Original Article Indian J Pediatr 1999; 66 : 351-355

Results of the Gastroesophageal Reflux Assessment in Wheezy Children

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Abstract : Gastroesophageal reflux (GER) is implicated in the pathogenesis of respiratory symptoms in childhood. It should be taken into account especially in the differential diagnosis of children presenting with wheezing.

Although, oesophageal pH monitorisation has been reported to be the best technique in the evaluation of GER, radionuclide studies have also been shown to be very sensitive recently. In this study, 82 children presenting with recurrent wheezing (n = 74) and/or vomiting (n = 28) (mean age 17.4 months; range 3-48 months) were evaluated. GER scintigraphy was performed to determine the frequency of GER. GER was determined in 18 of the 82 cases (21.9%). The GER was found in 21.1% of children with recurrent wheezing and in 16.6% of children suffering from recurrent vomiting.

GER scintigraphy should be kept in mind in the evaluation of children with the complaint of recurrent wheezing since it is a noninvasive and easily applicable method.
(Indian J Pediatr 1999; 66 : 351-355)

Key words : *Gastroesophageal reflux; Wheezing; Scintigraphy.*

Gastroesophageal reflux (GER) is the involuntary reflux of stomach contents back into the esophagus. This refluxing material may contain saliva, food or gastric secretions[1,2]. GER is regarded as a physiologic phenomenon which can be seen in all age groups[1,3]. Vandenplas, who has carried out the most extensive series of studies in the evaluation of GER in the pediatric age group, defines GER as a benign developmental phenomenon in children especially in the infants. However, he also reports, that this benign process could reach pathological levels in a small group of infants[1]. Hypotonia of lower oesophageal sphincter (LES), transient relaxation of LES, increased gastric emptying time and impaired mucosal resistance of the esophagus are implicated in the pathogenesis of GER[4]. GER may present within a clinical spectrum ranging from mild regurgitation to severe esophagitis and strictures. Thus, it could be a cause of significant morbidity and sometimes even mortality during childhood. Lately, GER has been reported to be a hereditary disease with autosomal inheritance[1,5,6]. Although, GER has been defined as a self limiting disease with a prevalence of eight per cent in childhood, it could be cured in only 60% of cases within a period of one and a half years by treatment and sometimes even could reach into adulthood[7]. The risk of

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complications is around 10% among the untreated cases. Thus, it is an important disease that should be evaluated and treated in children especially in infants[1,5]. Oesophageal pH monitorization during a 24 hour period has been reported to be the best way of diagnosing GER[1,5,6].

However, GER scintigraphy has lately become a recommended diagnostic method since it is non invasive, it can show the frequency duration and extent of reflux episodes and determine aspiration pneumonia[8].

This report presents the use of scintigraphic method for the detection of GER in the children presenting with recurrent wheezing and/or vomiting.

METHODS AND MATERIALS

The study was conducted in Pediatric Allergy Department, Dokuz Eylül University School of Medicine, Turkey between May and October 1996, in 82 children (32 girls, 50 boys), age between 3 months and 48 months (mean ± standard deviation = 17.43 ± 9.99 months). The incidence of GER in these patients was assessed by gastroesophageal reflux scintigraphy.

Major complaints at presentation were recurrent wheezing [n = 74 (90.2%)] and vomiting [n = 28 (34.1%)]. Gastroesophageal scintigraphy was performed after at least 4 hours of fasting. The child was fed a normal meal of milk formula appropriate for his or her age (3 months of age, 90 ml; 3-6 months of age, 120 ml; 6 months of age, 150 ml). Feeding was administered using bottle. After feeding, the children drank 5-10 ml of water for washing the residual activity in the mouth and osephagus. The children were placed under the single - head gamma

