proved. Distension of the esophagus in normal subjects is not associated with any change in cardiac rhythm. Such responses in our patient, and in previously reported cases of swallow syncope, are abnormal. As there was no obvious functional or structural abnormality of the esophagus, an excessive response by stretch receptors in the wall of the esophagus, to moderate distension, was probably responsible for reflex sinus bradycardia and AV block.

The distension produced by normal swallowing was possibly inadequate to stimulate this response. Furthermore, the hyperactive response was limited to the upper esophagus as distension of the middle and lower esophagus did not provoke heart block and responses of cardiac rhythm to other vagal afferents (eg, carotid sinus, pharyngeal) were also normal. The long history in this patient may reflect a congenital abnormality or a postinflammatory neuronal damage of the upper esophagus as a cause for this abnormal reflex.

REFERENCES


Mucoepidermoid Carcinoma of the Lung with Intracranial Metastases*

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Discussed is the first roentgenographic and post-mortem description of a patient with mucoepidermoid carcinoma of the lung who presented with intracranial metastases. The patient's primary tumor eluded physical diagnosis and bronchoscopic delineation. The autopsy confirmed minimal tumor involvement of the bronchial wall despite bulky regional and distant metastases.

Bronchial adenomas are a group of rare tumors representing less than 1 percent of primary lung neoplasms. Of 298 bronchial adenomas reported from the Mayo Clinic in 1978, 89 percent were classified as carcinoid tumors, 6 percent as adenoid cystic carcinomas, and 4 percent as mucoepidermoid carcinomas. Approximately 100 cases of primary mucoepidermoid carcinoma of the lung have been reported since this subtype was first recognized by Smetana et al in 1952. Histologically, this neoplasm is characterized by the coexistence of epidermoid, mucus-producing, and intermediate tumor cells. As a disease entity, it is distinctive for the infrequency with which it occurs, its variable clinical expression, and the occasional discordance between the tumor's histologic grade and biologic behavior. In the majority of reported cases, the tumor has remained localized to the bronchus of origin, although extrabronchial spread occurs in approximately 25 percent of the patients. Exceedingly uncommon are reports of central nervous system involvement. Autopsy demonstration of metastases to the dura mater was documented by Dowling et al in one patient. Turnbull and coworkers also reported three patients with brain metastases. The following is, to our knowledge, the first roentgenographic and post-mortem description of a patient with mucoepidermoid carcinoma of the lung who presented with intracranial metastases.

Case Report

A 65-year-old man presented with complaints of drooling, progressive left facial drooping, and left arm weakness of one month's duration. He denied visual disturbances, dysarthria, headaches or seizure activity. His past medical history was significant for type II diabetes mellitus and diffuse atherosclerotic vascular disease. He experienced transient ischemic attacks, and had suffered two previous myocardial infarctions. He smoked two packages of cigarettes a day for 40 years. The admitting physical examination revealed left central seventh cranial nerve palsy, decreased left arm strength and bilateral hyperreflexia. There was no lymphadenopathy. Results of the cardiac

FIGURE 1. The PA chest roentgenogram demonstrates new right hilar (small arrow) and left suprahilar lymphadenopathy (large arrow), without change in the left costophrenic angle blunting noted eight months earlier.
and pulmonary examinations were within normal limits.

Chest roentgenograms obtained eight months previously were normal except for left costophrenic angle blunting. The admitting chest roentgenograms demonstrated a left suprabullar mass and right hilar lymphadenopathy without any change in the left costophrenic angle blunting (Fig 1). Computed tomography (CT) of the thorax delineated aorto-pulmonic and circumferential paratracheal lymphadenopathy without a parenchymal mass lesion. Results of the head CT and bilateral carotid arteriography performed eight months earlier were normal except for diffuse atherosclerosis of the carotid arteries. The current head CT demonstrated a 2 cm ring lesion in the posterior right frontal lobe and a 5 mm ring lesion in the posterior left parietal lobe. Both of these lesions were associated with considerable edema and the right lateral ventricle was compressed.

To confirm the clinical suspicion of metastatic lung carcinoma, fiberoptic bronchoscopy was performed, but no endobronchial abnormality was found. Cytologic studies of bronchoscopic washing and brushing specimens, and subcarinal and left paratracheal transbronchial needle aspirates were negative for tumor cells. Two days later, the patient suffered a cardiopulmonary arrest and could not be resuscitated. An autopsy was performed.

Pathologic Findings

Gross inspection: Bilateral bullous pulmonary emphysema, particularly of the right upper lobe, was noted. Cross sections through the right upper lobe bronchus revealed mild thickening and narrowing of its first bifurcation. The mucosa overlying this stenotic portion was normal except for congestion and focal granularity. The submucosa was expanded. Adjacent lobar lymph nodes and the interlobar, aorto-pulmonic and hilar lymph nodes were extensively involved with metastatic tumor (Fig 2). The neuropathologic examination revealed two well circumscribed metastatic lesions: a right, posterior, frontal lobe mass located 1 cm from the cortical surface, and a left subcortical, white matter mass in the region of the insula. There was extensive atherosclerosis, ischemic infarction of the small bowel, and evidence for a recent myocardial infarction.

