PULMONARY TUBEROUS SCLEROSIS — A CASE REPORT

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SYNOPSIS

Pulmonary involvement in Tuberous Sclerosis is extremely rare. We present the case of a 24-year-old Chinese woman with a typical "honeycomb" lung and a right renal mass with the angiographic appearance of an angiomyolipoma. Lung biopsy showed that the parenchyma was infiltrated with fibroleiomyomatous tissue. Her lung function tests were consistent with the diagnosis. There was no neurological or dermatological involvement.

INTRODUCTION

Almost every doctor is conversant with the classical triad of adenoma sebaceum, epilepsy and mental retardation occurring in Tuberous Sclerosis. It has been increasingly recognised, however, that "forme frustes" of the disease can occur without involvement of the nervous system at all. This is especially so in Pulmonary Tuberous Sclerosis which has distinct clinicopathological features (Harris et al, 1969; Dwyer et al, 1971) and we report one such case.

HISTORY AND EXAMINATION

O.B.E., a 24-year-old Chinese woman, presented with a three year history of progressive breathlessness on exertion and several episodes of spontaneous pneumothorax. She also had an episode of colicky right loin pain just prior to her admission. There was no history of fever, skin rashes, joint pains or chronic cough.

She had been married for two years but was nulliparous. She had tried oral contraceptives for a short period only and had no history to suggest deep venous thrombosis or recurrent pulmonary embolism. She worked as a clerk and had no exposure to noxious fumes or industrial dusts. She was a non-smoker.

She was the second child in a family of six. Her younger brother was reported to have had one episode of spontaneous pneumothorax. There was no family history of skin disease or mental illness.

On examination the patient was dyspnoeic at rest and mildly cyanosed. Blood pressure was normal. She was

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rational, intelligent and cooperative. There were no skin markers of Tuberous Sclerosis despite a careful examination by a dermatologist. Her fundi were normal. Examination of her heart was unremarkable. Lung expansion and air entry were equal and no adventitious sounds were heard. Her right kidney was grossly enlarged. It was slightly tender, smooth and firm. Her liver was just palpable. The central and peripheral nervous system was normal.

INVESTIGATIONS

Her haemogoblin was 15.7 gm/100 ml of blood. Blood urea, serum electrolytes, calcium, phosphate and liver function tests were normal. Rheumatoid factor, anti-nuclear factor and L.E. cells were persistently negative. The erythrocyte sedimentation rate was 20 mm/hour.

An electrocardiogram was normal except for prominence of the "P" wave.

Her chest radiograph (Fig. 1) had a typical honeycomb appearance with a dense 2×3 cm opacity in the left upper zone. A small pneumothorax was seen in the right upper zone. Tomography (Fig. 2) showed that the opacity in the left lung was well demarcated and calcified. A selective right renal angiogram (Fig. 4) revealed a tumour measuring 9×7 cm at the lower pole of the kidney. It was hypervascular with arteriovenous shunting and pooling of contrast. The whorled appearance was characteristic of an angiomyolipoma (Stilbiger and Peterson, 1971; Becker et al, 1973).

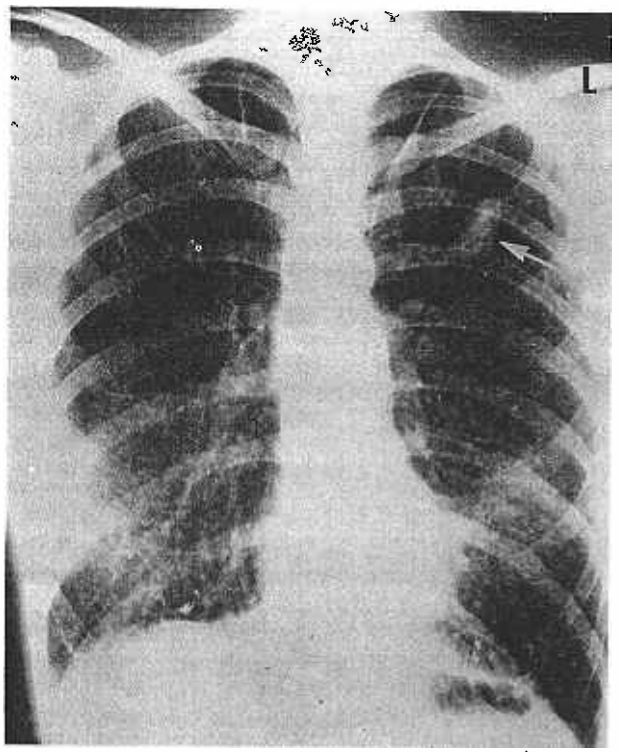
Arteriography of the left kidney, liver and spleen did not reveal any abnormal circulation. A skeletal survey, including skull radiographs, was normal.

