Microscopically the emboli in the heart and great vessels were found to consist entirely of tumour identical with that in the lung and adrenal glands (Fig. 3). The histological appearances were those of carcinoma of the adrenal cortex (Fig. 4).

Discussion

There have been several reports of death due to obstruction of the pulmonary arterial circulation by large tumour emboli. Some of these deaths occurred "spontaneously" in the absence of any operation upon the primary tumours (Table I). There have also been reports of cases in which death has resulted from massive neoplastic embolism involving the systemic arterial system (Table II).

TABLE I.—*Reports of Deaths Due to Pulmonary Neoplastic Embolism*

Authors	Site of Primary Growth	Relation of Death to Operation
Judd, E. S., and Scholl, A. J., 1924, <i>J. Amer. med. Ass.</i> , 82 , 75	Kidney	Half an hour after operation
Warren, S., 1931, <i>Amer. J. Path.</i> , 7 , 161	Chondrosarcoma of sacro-iliac joint	No operation save biopsy 44 months earlier. Death 8 days after first symptom of pulmonary embolism
Pettersson, G., 1941, <i>Acta chir. scand.</i> , 84 , 321	Kidney	During operation
Gordon-Taylor, G., and Wyndham, N. R., 1947, <i>Brit. J. Surg.</i> , 35 , 6	Testicle	Sudden death. No operation
Mimpriss, T. W., and Birt, St. J. M. C., 1949, <i>Brit. J. Surg.</i> , 36 , 429	Kidney	During operation
McLaren Todd, R., 1951, <i>Brit. J. Surg.</i> , 39 , 447	Adrenal cortex	Ten minutes after operation
Willis, R. A., 1952, <i>The Spread of Tumours in the Human Body</i> , 2nd ed., Butterworth, London	Round-cell sarcoma of thigh	No operation. Sudden death in an attack of acute dyspnoea
" "	Leiomyosarcoma of uterus	Sudden death a few weeks after hysterectomy
Masson, A. H. B., and Branwood, A. W., 1955, <i>British Medical Journal</i> , 1 , 1514	Kidney	During operation
Yates, H. B., 1955, <i>British Medical Journal</i> , 2 , 202	"	" "

TABLE II.—*Reports of Deaths Due to Systemic Neoplastic Embolism*

Author	Site of Primary Growth	Relation of Death to Operation	Site of Embolus
Thompson, T., and Evans, W., 1929, <i>Quart. J. Med.</i> , 23 , 135	Bilateral testicular teratomata	No operation. Death 5 days after onset of hemiplegia	Both coronary arteries, Right middle cerebral artery. Paradoxical embolism via patent foramen ovale
Eason, E. H., 1950, <i>J. Path. Bact.</i> , 62 , 454	Carcinoma of bronchus	48 hours after pneumonectomy	Right middle cerebral artery
Aylwin, J. A., 1951, <i>Thorax</i> , 6 , 250	Fibrosarcoma of back	5 hours after pneumonectomy for solitary metastasis, right lung	Aortic, bifurcation and coeliac artery
" "	Carcinoma of bronchus	10 hours after pneumonectomy	Right middle cerebral artery and right axillary artery
Loosemore, T. G. E., and Whittick, J. W., 1951, <i>J. Path. Bact.</i> , 63 , 133	Malignant synovium of knee	Death 24 hours after embolectomy. No operation for large pulmonary metastasis	Left axillary artery
Miller, A. A., and Jackson, F. B., 1954, <i>J. Path. Bact.</i> , 68 , 221	Myxosarcoma, left lung	No operation. Death 3 weeks after onset of hemiplegia	Right cerebral hemisphere

Aylwin (1951) stressed the fact that malignant tissue may be released into the circulation during resection of bronchial carcinoma, and urged early proximal ligation of the pulmonary veins to lessen this risk. In the case reported here a large intra-atrial projection of growth must have been present before operation. Ligation of the pulmonary veins close to the left atrium or resection of a small portion of atrial wall could not have prevented dislodgment of the intracardiac tumour extension. Inoperability could have been demonstrated only by the use of the best techniques of angiocardiology. An unusual feature was that pure tumour emboli were of sufficient size to cause death by obstructing the outflow from the left side of the heart.

I thank Mr. Dillwyn Thomas for permission to publish the case, and Dr. R. M. E. Seal for the pathological examinations. This case was mentioned briefly in a letter to the *British Medical Journal* (1955, **2**, 263), Tables I and II from which have been here amplified.

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CYSTIC DISEASE OF THE LUNGS

BY

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Since 1949, when nationalization brought increased diagnostic facilities, augmented in 1951 by the use of miniature mass radiography, a relatively high incidence of cystic disease of the lungs has been observed in this area. That the condition, although uncommon, is of significance will be seen from the degree of disability experienced in the cases here reviewed. Relatively little seems to be known about the cause, and although many cases have been reported, the mechanism of formation of persisting lung cysts is certainly still to be defined.

In a population of 132,000, 23 cases have been found, and 17 of these have been examined for the purposes of this survey.

