Primary Chondroma of the Lung*

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Reports in the literature are confusing in regard to differentiation between chondroma of the lung and hamartoma of the lung. According to Hochberg and Pernikoff1, these tumors are distinct and different forms of neoplastic disease. Bragg and Levene2 feel that in several articles in the literature dealing with pulmonary hamartoma these are incorrectly referred to as chondroma. The confusion dates from Albrecht (1904), when his differentiation of hamartoma as a benign mixed tumor occurring in various organs, including the lung, was made. According to him, hamartomata are not true tumors, but rather tumor-like mal-formations due to abnormal mixing or development of the normal components of that organ. The abnormality may take the form of a change in quality, arrangement, or degree of differentiation, or comprise variations of all three phases. Hochberg and Pernikoff consider chondroma of the lung a rare tumor, whereas in contrast, Bragg and Levene claim that hamartoma is not a rare tumor.

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Chondroma of the lung is described as variable in size, the smaller one being generally attached to a larger bronchus, and the larger tumors usually within the pulmonary parenchyma. Chondromas are round or ovoid, firm in consistency and covered by a semi-translucent capsule. Trabeculations pass from the capsule throughout the tumor substance, forming lobules. Accompanying changes in the surrounding lung tissue depend upon the location, size, and duration of the primary tumor. Histologically, these tumors simulate normal cartilage. The fibrous tissue capsule and trabeculation often are vascular. The core of the tumor may have calcification and bone formation. At other times there may be hemorrhage in the tumor, myxomatous degeneration, and sarcomatous changes.

However, the tumors described as pulmonary hamartoma occur as a solitary, discrete, lobulated, solid mass, often containing calcified areas situated in the parenchyma near the pleura, and surrounded by normal appearing lung. Cartilage, primitive connective tissue, and islands of glandular tissue are the usual constituents, with fat, bone, smooth muscle, lymphoid tissue and amorphous calcifications occurring less frequently. Although hamartoma contains cartilaginous elements, it is not comprised chiefly of that tissue, hence Moller (1933),12 called these mixed tumors.

In the literature some 100 cases have been reported, at least 75% of which were seen at autopsy. Verga (1932) was able to collect 58 cases and personally found 2 cases in a series of 20,000 autopsies. Hochberg and Pernikoff observed 2 cases in their series of 4,800 autopsies, and adding cases from the literature, reported a total of 78 cases. McDonald et al8 reported 20 instances of “hamartoma (often called chondroma)” of the lung, from 8,000 autopsies.

Although the tumor may occur in persons of all ages, the greatest incidences are after the fourth decade of life and there is a preponderance of three or four males to one female. The distribution corresponds roughly to the relative size of the different lobes, the right lower lobe being the most common, particularly in a subpleural location. The size varies from that of 1 cm. in diameter to one described as 20 x 16 x 9 cms. Virchow reported a case where three chondromata were present in one lung; one near the hilum, one within the parenchyma, and the third in the pleural region.

The case presentation has the microscopic picture of chondroma and lay in the periphery of the lung, right lower lobe. It has a known existence of 20 years.

Case Report

This is a 61 year old white male who suffers from Schizophrenic Reaction, Paranoid Type, Chronic Severe, manifested by exclusiveness, disinterestedness, severe feelings of hostility toward his surroundings, suspiciousness, and is uncooperative. He has been mentally ill for many years and has been a resident of a mental hospital for some 22 years. He is a veteran of World War I. The original evidence of pulmonary tumor was found in an x-ray film taken December 5th, 1930. Because his appetite had been poor and he was losing weight a suspicion of pulmonary tuberculosisis was entertained. This film was reported as essentially negative except for what was described as “large calcified gland and adhesions to the diaphragm in the right lower lung field.” No other pulmonary lesion was observed. X-ray films taken in 1935, 1937 and 1939 were similar with no evidence of pulmonary tuberculosis. In the last report of 1939, the right lung at the base, posteriorly, presented a definite oval increased density approximately 3 x 4 cm. At this time the radiologist felt that the density of the right base had been
present since his admission in 1930. A review of the films shows this density to stay in the same location, but to be somewhat larger than in 1930. It was believed this represented a cyst, or a benign tumor, possibly a fibroma. Subsequent to this he developed occasional respiratory complaints, which were transient and incidental, and subsequent x-ray films during the next 10 years showed no change in the well circumscribed density at the right base. In 1949 he had acute appendicitis and appendectomy. In the latter part of the same year he had acute cholecystitis and subsequent cholecystectomy. In the last 22 years a search was made for tubercle bacilli and for echinococcus cysts, which were never found.

In 1950 he was observed again for loss of weight and poor appetite. No cause for symptoms could be discovered except possibly for this mass in the chest, which was felt now to be undergoing degenerative changes. A surgical consultation made the diagnosis of hamartoma and suggested thoracotomy. On July 10, 1951, resection of the pulmonary tumor in the right lower lobe was performed through the bed of the eighth rib. The tumor was easily resected from the parenchyma and lay just beneath the visceral pleura.

