Spectrum of Esophageal Disorders in Children with Chest Pain

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The charts of 83 children with chest pain who underwent esophageal manometry followed by esophagogastroduodenoscopy were reviewed. Forty-seven (57%) had normal esophageal histology and normal motility (group I). Esophagitis and normal motility were demonstrated in 15 children (group II), normal esophageal histology and esophageal dysmotility in 13 (group III), and both esophagitis and abnormal motility in 8 (group IV). Diffuse esophageal spasm and achalasia were the most common motility disorders identified in seven and four patients, respectively. The presence and duration of symptoms, the age, and the gender were not different among the four patient groups. After six months of $H_2$-receptor blockade, 12 of 15 group II patients were asymptomatic, whereas a significantly smaller percentage (five of 18) of patients with abnormal esophageal motility responded to esophageal dilation or treatment with calcium channel blockade, $H_2$-receptor antagonist, and/or prokinetic agents ($P < 0.01$). These data suggest that the evaluation of children with chest pain should include esophageal motility testing and esophagoscopy, even in the absence of other gastrointestinal-associated symptoms, and that while treatment of esophagitis results in resolution of symptoms, motility disorders were relatively refractory to therapy.

KEY WORDS: chest pain; esophagitis; esophageal dysmotility.

Chest pain in adults often indicates the presence of atherosclerotic heart disease. Approximately 50% of adult patients with chest pain will have coronary artery disease found at angiography. In patients with angiographically normal coronary arteries, 30–40% will have esophagitis and/or abnormal esophageal motility subsequently identified as the cause of their symptoms (1–6). In contrast, the incidence of cardiac disease in children with chest pain is low, ranging from 0.4% to 4% (7, 8), and the majority of pediatric patients are diagnosed as having either idiopathic or functional chest pain. Selbst et al (7) reported that the incidence of gastrointestinal disease in children with chest pain is approximately 4% compared to about 30% as found in adults (1–6).

Recently, Berezin et al reported that in 17 of 27 adolescents with “idiopathic” chest pain, esophagitis or abnormal esophageal motility was the cause of their symptoms (9). In this report, we extend these observations concerning the relationships between abnormal esophageal motility, esophagitis, and chest pain in pediatric patients and describe both the spectrum of motility disorders found in these patients and the efficacy of treatment.

MATERIALS AND METHODS

We reviewed the charts of 83 patients between 1 and 20 years of age with chest pain and dysphagia or vomiting who were referred to the Division of Pediatric Gastroenterology and Nutrition, and noted the findings of esophageal manometry and esophagogastroduodenoscopy. The patients were classified into four groups based on the presence or absence of esophagitis and dysmotility.
characteristics of 83 adolescents and children with chest pain and/or dysphagia

<table>
<thead>
<tr>
<th>Group</th>
<th>(N)</th>
<th>Age (years) (mean ± SEM)</th>
<th>Male/Female</th>
<th>Duration of Symptoms (months) (mean ± SEM)</th>
<th>Symptoms at presentation [number of patients (%)]</th>
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</thead>
<tbody>
<tr>
<td>I</td>
<td>47</td>
<td>12.7 ± 0.76</td>
<td>25/24</td>
<td>20.6 ± 3.6</td>
<td>Chest pain 39 (83) Dysphagia 10 (21) Vomiting 18 (38)</td>
</tr>
<tr>
<td>II</td>
<td>15</td>
<td>12.7 ± 1.1</td>
<td>6/7</td>
<td>21.1 ± 4.1</td>
<td>Chest pain 13 (87) Dysphagia 7 (47) Vomiting 10 (67)</td>
</tr>
<tr>
<td>III</td>
<td>13</td>
<td>11.3 ± 1.4</td>
<td>9/4</td>
<td>34.9 ± 8.6</td>
<td>Chest pain 11 (84) Dysphagia 6 (46) Vomiting 9 (69)</td>
</tr>
<tr>
<td>IV</td>
<td>8</td>
<td>12.2 ± 2.0</td>
<td>4/4</td>
<td>39.2 ± 20</td>
<td>Chest pain 7 (87) Dysphagia 3 (37) Vomiting 3 (37)</td>
</tr>
</tbody>
</table>

terology at New York Medical College between July 1987 and June 1991 for evaluation, which included cardiorespiratory, neurologic and abdominal physical examinations, electrocardiogram, chest x-ray, esophagogastroduodenoscopy, and esophageal motility testing.

Esophageal manometry was performed using a four-lumen polyvinyl catheter assembly (individual outer diameter 1.2 mm) with three pressure-sensing orifices separated by 5 cm. The catheter was perfused with sterile water at a rate of 0.5 ml/min by a low-compliance pneumatic hydraulic capillary infusion system, with a pressure response greater than 800 mm Hg/sec. Pressures were transmitted via the fluid-filled catheters to transducers connected to a three-channel polygraph recording system. The station pull-through technique was used to determine the lower esophageal sphincter pressure and location (10). For evaluation of esophageal peristalsis, 10 wet swallows (5 cc water each) were given, separated by 30-sec intervals. Esophageal motility abnormalities were classified according to the criteria of Richter et al (10) for adult patients. Nutcracker esophagus was defined by average peristaltic pressures (mean of 10 wet swallows) >180 mm Hg and of prolonged duration (>6 sec) with normal peristaltic progression. Lower esophageal pressures <10 mm Hg or >45 mm Hg were considered outside the normal range (11).

Esophagogastroduodenoscopy was subsequently performed using an Olympus GIF-XP10 gastroscope (Olympus Co., Lake Success, New York) after informed consent was obtained, and intravenous sedation with meperidine and diazepam was administered. Esophagitis was endoscopically defined by friability, erythema, ulceration, or granularity of the lower esophagus. In all patients, an esophageal biopsy specimen was taken at least 7–10 cm above the gastroesophageal junction (Z line) under direct visualization. Esophagitis was confirmed histologically according to established criteria (12).

Statistical significance was determined using analysis of variance, comparing all four patient groups and chi-squared analysis comparing response to treatment in groups 2, 3, and 4. A P value <0.05 was considered statistically significant.

RESULTS

In 47 of 83 patients (56.6%), esophagogastroduodenoscopy and esophageal manometry testing were normal (group I). Histologic evidence of esophagitis was found in 15 children (18%) with normal esophageal motility (group II), and an additional 13 patients (15.6%) had abnormal esophageal motility and normal distal esophageal histology (group III). Eight patients (9.6%) had both distal esophagitis and esophageal dysmotility (group IV). There were no significant differences in age, gender, or the location, character, or duration of symptoms among the four patient groups (Table 1).

The manometric diagnoses of the 21 patients (25.3%) with abnormal esophageal motility are shown in Figure 1. Diffuse esophageal spasm was diagnosed in seven patients; achalasia in four; hypotensive lower esophageal sphincter in three; aperistalsis of the distal esophagus in three; nutcracker esophagus in two; and hypertensive lower esophageal sphincter in two.

Twelve of 15 (80%) children with esophagitis and normal motility had complete resolution of chest pain and were able to discontinue therapy after six months of treatment with an H2-receptor antagonist. The three additional group II patients required continued treatment for one year and remained

![Manometric Diagnoses (% of total)](image_url)