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Mesenchymoma of the lung (so called hamartoma): a review of 154 parenchymal and endobronchial cases

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ABSTRACT In a series of 154 patients (116 male and 38 female) with so called pulmonary hamartoma the peak incidence was in the sixth decade, with only three patients less than 20 years of age. Sequential radiographs showed that in 55 patients the tumour first appeared in adult life and that in 53 it progressively increased in size. The age incidence and progressive growth leads to the conclusion that the tumour is a benign neoplasm rather than a hamartoma, consisting of various connective tissues intersected by clefts lined by respiratory epithelium. The epithelial elements are regarded as entrapped non-neoplastic inclusions and the tumour as a purely mesenchymal neoplasm: the name mesenchymoma therefore seems the most appropriate. There were two recurrences after simple enucleation, 10 and 12 years later. A total of 142 tumours were parenchymal, and only 12 were endobronchial. All lobes were affected but there was a slight preponderance in the left upper lobe. Four patients had two (synchronous) mesenchymomas. There was an associated bronchial carcinoma in 11 patients, synchronous in six and metachronous in five.

A hamartoma is a non-neoplastic tumour like malformation,[1] but there is evidence that the so called hamartoma of the lung is a benign neoplasm.[2] We have reviewed the clinical and pathological features of 154 patients with this entity and present data supporting the argument that it is a true neoplasm. We prefer to classify these lesions as benign mesenchymal tumours of the lung or mesenchymomas.

Clinicopathological data

PATIENTS

Mesenchymoma was diagnosed in 158 patients from 1956 to 1984, but the histological slides of only 154 were available for review. The patients were drawn from a predominantly Dutch population of about 500 000, representing an annual incidence of about 1:100 000. They ranged in age from 14 to 74 years (mean 51 years), with a peak incidence in the sixth decade. The tumour was detected before the third decade in only three patients, aged 14, 15, and 17 years. The male to female ratio was 3:1. Smoking histories had seldom been obtained. In 142 (92%) patients the tumour was parenchymal, and in only 12 (8%) was it visible with the rigid bronchoscope. All lobes were affected, with a slight preponderance in the left upper lobe. Four patients were found to have two synchronous tumours.

One patient with a parenchymal lesion presented with a small haemoptysis. The remainder were symptomless, the tumours being incidental findings in routine chest radiographs. Ten of the 12 patients with endobronchial mesenchymomas, on the other hand, had pulmonary symptoms in the three months leading up to the diagnosis, including cough (9 cases), phlegm (4), haemoptysis (3), dyspnoea on exertion (6), and fever (3).

RADIOGRAPHY

Preoperative chest radiographs were available from 131 patients. Parenchymal mesenchymomas formed a peripheral opacity, which was round in 80% of cases and lobulated in 20%. The opacity was homogeneous in all but 13 cases that showed partial calcification; it was eccentric in 10 and central in three. The chest radiographs of nine patients with

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endobronchial mesenchymoma showed either segmental atelectasis (5), no abnormality (1), consolidation (1), hyperinflation of the lobe (1), or a patchily calcified tumour (1).

Previous chest radiographs were available from 57 patients. In 30 the tumour was not visible one to 18 years before detection. In 25 cases radiographs taken one to 13 years before diagnosis showed a tumour that had since increased in size. In only two patients did previous chest radiographs, one and three years before detection, fail to show enlargement of the tumour.

ADDITIONAL TUMOURS

Five patients had an additional opacity that later proved to be a simultaneous bronchial carcinoma, and a further patient developed a bronchial carcinoma within six months. The carcinoma was squamous in three cases, adenocarcinoma in two cases, and adenosquamous in one. All but one affected the same lobe as the mesenchymoma. A further patient had a simultaneous retroperitoneal phaeochromocytoma, but was not thought to have an incomplete Carney's triad (bronchial chondroma, multiple gastric leiomyosarcomas and extra-adrenal paraganglioma) because of her age (66 years), the parenchymal location of the pulmonary tumour, and its microscopic structure.

