Pulmonary Function in Patients with Gastroesophageal Reflux*

George A. Vraney, M.D.; and Charles Pokorny, M.D., F.C.C.P.

Gastroesophageal reflux has been suggested to play a causal role in a variety of chronic pulmonary disorders. This hypothesis has been supported by the increased incidence of reflux in patients with idiopathic pulmonary disorders and by the anecdotal reports of symptomatic improvement following surgical correction of the reflux. In an effort to determine whether patients with reflux as a group demonstrated a significant degree of pulmonary dysfunction, 100 patients with reflux were compared with another group of 100 control patients, matched for age and sex and without demonstrable reflux. Standard pulmonary function studies were used for this comparison. No difference could be detected between the two groups, which suggested that the isolated findings of reflux in patients with pulmonary disorders should not be considered etiologic by virtue of the association alone. Alternate explanations for the relationship are given.

The association of gastroesophageal reflux with a variety of pulmonary disorders has been recognized and recorded as early as 1887. Medical researchers have suggested that the gastroesophageal reflux has been etiologic in the development of the pulmonary disorders, and that episodes of aspiration of gastric acid may act as "trigger factors" in cases of intrinsic asthma, with the onset of wheezing in older patients suggested as an indicator that such an etiology may be present. A spectrum of pulmonary disorders have been described by these investigators, including such diverse entities as asthma, bronchiolitis, supplicative lung disorders, and idiopathic pulmonary fibrosis.

The coexistence of the two conditions has been interpreted as presumptive evidence of cause-and-effect relationship in instances where the pulmonary pathology could not be attributed to other factors. This has been supported by reports in the surgical literature, attributing a relief of pulmonary "symptoms" to surgical procedures designed to inhibit gastroesophageal reflux.

Increased incidence of gastroesophageal reflux has been demonstrated in patients with pulmonary disorders. Although the basis for this increased incidence might be the disturbed intrapleural pressure relationships in such cases, no definitive evidence supports this postulate.

It would appear that, in at least isolated cases, gastroesophageal reflux can result in pulmonary complications, but it has not been demonstrated that patients with such reflux have increased incidence of respiratory dysfunction. In an effort to define this further, a population of hospitalized patients demonstrating reflux has been compared to a control population without reflux.

Materials and Methods

One hundred hospitalized patients demonstrating free reflux on upper gastrointestinal x-ray examinations were age- and sex-matched with patients undergoing upper gastrointestinal x-ray examination and on whom no reflux could be demonstrated. All examinations were done by one of two radiologists, with no extreme or nonphysiologic attempts to induce reflux. The presence of spontaneous reflux with or without a definitive hiatal hernia was adequate to include the individual as a study patient. The 200 patients then completed a brief questionnaire concerning their smoking history and history of pulmonary symptoms or diagnoses and underwent a set of pulmonary function studies including forced vital capacity, forced expiratory volume in one second, and measurement of maximum mid-expiratory flow rate.

Results

The study group was made up of 48 women and 52 men with 93 percent of the group in excess of 40 years of age. Of the patients with reflux, 29 percent were cigarette smokers, with the non-reflux group having a 39 percent incidence of smoking. Medical history of pulmonary disease or pulmonary symptoms did not differ between the groups.

Results of pulmonary function studies were grouped according to smoking history and demonstrated reflux. The four groups to be compared in-
Table 1—Number of Patients With Abnormal Flow Rates—(FEV₁ < 75% of FEV₁)

<table>
<thead>
<tr>
<th></th>
<th>Reflux</th>
<th>Non Reflux</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoker</td>
<td>14</td>
<td>19</td>
</tr>
<tr>
<td>Nonsmoker</td>
<td>25</td>
<td>23</td>
</tr>
</tbody>
</table>

Table 2—Mean of Abnormal FEV₁

<table>
<thead>
<tr>
<th></th>
<th>Reflux</th>
<th>Non Reflux</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoker</td>
<td>65.9%</td>
<td>66.1%</td>
</tr>
<tr>
<td>Nonsmoker</td>
<td>68.2%</td>
<td>67.5%</td>
</tr>
</tbody>
</table>

Table 3—Flow Rates in Patients With and Without Reflux

<table>
<thead>
<tr>
<th></th>
<th>FEV₁/FEV₁</th>
<th>MMEF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reflux</td>
<td>75.2</td>
<td>76.9</td>
</tr>
<tr>
<td>Non Reflux</td>
<td>74.6</td>
<td>75.1</td>
</tr>
</tbody>
</table>

Other potential relationships between gastroesophageal reflux and chronic airway obstruction may be secondary to altered pressure dynamics seen in patients with chronic lung disorders, or may be related to the smooth muscle relaxation secondary to bronchodilator medication resulting in incompetence of the gastroesophageal sphincter. From these initial data it would appear that the isolated coexistence of gastroesophageal reflux and chronic airway obstruction cannot be considered to exist in a cause-and-effect relationship. Clinical improvement and improvement of pulmonary function studies following surgical intervention, or an intense medical management program can be supportive of such an etiology in isolated cases. An intensive trial of medical management may be indicated in all such instances.

References

15 Klotz SD, Moeller RK: Hiatal hernia and intractable bronchial asthma. Ann Allergy 29:325-328, 1971
19 Vinson EP: Diagnosis and treatment of cardiopasm. JAMA 82:859, 1924