant and children with evaluation of IGERQ score. *Int J Contemp Pediatr* 2018;5:395-9.