FEATURES OF THE MESENCHYMOMAS

In three patients with endobronchial mesenchymoma the preoperative pathological diagnoses were chondroma, lipoma, and granulation tissue. The correct diagnosis was made in two instances. Bronchoscopic examination did not provide a diagnosis in the remaining seven patients with endobronchial growths or in any of the patients with parenchymal mesenchymoma.

Histology of endobronchial tumours The endobronchial tumours varied from 8 to 70 mm in diameter (mean 21 mm), with most in the 10–30 mm range. The connective tissue component was predominantly chondroid in 50%, fatty in 33%, fibroblastic in 8%, and osseous in 8%. The chondroid tissue bore no anatomical relationship to the airway cartilage but the osseous component always occurred in the chondroid element and appeared to be metaplastic. Young, active fibroblasts, often of irregular configuration, were usually located close to the chondroid elements. Seromucous glands were scattered between the fatty or fibroblastic components and the surface of the tumour was covered by respiratory epithelium. In nine cases the surface was smooth, but in two a papillary structure with the formation of epithelial inclusions was seen. The chondroid tissue was usually nodular, giving the tumour a lobulated character, probably reflecting multicentric maturation.

Histology of parenchymal tumours The parenchymal tumours varied in size from 4 to 90 mm in diameter (mean 19 mm). In 80% the predominant differentiation was chondroid, in 12% fibroblastic, in 5% fatty, and in 3% osseous. The boundary between tumour and lung was often indistinct or papillary, as a result of outgrowths of fibroblasts into alveolar walls. This was particularly evident in the tumours with multicentric maturation; such tumours also showed epithelial inclusions of type II pneumocytes, or ciliated, non-ciliated, or mucus-producing bronchiolar cells. Other parenchymal tumours had a more solid appearance, with a sharp border and few epithelial inclusions; these had a predominantly chondroid structure. At the periphery of the tumour lymphocytes, plasma cells, and occasionally mast cells were often present. Collections of macrophages were usually present in adjacent alveolar spaces, and in one case the appearances around the tumour were typical of a plasma cell granuloma. Three peripheral tumours were associated with non-caseating granulomas in which no microorganisms could be detected; there was no evidence of sarcoidosis, either at the time of thoracotomy or at follow up.

Except for the proportions of the various components, no difference was found between the endobronchial and parenchymal tumours. Moreover, 11 tumours with radiologically documented growth in the year preceding thoracotomy were no different histologically, either in composition or in peripheral extension. In three of the four patients with two tumours, the relative proportions of their components were similar, but in the fourth patient one tumour was predominantly cartilagenous and the other fibrous. Malignant change was not seen. Two patients suffered a recurrence but no difference was found between their first and second tumours, chondroid tissue being the predominant element in both.

TREATMENT AND FOLLOW UP

Treatment of 129 patients with parenchymal mesenchymoma consisted of thoracotomy with enucleation or wedge excision after frozen section had shown that the lesion was benign. Larger resections—segmentectomies, lobectomies, or bilobectomies—were performed in 17 patients, because of bronchial carcinoma (5), suspected carcinoma (2), tumour size (1), or central localisation (4); in five the reason for the resection was not documented. Of the 12 patients with endobronchial mesenchymoma, five had a lobectomy, four a segmental resection, and one a lobectomy with reconstructive surgery of the bronchus; one was treated by bronchoscopic removal, and one by thoracotomy and bronchotomy.

Follow up of 138 patients with parenchymal mesenchymoma was possible (1–25 years, mean 5). In two patients the tumour recurred in the same pulmonary segment, 10 and 12 years later respectively. Five patients developed a bronchial carcinoma between one and seven years after diagnosis of mesenchymoma, four of which were squamous and one adenocarcinoma. In contrast to the synchronous carcinomas these metachronous growths affected different lobes from the mesenchymoma.