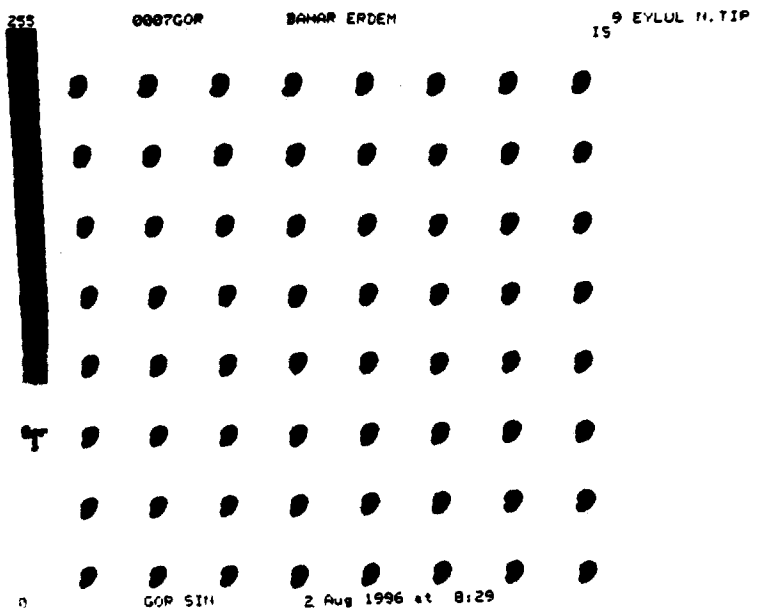

Fig. 1. GER scintigraphic film demonstrating no reflux

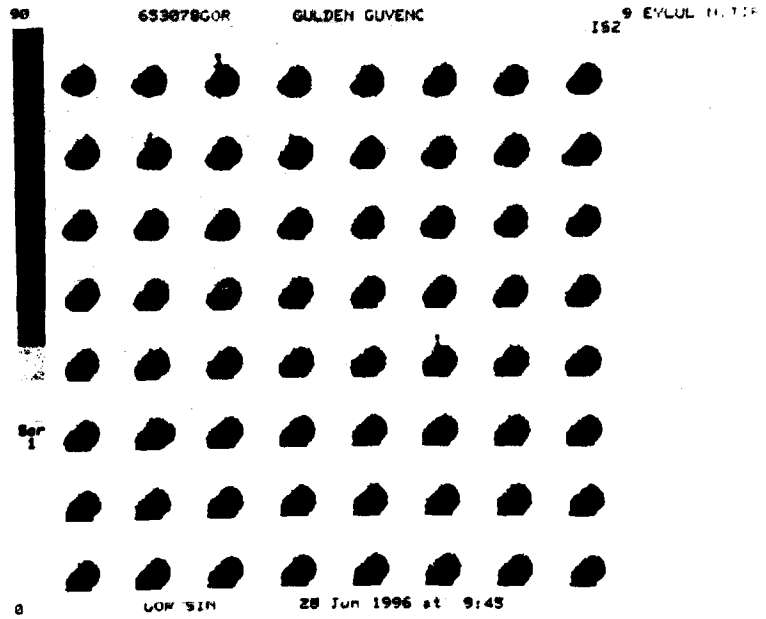

Fig. 2. GER scintigraphic film showing reflux of radionuclide back into the eosophagus

camera in supine position. A low energy, general purpose collimator was used. The children were positioned to include the stomach, the thorax and the mouth in the field of view. A total of 120 frames were obtained with 30 seconds duration for 60 minutes in 64 × 64 matrix. Two or three hours later, an anterior image was obtained for evaluating pneumatic aspiration. Dynamic study was evaluated visually and marked activity in the oesophagus was accepted as GER (Figs. 1 and 2). Regions of interest were also drawn over the upper-middle and lower oesophagus and time-activity curves were generated to assess for GER.

RESULTS

In this study, GER was established scintigraphically in 18 of 82 patients (21%). Among these patients in whom GER was demonstrated, mean age ± SD was 15.6 ± 7.8 months (between 7 months-36 months) and this was not significantly different from the rest of the group ($p > 0.05$). Classification of patients in whom GER was determined regarding age and presenting complaints is shown in tables 1 and 2.

GER was determined to be most prevalent between 7 and 12 months (31.2%). In cases with wheezing only, GER prevalence

Table 1. Age Distribution of Patients with GER

Months	Patient number	GER (+)	%
0-6	4	0	0
7-12	32	10	31.2
12 and above	46	8	17.3

TABLE 2. Distribution of Cases in Relation to Presenting Complaints and Presence of GER

	Patient number	GER (+)	%
Wheezing	52	11	21.1
Wheezing and vomiting	18	5	27.7
Vomiting	12	2	16.6

was 21.1% and with coexisting vomiting (complaint), the relevance was 27.7%.

In patients presenting only with vomiting, GER prevalence was 16.6%. Two or three hours later, none of the patients showed radionuclide accumulation in the tracheobronchial tree.

DISCUSSION

Gastroesophageal reflux (GER) in children has been implicated as a cause of recurrent respiratory infections, recurrent otitis media, anemia, poor weight gain, vomiting, asthmatic episodes, stridor aspiration or choking[4].

In the present study, GER was detected by a scintigraphic technique in 18 (21.9%) of 82 patients who were admitted in the hospital with stridor and vomiting. GER was shown in 31.2% of 7-12 months old children, and in 17.3% of 1 year olds. GER was found in 21.1% of children with stridor. If vomiting was concomitantly present, the GER incidence reached 27.7%.

In the previous studies, the frequency of GER in patients with recurrent respiratory diseases has been reported as 25-80%[9,10]. In these studies it has been suggested that factors such as aspiration, reflex bronchospasm and laryngospasm may be responsible for recurrent respiratory infections[10].

There are different mechanisms for explaining the relationship between GER and bronchial asthma. These mechanisms may be summarized as follows : (1) after microaspiration of gastric contents, the exudative mucosal reaction may occur[11], (2) the stimulation of esophageal receptors by acidic materials may cause reflex bronchospasm[12]. (3) recurrent microaspirations to the lung may cause bronchial tree sensitization. Hypersensitive bronchial airway may react to other external stimuli[13].

In our study, a single GER episode during scintigraphy was seen in 14 out of 18 children with GER. In rest of the four children, three and more GER episodes were observed. These patients had more frequent stridor attacks than the others. Cisaprid (0.2 mg/kg) which is a noncholinergic and nondopaminergic drug was given to these four children as well as general suggestions for prevention of GER. After fifteen days of treatment, it was observed that the number and severity of wheezing attacks of these patients had decreased.

There are many methods of detecting GER, including upper gastrointestinal examination with barium, distal esophageal sphincter pressure measurements, pH measurements in the distal esophagus and the radionuclide examination of the upper gastrointestinal tract. The gold standards for the detection of significant GER is the 24 hours pH probe[14,15]. The disadvantages of this method are the requirement of endoscopy for appropriate placement of the probe and a 24-hour hospital stay. Radionuclide examination of the upper gastrointestinal tract is the best trade-off in terms of sensitivity (75-79%), specificity (93%) and ease of performance. The advantages of radionuclide examination are the

detection of number, duration and amount of GER, the examination of gastric emptying and description of neutral alkaline material reflux[8].

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