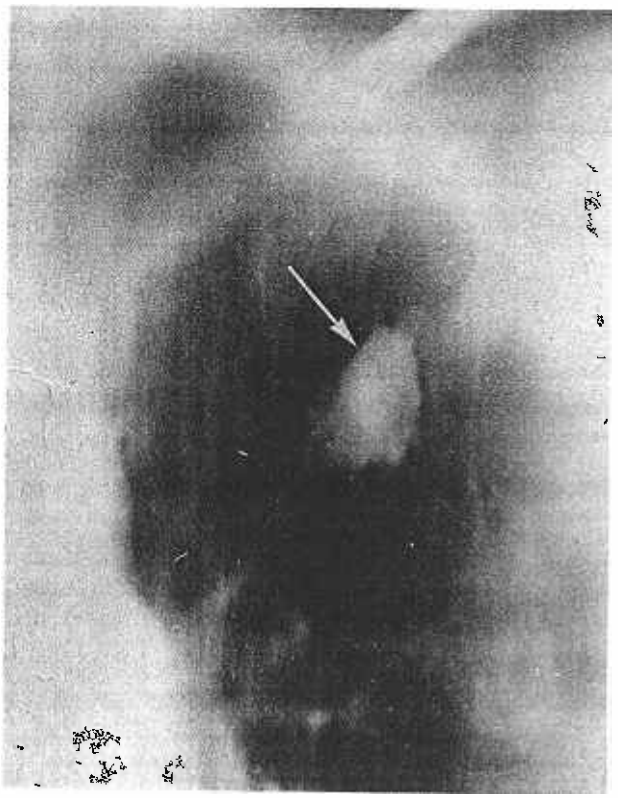
Her arterial blood gases showed an oxygen saturation of 90%, pO_2 of 61 mmHg, pCO_2 of 24 mmHG and a pH of 7.39.

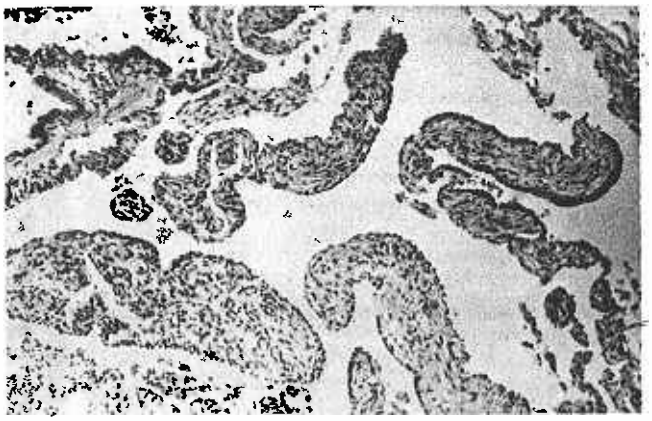
LUNG FUNCTION TESTS:

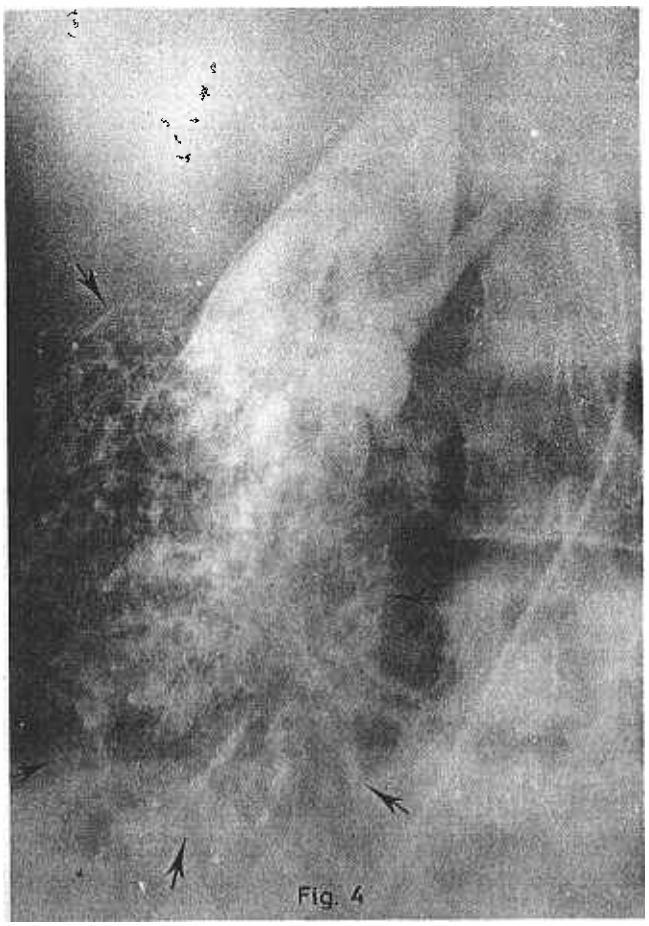
Forced Vital Capacity (ml)	1183
Vital capacity (ml)	1236 (predicted 2,600)
FEV_1 (ml)	538
FEV_1/FVC (%)	45.4
Functional Residual Capacity (ml)	2809
Residual capacity (RC) (ml)	2341
Total lung capacity	3577 (predicted 3,800) (TLC) (ml)
RC/TLC (%)	65.4
CO Diffusing Capacity at rest (ml/min/mmHg)	1.0
(Repeat)	2.1

