Intracardiac Extension of a Bronchogenic Carcinoma*

PRIMITIVO T. CRUZ, M.D.† and ERVIN F. STAMBAUGH, M.D.**

Lewes, Delaware

The heart and pericardium are by no means exempted* from metatases from bronchogenic carcinoma but considering the anatomic proximity of the heart to the lungs it is surprising that cardiac metastasis occurs but in 8 to 10 per cent of cases reported by various authors.1, 2 Being a malignant tumor, pulmonary carcinoma frequently penetrates pulmonary veins and their tributaries (five instances are cited by Willis*). Rarely, it may extend into the heart. One such case was reported by Whiteley.4

We would like to present the following which is the first reported case of intraventricular extension of bronchogenic carcinoma in the literature.

J. W. (Hospital No. 40964), a 63 year old white man, bus driver, was admitted for the chief complaints of indigestion, chest pain, and cough. On physical examination, the right lung was found to be emphysematous. The heart was enlarged, the rhythm was irregular, and a grade II systolic murmur was heard over the aortic valve. Blood pressure was 95/60 mm. of Hg. X-ray film of the chest revealed old pulmonary tuberculosis with emphysema and a left hilar mass. He was discharged after 10 days with a diagnosis of inoperable carcinoma of the left lung.

He was readmitted a month later with severe dyspnea and bilateral axillary lymphadenopathy. Cardiac findings remained the same. He died five days later with symptoms of respiratory failure.

The past history revealed that he had been admitted at another hospital four years before death, complaining of chills, fever, and pain in the left lower chest. At that time, the lungs were found to be hyperresonant in both bases with asthmatic wheezes throughout both lungs. The heart was normal. X-ray film of the chest revealed a density in the left costo-phrenic angle interpreted as acute pleurisy with effusion and possible pneumonitis.† The right lung was emphysematous. No tumor mass was seen.

The pertinent necropsy findings were in the lungs and heart. In the left upper pulmonary lobe there was a pedunculated nodular firm tumor mass measuring 7.0 cm. in diameter. It was attached to the upper left descending bronchus by a firm narrow pedicle measuring 2.5 cm. in length and with an average diameter of 0.5 cm. The heart was enlarged and weighed 500 Gms. A firm, 14.0 cm. long tumor mass protruded from the median pulmonary vein into the left ventricle completely plugging the mitral opening (Fig. 1). The intracardiac mass was pear-shaped, with the proximal end measuring 4.0 cm. in average diameter and the distal portion 10.0 cm. in diameter. The mass was not adherent to the endocardium. Neither were there intrinsic lesions on the valves. Sections through the pulmonary and intracardiac tumors revealed irregularly lobulated, firm, mottled gray pink tissue. No other gross metastases were seen.

Microscopic examination disclosed a pleomorphocellular malignant neoplasm. At the site of origin in the bronchus the tumor had a typical...
oat-celled pattern with loose aggregates of small round to ovoid cells with scanty cytoplasm and fine reticulated stroma. There were areas where the cells were in small clumps and nests with peripheral palisading suggestive of a carcinoid type of bronchial adenoma. This histologic configuration was seen at the site of penetration of the tumor into the pulmonary vein (Fig. 2). With increasing distance from the site of origin, the tumor assumed a different architecture. The cells became polygonal and large and arranged in solid sheets and islands with definite cobble-stone pattern (Fig. 3). There was definite evidence of keratinization with well-formed
epithelial pearls. The tumor stroma in these areas was made up of dense collagenous fibers. The same microscopic picture was seen in the intracardiac mass (Fig. 4). The tumor as a whole was extensively necrotic. There was focal lymphocytic infiltration of the stroma. The other organs were free of metastases.

Discussion

Aside from its rarity, this case presents several interesting facets in its clinical and pathologic picture.

