Carcinoma of the Lung and Dysphagia*

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In order to determine the frequency of dysphagia in primary carcinoma of the lung we reviewed the records of 615 consecutive hospital admissions which took place over a 9%-year period; the incidence was 2.2 per cent in 405 proved cases. The mechanism is esophageal involvement and compression by subcarinal and periesophageal lymph nodes. Dysphagia is not an early symptom; it indicates advanced disease and usually forecasts inoperability. Even in some cases when dysphagia is not present, the esophagogram can be of help in assessing the involvement of periesophageal nodes and hence inoperability. The roentgenologic appearance varies from compression of the esophagus to one of involvement of the esophageal wall and occasionally to that of a circumferential lesion. Lung carcinoma should be considered in the differential diagnosis of all patients with midesophageal dysphagia.

Cough, hemoptysis, chest pain and weight loss are classic symptoms of bronchogenic carcinoma. Dysphagia is rarely mentioned in this symptom-complex; we recently encountered two patients in which it formed the principal complaint.

MATERIAL

Our study originated at St. Vincent Hospital and Medical Center, a 500-bed general hospital. It extends from January, 1957, to September, 1966, and embraces 615 admissions for primary lung cancer. The table indicates the yearly distribution. We reviewed a total of 470 consecutive cases, 405 of which were proved. A proved diagnosis rests upon tissue findings obtained from: (1) autopsy, (2) operation, (3) lymph node biopsy, (4) bronchoscopy, and (5) examination of bronchial washings or pleural effusion aspirate. The group includes no case substantiated by chest roentgenogram alone. We excluded 65 cases for lack of tissue proof. We employed no other method of case selection.

FINDINGS AND ANALYSIS

Within the proved group of 405 cases, we discovered nine patients who complained of dysphagia, an incidence of 2.2 per cent. Eight patients were men, one was a woman. In terms of location, the alveolar carcinoma were found associated with dysphagia. A point of interest concerns the close similarity between dermatomyositis and scleroderma, both of which directly involve the esophagus to produce dysphagia. An increased incidence of various organ carcinomas has been noted in patients with dermatomyositis. Yet, in scleroderma there is an increased incidence of alveolar cell carcinoma of the lung without a greater propensity for other malignant lesions.1

Three patients sought medical advice primarily because of dysphagia. Two patients noted dysphagia one to three months after the diagnosis was established, while in three others, dysphagia appeared two or more years after diagnosis. The records of the remaining patient show only that it was an early symptom.

PATHOLOGY

Figure 1 illustrates the arrangement of lymph nodes about the tracheobronchial tree. Besides

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<tr>
<th>Year</th>
<th>No. of Admissions</th>
<th>No. of Patients</th>
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<tbody>
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<td>1965</td>
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<td>74</td>
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<tr>
<td>1966*</td>
<td>69</td>
<td>57</td>
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<tr>
<td>Total</td>
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<td>470</td>
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*First eight months of 1966.
these, the mediastinum contains two other main groups: the anterior nodes lie in relation to the large vessels in the upper mediastinum, the posterior are behind the pericardium in the area of the esophagus and descending aorta.

The close proximity of the esophagus to the trachea and left main stem bronchus holds a twofold significance as related to dysphagia. Bronchogenic carcinoma directly involving the esophagus often arises in the left main stem bronchus. However, metastases causing enlargement of the subcarinal nodes also disturb this relationship. These nodes cannot enlarge laterally very much so they grow posteriorly and intrude upon the wall of the esophagus. Yet, it is here that the esophagus is relatively more fixed because of its tracheal attachments and the presence of the unyielding vertebral bodies. These nodes are frequently involved in the spread of bronchogenic carcinoma. Nohl,2 in examining 100 specimens of surgically resected lungs, found that squamous cell carcinoma produced a frequency of mediastinal node involvement of 34 per cent, while undifferentiated carcinoma produced involvement in 60.7 per cent. Baird3 studied both pulmonary and mediastinal node spread in 218 surgically resected lungs and noted node metastases in 66 per cent. Onuigbo,4 in examining 100 autopsy cases of primary lung cancer demonstrated that there was a 97 per cent spread into the bronchopulmonary nodes, and that 85 per cent of the cases showed positive superior and inferior (subcarinal) tracheobronchial nodes. He also believes that the spread into the esophageal wall itself is lymphatic in nature. The paratracheal nodes were 70 per cent positive for tumor while the parasaophagéal nodes were affected 51 per cent of the time.