Pathological examination described a grayish yellow mass measuring 5 x 3.8 x 2.8 cm. One aspect firmly attached to the pleura over an area of 4.5 x 4 cm. The pleura was thickened and opaque. The remainder of the tumor was partially covered by a thin capsule-like structure. It was moderately firm in consistency and one section was composed of lobules of various size. There were large pearly white and bluish gray areas as well as yellow zones of fat. The white and gray areas were firm, the latter having the consistency of cartilage. There was no apparent infiltration into or beyond the capsule, or into the attached pleura. Histological examination showed large areas composed of cartilaginous tissue. The cartilage cells showed variations of size as well as variation in the size of the lacunae. Different areas showed different amounts of matrix. In some a fine fibrillar connective tissue was seen. The cartilage tissue was present in the form of lobules with fairly well defined periphery. The surrounding tissue was chiefly fat. In addition, there were areas composed of myxoid tissue, with spindle and stellate cells, and a fine pale blue staining inter-cellular matrix, also showed inter-lacing fibers. Some portions of the tumor were lined by tall columnar, ciliated epithelium, with oval nuclei tending toward the base. In some areas a loose subepithelial propria, with a small number of plasma cells, was present beneath the epithelial lining. On one edge a small fragment of compressed pulmonary tissue was recognizable. The diagnosis was chondroma.

The patient made an uneventful post-operative recovery and is well, as far as his chest is concerned, 18 months after the operation.

FIGURE 1: Primary Chondroma of the Lung Gross.
Comments

The microscopic findings in the present case conform mainly to the diagnosis of chondroma and yet clinically have the characteristics of hamartoma in that it lay in the periphery of the lung and was of long standing (at least 20 years known existence). This suggests that chondroma and hamartoma of the lung are quite similar, and the differentiation is not as distinct as has been described. To avoid further confusion it is suggested that these tumors should be considered the same, with one being a variation of the other.

The majority of cases of hamartoma of the lung have been classified as chondroma because of the predominance of cartilage. It is also probable that some cases in which the glandular elements predominate that a bronchial adenoma was diagnosed. McDonald et al. described three benign pulmonary tumors which were strikingly similar and unusual. They called them hamartoma (often called chondroma) and all the tissues found in these tumors correspond with those found normally in the bronchi, although lacking in orderly arrangement. These tumors were supposed to be the result of abnormal development of bronchial analage, therefore, called hamartoma, (failed, erred). There is a contention also that hamartoma may contain cartilaginous elements, but is not chiefly comprised of that tissue.

It is our surmise that the chondroma and the hamartoma as described in the literature may be one and the same tumor, with variations. This is a matter of histologic debate and it seems that the histogenesis is the
same. It is quite apparent that the chondroma and the hamartoma are alike clinically in that they occur in practically the same places and have the same slow growth and provoke few or no symptoms. It is believed that hamartoma is strictly a benign tumor and although there is a suspicion of chondroma undergoing sarcomatous changes, none have been reported. Again this makes one believe that the two tumors are alike. Both tumors are diagnosed roentgenologically and they should be suspected in every case of a solitary tumor of the lung. Frequently the diagnosis can only be made on microscopic examination. It is agreed that excision of the tumor is the recommended therapy. Until we are more adept at x-ray diagnosis excision is recommended because by necessity the tumor must be differentiated from bronchogenic carcinoma, a solitary metastasis, bronchial adenoma, tuberculoma and echinococcus cyst.

Two theories have been proposed as to the origin of these tumors of the lung. The first assumes that bronchial wall irritation will cause hyperplasia of cartilage and tumor formation. This theory would explain the origin of some of the tumors found within the bronchial wall. On the other hand, the second theory, which is more generally accepted explains tumor formation as the results of abnormal development of the bronchial analage, with alteration in the development of the cartilaginous elements. In the development of the lung the centers which form the cartilage in the mesoderm of the bronchus are scattered and the lung grows much more rapidly after the bronchial wall is developed. It is assumed that in the expansion of the lung after birth some displacement of these aberrant elements will later give rise to peripheral parenchymal tumors.

The symptoms induced by chondroma of the lung are dependent upon the size, location and the effects in the neighboring tissue, and as shown, many of these are entirely asymptomatic and only discovered at autopsy. The neoplasm that resides in the neighborhood of the main bronchus will provoke symptoms characteristic of bronchial irritation, such as asthmatic and dyspneic symptoms if encroaching on the lumen of the bronchus. The tumors in the periphery of the lung will remain asymptomatic until they cause erosion of a vessel, or local or referred pain when coming close to the chest wall. Since these tumors grow slowly without appreciable change in size as demonstrated in this case (20 years known duration) the symptoms will be minimal and transitory and probably will not interfere with peripheral pulmonary function. In some cases the tumor was first seen on x-ray film. The roentgen diagnosis is not always possible and rests mainly on the presence of calcification within the tumor. This usually is sharply defined in the lung parenchyma with clear lung tissue surrounding it. Some reports describe lobulation of the margins. The location is usually peripheral and subpleural.

**SUMMARY**

Primary chondroma of the lung is a benign tumor. One in the periphery of the right lower lobe of the lung with a known existence of 20 years with operation and recovery is presented. Chondroma and hamartoma as described in the literature may be one and the same tumor, with varia-
tions. This is a matter of histological debate and it seems that the histogenesis is the same. Both tumors are alike clinically in that they occur in practically the same places and have the same slow growth and provoke few or no symptoms. Excision is recommended until we become more adept at x-ray diagnosis.

RESUMEN

El condroma primario del pulmón es un tumor benigno. Se presenta, uno situado en la periferia de lóbulo inferior derecho, cuya existencia se había conocido por 20 años, el cual fue operado y se recuperó. El condroma y el hamartoma, tal como se describen en la literatura, pueden ser el mismo tumor, con variantes.

Este es un motivo de discusión histológica y así parece respecto de la histogénesis. Ambos tumores se asemejan clínicamente en que aparecen prácticamente en los mismos lugares, tienen un crecimiento lento y provocan pocos síntomas o ningunos. Se recomienda la excisión, mientras no vengamos a hacer un diagnóstico radiológico más adecuado.

REFERENCES