The history of chronic cough and asthma of long standing becomes quite interesting in the light of the findings of one of the authors who studied cases of bronchogenic carcinoma admitted to the Ohio State University Hospital in the year 1952-1953. About two thirds of the patients studied gave a history of “asthma.” While it is difficult to draw a cause-and-effect relationship between chronic cough, asthma, and bronchogenic carcinoma, the frequent association of these three conditions with the cough and asthma usually antedating the neoplasm should attract attention of all interested in the problem of lung cancer.

As emphasized in the clinical history, the findings of cardiac enlargement, arrhythmia, and aortic systolic murmur coincided with the discovery of the lung tumor. Four years before, the heart was essentially normal. It is difficult to state that the same findings would be present in all cases of intracardiac tumor in the left atrium or ventricle. But, the presence of a left hilar tumor mass, the sudden appearance of such cardiac abnormalities should alert the clinician to the possibility of intracardiac extension of a pulmonary neoplasm. Undoubtedly, electrocardiographic studies or cardiac catheterization would have provided valuable diagnostic clues. Unfortunately, the patient expired before requests for such studies could be filled.

The absence of distant metastases makes our case and the few other similar cases reported unique among patients who succumb to bronchogenic carcinoma. At first glance, it seems paradoxical for a malignant tumor to remain localized after it has penetrated the general circulation. One should consider, though, that intravenous and intracardiac extension of a bronchogenic tumor is still an integral part of the main tumor mass and is more cohesive since it carries with it its own tumor stroma. In contrast to this, a tumor embolus is as a rule only a nest or loose aggregate of tumor cells which has been detached from the main new growth. Another logical explanation for the absence of remote metastasis is the possibility that intracardiac extension is a lethal complication and that the patient dies before distant metastasis has developed.

To the pathologist, the pleomorphism of the neoplasm in our patient is striking. There was hesitation as to the proper classification of the tumor. The question came up whether this is an oat-celled type of bronchogenic carcinoma with extensive squamous metaplasia, whether this malignant tumor arises from a carcinoid type of bronchial adenoma, or whether it is a poorly differentiated squamous carcinoma of the bronchus. The
presence of all these histologic features in a tumor brings out the question whether our classification of bronchogenic carcinoma into definite cell types might be too arbitrary. Drawing a corollary with breast carcinoma, where sections taken at various levels through the same tumor mass as a rule give a varying histologic picture as far as cell type and stroma are concerned, probably serial sections through a bronchogenic carcinoma would likewise give a pleomorphic picture such as we see in our case. Aware of the totipotentialities of the alveolar and bronchiolar epithelium and to be in accord with the accepted modes of classification, we are inclined to call the new growth an oat-celled type of bronchogenic carcinoma with squamous metaplasia. Whether the tumor originally started as a bronchial adenoma of the carcinoid type poses another question.

Acknowledgment: The authors wish to thank Dr. O. J. Pollak, pathologist at Beebe Hospital for assistance in the preparation of this paper.

SUMMARY

A rare case of bronchogenic carcinoma with intracardiac extension by way of the pulmonary vein is reported. Various points of clinical and pathologic interest presented by the patient and his new growth are discussed.

RESUMEN

Se relata un caso raro de carcinoma bronquiogénico con propagación intracardiaca por la vía de la vena pulmonar. Se discuten varios puntos de interés clínico y patológico en este enfermo y en el tumor que presentó.

RESUME

L'auteur rapporte un cas rare de cancer bronchique avec extension à l'endocarde par la veine pulmonaire. Différents points d'intérêt clinique et anatomique présentés par le malade et l'extension nouvelle de sa maladie sont étudiés.

ZUSAMMENFASSUNG

Wiedergabe eines seltenen Falles von bronchogenem Carcinom mit intracardialer Ausbreitung auf dem Wege über die Lungenvenen. Die verschiedenen Punkte von klinischem und pathologischem Interesse, die der Kranke und sein neues Wachstum bietet, werden besprochen.

REFERENCES

5 Cruz, P. T. and Von Haam, E.: Cancer Distribution in Central Ohio, to be published.