During open lung biopsy, the lung was noted to be cystic and friable. Histologically (Fig. 3) there was fibrous thickening of the pleura. Present among the alveoli were thickened septa of fibroleiomyomatous tissue lined by cuboidal epithelium. Histiocytic cells with haemosiderin pigment were present within the lumen of the alveoli. There was no inflammatory exudate.









ILLUSTRATIONS

FIG. 1 — Frontal view of chest showing interlacing radiopaque lines suggestive of interstitial fibrosis. A spherical opacity at the left apex is demonstrated and this is arrowed.

FIG. 2 — Tomogram of the left upper zone of lung showing interlacing shadows typical of a 'honeycomb' lung. The 'arrow' points to a well-defined dense spherical opacity.

FIG. 3 — Lung biopsy. Papillary processes of fibroleiomyomatous tissue lined by cuboidal epithelium.

FIG. 4 — Selective right renal arteriogram showing marked hypervascularity with arterio-venous shunting and pooling of contrast giving a 'whorled' appearance. The 'arrows' indicate the abnormal area of circulation.

DISCUSSION

Tuberous Sclerosis is an inherited disorder of connective tissue development. Virtually any organ in the body can be affected by the abnormal development of tumours and cysts and all symptoms are secondary to this. In the classical form the sexes are affected equally, the onset of fits and mental retardation is noted in early childhood, and 75% of the patients are dead by the 20th year.

Involvement of the lung in Tuberous Sclerosis is extremely rare, accounting for 0.1 to 1.0% of all cases only. The unique features of pulmonary tuberous (Harris et al, 1969; Dwyer et al, 1971) sclerosis are, firstly, the marked female preponderance (84% of all reported cases were females); secondly, less than half the reported cases had neurological involvement; and thirdly, the onset of symptoms is in adulthood. No patients below the age of 20 years developed any symptoms and the average age of onset was 34 years. Most patients were dead five years from the onset of symptoms. Sixty percent of all such cases had evidence of a renal tumour as did our case. Twenty percent of these cases had no skin manifestations.

The pulmonary pathophysiology in Tuberous Sclerosis has been discussed by Harris et al, 1969. The combination of severe airway obstruction, air-trapping and impaired diffusion was demonstrated in our patient. The chest radiograph and renal angiogram were also consistent with the diagnosis. There was a suggestion that the calcium containing nodule in the left upper zone was a harmatoma though we were unable to confirm this. What probably clinched the diagnosis, was the open lung biopsy, as virtually no other condition gives a similar histological appearance.

In conclusion we would like to suggest that pulmonary tuberous sclerosis, although rare, should always be considered in the differential diagnosis of a "honeycomb lung", especially if there is evidence of multi-organ involvement. Pulmonary tuberous sclerosis has distinct features of its own and the nervous system and even the skin may be spared completely.

Postscript: This patient was first admitted in September 1976. She was then lost to follow-up and admitted again in August 1977 in terminal respiratory failure. She died a few days later and permission for postmortem was refused (not uncommon in this country where for cultural and religious reasons the body must be undefiled). The only change noted was in the ECG which now showed the typical pattern of right ventricular hypertrophy and strain. The course of her illness was thus consistent with other reported cases.

ACKNOWLEDGEMENTS

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