Gastroesophageal Reflux Disease: An Etiology of Apparent Life Threatening Event in Early Infancy

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Abstract

Gastroesophageal reflux (GER) may lead to apparent life threatening event (ALTE) during childhood.

Two months old girl presented with cough and cyanosis. Previous history, physical examination and routine blood tests were normal. Echocardiography revealed secundum atrial septal defect. Laryngoscopy displayed posterior laryngeal granulation tissue. 24 hour pH monitoring failed to detect pathological GER. Prolonged GER scintigraphy revealed GER to the upper esophagus. Flexible fiberoptic bronchoscopy showed normal airway. Clinical findings disappeared with anti-GER treatment.

Symptoms of GER may be complex and diagnosis may be difficult and it needs to be included in differential diagnosis of ALTE during early childhood.

Keywords: Gastroesophageal reflux, acute life threatening event, infancy

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INTRODUCTION

An apparent life threatening event (ALTE) is an episode of acute and unexpected change in behavior characterized by apnea, change in skin color, muscle tone, choking or gagging which requires vigorous stimulation or sometimes resuscitation [1,2]. There is an association of this clinical syndrome with sudden infant death syndrome (SIDS) in 7-15% of cases [3]. Therefore it is vital to discover the etiological or contributing factors. Etiology is diverse and includes digestive, neurological, respiratory, cardiovascular and rarely endocrine and metabolic problems, but 50% are idiopathic [2,4]. The role of gastroesophageal reflux (GER) in development of ALTE is a recent issue [1,3,5]. Gastroesophageal reflux (GER) is the passive regurgitation of gastric contents into the esophagus. It is termed as pathological gastroesophageal reflux disease (GERD) when it results in poor weight gain, signs of esophagitis, persistent respiratory symptoms or neurobehavioral changes [6,7]. Frequency of the association of GER with ALTE varies from 0-88 % [3]. Diagnosis of GER is challenging because a gold standard diagnostic tool is absent. Therefore, results of all diagnostic tests should be correlated with clinical findings to achieve the diagnosis.

CASE

Two months old girl presented with cough while feeding since birth. Cough had changed character recently and had become independent of feeding and was accompanied by cyanosis, respiratory distress and sometimes choking. Previous history and family history was unremarkable. Physical examination revealed a well nourished female infant of 4490 grams (25-50 p) in weight and 54 cm in height (10 p). Head circumference was 39 cm (75-90 p). Physical examination was normal. Complete blood count, routine biochemical tests and peripheral blood smear were normal. She was hospitalized with the diagnosis of ALTE.

During the first days of hospitalization, respiratory distress and significant cyanosis accompanied cough. These findings were sometimes severe enough to require resuscitation. Arterial blood oxygen saturation was normal between the episodes; however it decreased to 80-85% when cyanosis accompanied her cough episodes. Echocardiography revealed secundum atrial septal defect of 6-7 mm. Esophageal passage X-rays ruled out the presence of a tracheoesophageal fistula, but revealed gastroesophageal reflux to the level of hypopharynx. Therefore, GER scintigraphy by Tc99m-DTPA was performed and displayed three GER episodes of 10 seconds to one minute duration reaching the upper parts of the esophagus. Granulation tissue and edema at the level of cricoid cartilage apparent in the laryngoscopic examination was attributed to GER. Surgery was under consideration due to the episodes of cough and cyanosis prompting resuscitation. 24 hour pH monitoring performed to evaluate for the indications of surgery revealed reflux indices of 0.2% and 0.1% in proximal and distal esophagus respectively. Prolonged GER scintigraphy with Tc99m-DTPA revealed two GER episodes of 20 and 30 seconds duration reaching the upper esophagus. Static images at 1, 4, 6 and 24 hours of the technique failed to

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demonstrate lung involvement. Flexible fiberoptic bronchoscopy displayed normal airway.