Light microscopy: Sections from the stenotic right upper lobe bronchus were stained with hematoxylin and eosin. The mucosa showed a few areas of moderate dysplasia, but was otherwise normal. Examination of the right upper lobe bronchial mucous glands demonstrated hyperplasia, squamous metaplasia, and malignant transformations, both in-situ and with infiltration into the glandular epithelial cells. This was considered to be the primary tumor focus.

The tumor cells were predominantly arranged in sheets and smaller nests. The epidermoid cells were polygonal with distinct borders and abundant eosinophilic cytoplasm. The nuclei were centrally and peripherally located, hyperchromatic and vesicular, with brisk mitoses. In areas, vague glandular formations were seen. Some cells contained intracytoplasmic lumina. Mucin was positive, within the intracytoplasmic lumina and occasionally in the cytoplasm in both the primary tumor focus and the metastatic tissue foci. Bizarre tumor giant cells were noted. The lymph node (Fig 3 and 4) and intracranial metastases had identical histologic characteristics.

Discussion

Mucoepidermoid carcinoma of the lung is a rare subtype of bronchial adenoma first described 35 years ago by Smetana et al.1 Although initially perceived to be a slow-growing neoplasm exhibiting local but not distant spread, dissemination was later described by Ozlu et al in 1961. Widespread metastases have since been described by many authors.1,3,7,9,10,13,14,16,18,22,24,25-34 Of the previously reported cases with metastatic disease, most patients reported pulmonary symptoms, such as cough and hemoptysis, that antedated the diagnosis by several months to years.1,3,7,9,10,13,14,16,18,22,24,25-34 Physical examination, though infrequently described, revealed pulmonary abnormalities such as consolidation or wheezing, consistent with bronchial obstruction.1,4,5 The primary tumor was usually easily identified on the chest roentgenogram, and due to its frequent central location and airway origin,
could be visualized and diagnosed by bronchoscopy in the majority of instances. Both lymphangitic and hematogenous routes of dissemination have been demonstrated. The usual metastatic sites are the regional lymph nodes (48 percent), other portions of the lung (25 percent), bone marrow (25 percent), distant lymph nodes (18 percent), adrenal gland (14 percent), the brain parenchyma (14 percent) and skin (14 percent). There have been infrequent reports of renal, pleural, pericardial, mediastinal, dura mater, and gastrointestinal (liver, spleen, intestines, esophagus and pancreas) involvement. Axelsson et al described metastatic spread of a primary lung mucoepidermoid carcinoma with low grade histologic characteristics, a finding which Barsky et al also demonstrated with light and electron microscopic techniques. However, most authors have observed that the histologic grade predicts clinical course.

The case of primary bronchial mucoepidermoid carcinoma we describe did display a concordant malignant histologic pattern, that is, the characteristic admixture of epidermoid and mucus-producing cells with brisk mitoses and metastaticoci, and clinical course. However, this case is unusual in several respects. The patient had no symptom or physical sign of a lung lesion. Findings consistent with a space-occupying central nervous system lesion were the only tumor manifestations. The chest roentgenogram and thoracic CT demonstrated lymphadenopathy without a parenchymal mass lesion. No endobronchial abnormality was found on fiberoptic bronchoscopic inspection. Cytologic specimens were negative for tumor cells, and gross pathologic examination confirmed very minor bronchial changes despite bulky regional and distant metastatic disease.

To summarize the data derived from this patient and from those cases of metastatic lung mucoepidermoid carcinoma reviewed here, the following statements can be made: due to the involvement of central airways and the frequent obstruction of a bronchus by the primary lesion, pulmonary symptoms and an abnormal chest examination are usually present. Chest roentgenograms are generally abnormal, though a distinct parenchymal mass may be absent. Visualization and diagnosis by means of bronchoscopy are possible in the majority of instances. The tumor’s biologic behavior may not parallel the histologic grade. Both lymphangitic and hematogenous spread can occur, with regional and distant lymph nodes, other portions of the lung and bone marrow the most frequent sites of involvement. Finally, brain metastases, although infrequent, may be the initial and only manifestation of the tumor.

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Sjögren's Syndrome with Multiple Bullae and Pulmonary Nodular Amyloidosis*

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We treated a patient with Sjögren's syndrome associated with multiple bullae and pulmonary nodular amyloidosis, both of which were identified by open lung biopsy. The mechanism of bullae formation appeared to be narrowing of the airway, as a result of extensive inflammatory cell infiltration to the bronchiolar wall, which acted as the check valve mechanism. We believe this to be the first reported case of Sjögren's syndrome accompanied by these two pulmonary manifestations.

It is well known that various pulmonary diseases may accompany Sjögren's syndrome.1,4 We report the first case of Sjögren's syndrome complicated by multiple bullae and pulmonary nodular amyloidosis.

CASE REPORT

A 53-year-old woman was admitted to our hospital with the chief complaints of cough and exertional dyspnea, which had appeared three years earlier and had steadily progressed. Multiple linear shadows and bullous change were presented on chest roentgenograms six years ago, but at that time, she did not have any pulmonary complaint. She also complained of dryness of the conjunctiva and mouth. The physical examination disclosed only slight crepitations on chest auscultation. Laboratory examination revealed polyclonal

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Figure 1. Chest roentgenogram on admission. Both lung fields are hyperlucent and contain linear shadows, suggesting the presence of multiple bullae.

Figure 2. Chest computed tomography at subcarinal level and lower lobe. Cystic lesions up to 10 cm in diameter are clearly identifiable through the lung.