In the study mentioned above, Nohl2 made a detailed correlation of the lymph node drainage of the various lobes of the lungs and demonstrated that the patterns of drainage from the right lower lobe, the right middle lobe, the left upper lobe, and the left lower lobe were such that the subcarinal nodes would be affected among others. Baird3 differed somewhat in finding that neoplasms of either upper lobe metastasized usually to the ipsilateral superior tracheobronchial groups and less often to the inferior tracheobronchial nodes. Drainage of the right middle lobe and the lingula followed the pattern of the upper lobes. Neoplasms in either lower lobe usually affected the subcarinal nodes.

**ROENTGEN FINDINGS**

Standard roentgenograms of the chest will demonstrate sufficiently enlarged paratracheal, bronchopulmonary and superior tracheobronchial nodes as densities extending beyond the usual confines of the upper mediastinum. The subcarinal nodes are often not visible because of their location. Widening of the carina may be present but even then is not a reliable sign.5 Examination of the esophagus employing barium will usually disclose the presence of enlarged subcarinal nodes which displace the esophagus posteriorly and to the left.6 These enlarged nodes usually produce simple localized deviation of the esophagus. A soft tissue mass may be seen in the area of deviation. The mucosa remains intact.

A somewhat more complicated situation is present when the tumorous nodes transfix the esophageal wall. The studies of Schatzki and Hawes7 demonstrate that a lesion closely adherent to the esophageal wall will stretch the overlying mucosa; when seen in profile, there will be a sharp angle wherever the tumor starts. Face on, the mucosa over the lesion may be obliterated, sometimes allowing the normal mucosal pattern of the uninvolved wall to show through. We, therefore, have the appearance of an intramural, extra-mucosal lesion produced by an invasive mass which is actually extra-esophageal.

In one patient who was very recently seen and is therefore not included in our series, the lymph node involvement was such to produce a circumferential esophageal lesion. In such a case, we distinguish the ordinary roentgenologic characteristics of primary esophageal malignancy. An intact mucosal pattern may speak against this but is not entirely reliable. If, in addition, mucosal breakthrough has occurred, the roentgen appearance of primary ma-
The formation of a tracheo-esophageal fistula is ordinarily quite apparent when contrast material passes from the esophagus into the trachea or left main stem bronchus.

**Case Reports**

**Case 1**

This is a 64-year-old man who found enlarging masses in the lower right neck and in the right axilla. At bronchoscopy, a 1 cm tumor was found in the right main stem bronchus. The result of biopsy showed it to be an epidermoid carcinoma. Laminographic roentgenograms showed elevation of the left main stem bronchus with a smooth indentation along its inferior border (Fig 2). Esophagogram demonstrated a 3.5 cm smooth impression along the left anterior esophageal wall just below the carina. The mucosa was intact (Fig 3).

This illustrates a frequently seen appearance. There was no dysphagia this time.

**Case 2**

A 53-year-old man had noted a cough for one month. The chest roentgenograms showed findings compatible with atelectasis of the right lower lobe with a suggestion of a right infrahilar mass as well. Bronchoscopy revealed a tumor mass in the right bronchus intermedius which proved to be an oat cell carcinoma. The esophagogram demonstrated a 4 cm flat lesion posteriorly and to the left in the lower third of the esophagus (Fig 4). The narrowing was not annular. At esophagoscopy, the examiner found undigested food proximal to an area of extrinsic compression and saw no mucosal involvement.

This patient complained of considerable dysphagia. The location of this lesion suggests that it originated from paraesophageal node involvement.