Therefore, ranitidine and domperidon were tried as anti-reflux treatment before the decision of surgery. Episodes of cough and cyanosis disappeared under this therapy and she was discharged. It has been three months since initiation of treatment and she did not experience a new episode of ALTE. Control laryngoscopic examination displayed a regression in the granulation tissue and edema of the arytenoid cartilage.

DISCUSSION

Apparent life threatening event is a sudden event characterized by apnea, coughing, gagging and change in color or muscle tone which may sometimes necessitate stimulation or resuscitation to arouse the child [4]. Frequency of ALTEs has been reported be between 0.05 and 6 % when infants brought to the hospital for evaluation are considered [2,4]. SIDS is defined as the sudden death of an infant less than one year of age that remains unexplained after a thorough investigation [8]. Less than 10 % of future SIDS victims was reported to have presented with ALTE at some time before death [2]. Therefore it is essential to diagnose ALTE and to reveal the underlying pathologies to prevent the occurrence of potential SIDS.

The presented case presented with episodes of cough that progressed to redness of face and cyanosis that sometimes prompted resuscitation. She was completely healthy between the episodes. Physical examination was unremarkable. In previous research, redness of face, choking and cyanosis were reported to be present in 35 %, 29 % and 71 % of ALTE cases respectively [9]. In our case, the episodes occurred both when sleeping and awake and they were not associated with feeding. 58 % of the cases reported in a previous study were observed while awake [9]. The sudden changes in behavior, color and breathing in our case lead to the diagnosis of ALTE.

There are many etiologies including digestive, neurological, respiratory, cardiovascular, metabolic and endocrine problems that are potentially associated with ALTE[2]. Frequency of association with digestive problems has been reported to be around 50 % [2]. Gastroesophageal reflux has been reported to be associated with various respiratory problems [10, 11]. Among these, it was detected in 13-55 % of ALTE cases in previous studies [1,3,9]. Furthermore, incidence of sleep reflux was demonstrated to be significantly higher in infants with ALTE when compared to infants presenting with only vomiting (27 vs. 0%) [12]. On the contrary, another study reported that GER was absent in 81 % of the ALTE cases and that it preceded apnea episodes in only 6.4 % cases [5]. Moreover, research has failed to detect reflux reaching proximal esophagus as a frequent cause of ALTE [13]. However, this data was obtained by 24 hour pH monitoring that requires clinical correlation for diagnosis of GERD.

GER which may be physiological during childhood is evaluated as GERD when complications develop; therefore evaluation of the results of the diagnostic modalities needs to be correlated with the clinical findings. The diagnosis of GERD in this patient was confirmed by laryngoscopic examination which demonstrated granulation tissue at the level of cricoid cartilage. However, pH monitorization failed to reveal pathological GER and prolonged GER scintigraphy did not reveal pulmonary involvement. Although, 24 hour pH monitoring is accepted as one of the most sensitive and specific diagnostic modality of GER, there is no gold standard technique [14]. Diagnostic sensitivity decreases especially when the procedure is performed in the hospital setting [15]. Disconcordance rate of 70% in repetitive 24 hour pH monitoring results should be considered when evaluating the results of this technique especially when uncorrelated with clinical findings [16]. Therefore, our case was diagnosed as having GERD on the basis of clinical and laryngoscopic findings. Moreover, clinical response to anti-GER treatment was evident with significant decrease in episodes of cough and redness in face and disappearance of cyanosis.

Echocardiography revealed the presence of atrial septal defect of 2-3 mm in diameter in our case. This cardiovascular pathology, though it can lead to cyanosis with reversal of the intracardiac shunt with cough, was not determined to be the primary pathology since it is not a potential cause of cough. However, it certainly contributed to the severity of symptoms.

As a conclusion, GERD may be a significant factor for the development of ALTE in infants. The diagnosis of GERD needs to be assessed via the results of both clinical and radiological examinations as well as the 24 hour pH monitoring.

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