Discussion

Whereas a hamartoma ceases to grow when the organ in which it is situated stops growing, a neoplasm shows inexorable growth and compresses the surrounding tissue, in the process generally acquiring a capsule, a feature generally lacking in a hamartoma. Mesenchymomas are most often first diagnosed in the fifth or sixth decade of life,[2] and seldom in childhood,[3] a strong argument against their being non-neoplastic malformations. In our series only three were detected in adolescence and none in childhood. Our observation that previous radiographs had frequently been normal indicates that mesenchymoma often develops in middle age. Furthermore, when the tumour had been apparent in previous radiographs it was generally evident that it had increased in size in the interim. In only two patients was there evidence of no continued growth, and in these the follow up period was comparatively short. These features suggest that the lesions are neoplastic rather than hamartomatous.

The pathological evidence is less strong and indeed could well be considered to favour a hamartomatous rather than neoplastic origin. Unlike most expansile tumours, these lesions lack a capsule and show no appreciable compression of the surrounding lung, although in our experience benign neoplasms in pulmonary tissue often lack these features. Furthermore, the mixture of several connective tissue elements with epithelial clefts could be taken to represent a bizarre bronchial maldevelopment, and has been quoted in support of the hamartomatous nature of the lesion.[4] Entrapment of various pulmonary components, however, is frequently seen in lung tumours,[5] and in our opinion the epithelial clefts of the so called hamartoma are formed in the same way. We do not favour the frequently used term adenochondroma, but prefer one that reflects a purely mesenchymal histogenesis. Since these lesions consist of various connective tissues we favour the term benign mesenchymal neoplasm or mesenchymoma.

The relationship of mesenchymoma to chondroma, fibroma, and lipoma of the lung has been considered previously and the differences noted.[4] Chondromas and lipomas are generally endobronchial, contain only one type of tissue, and lack epithelial inclusions, whereas mesenchymomas are more often parenchymal than endobronchial, consist of multiple types of connective tissue, and contain epithelial inclusions.

Mesenchymomas occur both endobronchially and in the pulmonary parenchyma, the former making up some 10–20%.[2 6] In large series mesenchymomas constitute 7–14% of all coin lesions.[7 8] They are distributed fairly uniformly throughout the lungs. Multiple mesenchymomas are rare,[9 10 11] and those patients who had two tumours in our series represent an unusually high proportion. Very rarely both endobronchial and parenchymal mesenchymomas are found in the same patient.[9] The high prevalence of mesenchymoma in males[12] possibly reflects the preferential participation of men in mass radiographic surveys, a common way in which the asymptomatic parenchymal mesenchymoma is detected.

The typical radiological abnormality is a round homogeneous opacity in the periphery of the lung. Only occasionally does it appear lobulated, despite the frequency of this pathological finding. Calcification is evident radiologically in 10%, particularly at the periphery. Radiological abnormalities in patients with endobronchial tumours are mainly the result of bronchial obstruction.

The surgical treatment was usually enucleation or wedge resection. Extensive resection was performed in only 12% of the parenchymal group, whereas in the endobronchial group it was undertaken in 83%, because of the central localisation. Two of our patients had a second resection owing to recurrence in the same pulmonary segment, probably due to incomplete removal. The histological growth pattern suggests that a wedge excision with a narrow margin of normal lung, rather than simple enucleation, may be necessary to prevent recurrence. Multicentric growth could explain apparent recurrences,[13] but is unlikely because multiple growths are decidedly rare.

Eleven of our patients (7%) also had bronchial carcinoma, which was synchronous in six and metachronous in five. This association has been observed by others and the risk of lung cancer has been estimated to be 6.3 times higher in patients with mesenchymoma than in the general population.[14] The reason for this is not clear, although the development of cancer could well lead to the discovery of an asymptomatic mesenchymoma that would otherwise not have been detected. The assessment of patients with mesenchymoma and carcinoma may be difficult, because the mesenchymoma can easily be mistaken for a metastasis.

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