**Case 3**

A 74-year-old man had lost 4.5 kg (10 lb) of weight and had progressive dysphagia for two months. Esophagogram demonstrated an abrupt circumferential narrowing in the esophagus at the level of the ninth thoracic vertebral body producing a nearly complete obstruction to the flow of barium. Multiple spot roentgenograms revealed an intact mucosa (Fig 5). We also saw some evidence of pleural effusion on the right side and noted a partially concealed nodule in the lower right lung (Fig 6).

The patient died suddenly a few days after admission to...
pressed lower pleural by lying motility nancy Microscopic gastric the masses: a middle lesion. The wall, and neck is involved all, compression of the pharynx and upper esophagus because its antecedent invasion of the wall of the esophagus. This was a definite consideration in one of our nine patients and the problem was not resolved either by the performance of an esophagogram or by esophagoscopy with biopsy.

Some previous surveys of the general symptoms of primary lung carcinoma do mention dysphagia. Ariel and others reviewed the initial symptoms of 1,109 cases and found dysphagia in 1 per cent.

Third, there is the infrequent possibility that esophageal fibrosis and stenosis have come about as a delayed result of radiation therapy, but perhaps only if there has been antecedent invasion of the wall of the esophagus. This was a definite consideration in one of our nine patients and the problem was not resolved either by the performance of an esophagogram or by esophagoscopy with biopsy.

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Comment

The pathology involved in abnormal esophageal motility is incompletely understood. There probably is a functional etiology in rare cases. It may appear because of a reflex disturbance.

For the most part, an organic agent with underlying mechanical factors causes the dysphagia. First, compression of the pharynx and upper esophagus by enlarged, tumor-bearing lymph nodes in the neck may be a cause. Second, and most common of all, deviation and compression of the esophagus by involved lymph nodes in the mediastinum, with, and possibly without fixation of the esophageal wall, produces dysphagia. Tumor erosion into and through the esophageal wall forming a tracheoesophageal fistula occurs, but rarely confronts us. Such a fistula existed in one of our group of nine patients with dysphagia. Occasionally, it becomes an unfortunate late complication of radiotherapy. Atkins points out that patients with a high esophageal lesion should be examined with the bronchoscope as well as the esophagoscope since the tumor may have invaded the tracheobronchial tree, or conversely, may have had its origin there.

Autopsy revealed a 2.3 cm lesion in the right middle lobe which microscopic examination showed to be a squamous cell carcinoma. There was a 1,000 ml right pleural effusion. The examiner found two mediastinal masses: the first was a 5 cm tumor in the right pericardium, the second was 6 cm long and completely surrounded the lower esophagus, ending about 3 cm above the esophagogastric junction. The lower esophagus was stenotic and compressed by this lesion but the mucosa was intact throughout. Microscopic examination of the tissue showed a cell type identical to that of the lung lesion.

This lesion was nearly mistaken for a primary malignancy of the esophagus because of its atypical features and its distal location.

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Figure 6. Note obstructing lesion distal esophagus, also nodule right lower lung partly concealed by pleural effusion.

Sabour et al\textsuperscript{11} studied 509 cases noting dysphagia as the primary complaint in 1.7 per cent, with a total incidence of 2.8 per cent. Cohen and Hossain\textsuperscript{12} analyzed 417 cases and found dysphagia in 5 per cent on the first hospital admission. Certainly, a symptom of such low incidence helps the practicing physician but little to make the early diagnosis of primary carcinoma of the lung. The main significance presents itself in evaluating the disease. Whether seen early or late, if the organic causes exist, dysphagia usually signals the presence of advanced disease with mediastinal involvement.\textsuperscript{8,13} The same authors tell us of nearly uniform inoperability. Considering this implication, we can only reiterate the statements of previous investigators and urge the use of barium examination of the esophagus in the preoperative study of such patients.\textsuperscript{6,8,14} This is a simple uncomplicated and nonformidable procedure, valuable in determining involvement of the periesophageal nodes in the presence of dysphagia and in some cases without dysphagia.


REFERENCES


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