History

The first case of cystic lung disease was described by Fontanus over three hundred years ago in a baby of 3 months (Bowden, 1948). Bartholinus recorded a case in 1687 (Levine, 1950). Levine also states that Koontz in 1925 collected 108 cases from European literature, less than 100 being true cases of cystic lung disease, and that Scherck in 1937 collected 381 cases—Wood adding 48 more seen at the Mayo Clinic. Liese recorded 400 in the same period. Liese's cases included some of those recorded by Schenck; the total number of cases was therefore about 600.

Levine thought that large cysts were the result of an early arrest in development, while extensive areas of multiloculated or uniloculated cysts pointed to a later arrest. Most investigators consider that the true congenital cyst is lined by a bronchial type of epithelium and that the presence of alveolar cells in the cyst wall indicates a non-congenital origin. Potts and Riker (1950) described a number of cases of cysts of the latter type following staphylococcal pneumonia, and state that these may resolve. On the other hand, Cooke and Blades (1952) divide congenital cysts into three main groups: bronchogenic cell type, solitary or multiple; alveolar cell type, solitary or multiple; and combined bronchogenic and alveolar types.

A number of reported cases have required pneumonectomy during the first few weeks of life. These cysts are

of the large balloon type, and impede respiration to a dangerous extent. Of the cysts which reveal themselves first at a later age, the majority are found in the mid-zones, and Adams (1947) points out that if these become infected the contents may spill over and lead to bronchiectasis in the lower lobes. Operation may then be ruled out because the area of involvement is thought to be too extensive, whereas removal of the cysts alone may cure the whole condition. The oldest patient mentioned is a man of 80 dying of a pontine haemorrhage (Bowden, 1948).

Present Investigation

The material has been drawn from the non-tuberculous registers of the chest clinics in the area, and no case of tuberculous origin or of extensive bronchiectasis with cystic changes has been included. This method of approach naturally does not give a complete survey of the population, but provides a rough index of the incidence of recognized cases. Patients have been referred to the chest clinics by general practitioners, by the M.M.R., and from hospitals. The age and sex incidence are shown in Table I.

TABLE I

Age	Males	Females	Age	Males	Females
1- years	1	—	40- years	4	—
10- "	1	—	50- "	2	—
20- "	3	—	60+ "	—	2
30- "	3	1			

Residence.—Fourteen have lived in West Cumberland for all, or nearly all, their lives. One started life in Northumberland, one in Durham, and one in Great Yarmouth.

Age at Onset of Symptoms.—It is difficult to be certain of the exact date of onset of symptoms in all cases, but nearly half gave a history as far back as the first year of life. Three were treated in sanatoria in childhood, presumably through misdiagnosis. Only one gave a history of contact with tuberculosis. Her brother had died of it. It was common to find considerable disruption of school life owing to recurrent respiratory infections. Disability varied, but was usually progressive. Some were able to take part in school games, and four at the time of the investigation still admitted no dyspnoea at all even after strenuous effort such as running upstairs or climbing Green Gable.

History of Work.—Dyspnoea and recurrent infections have been the chief reasons for giving up work. The mental outlook of these patients was in marked contrast to that of the average case of tuberculosis. They were free from depression and introspection even when their disease was grossly disabling.

Diagnosis.—The diagnosis was based on: (1) Radiological findings—both postero-anterior and lateral views of the chest. The lateral views are of great value, as the cysts are frequently located medially in the mid-zone. Characteristic changes are seen in many straight x-ray films, but in some cases tomographs are required to define the changes, and commonly one cut in the appropriate plane is sufficient. (2) A persistently negative sputum for *Mycobacterium tuberculosis* was required. (3) In the earlier stages there is relatively little toxæmia for the amount of cavitation seen on

the x-ray film. (4) There was a history of recurrent episodes of acute infection.

General Condition.—Nine of the patients looked ill. These were mostly in the older age groups, but they included the little boy of 8. If cachexia develops early the patient is also undersized. A well-marked case looks anxious—grey or sallow (one was livid)—and is extremely breathless.

Symptoms.—Cough was the commonest symptom (Table II). Apart from secondary infections there was nothing very distinctive about the cough, which was often very slight. In contradistinction to what is found in bronchiectasis, sputum was offensive in only two cases. Haemoptysis is rarely severe. Dyspnoea is a striking feature of the well-developed case. Although none of the 17 patients examined were bedridden, some could walk only a few steps on the level before becoming distressingly dyspnoeic, and even slight movement in dressing and undressing brought difficulty. Toxaemia was related to the extent of cystic changes and to chronic suppurative infection. A history of frequent colds was not given spontaneously, but was elicited in 11 instances after careful inquiry. Possibly the amount of ill-health experienced in early life has accustomed some to expect colds, and less notice than usual is taken of them and of feverish episodes. For the same reason recovery may be slower than usual without attracting the patient's attention to the fact. There was no evidence that pulmonary fibrosis and subsequent right-sided heart failure were associated with cystic lung disease. Only one case showed fibrosis, and here there was the complication of injury to the lung as well.

Signs.—Nine looked ill, as stated, and four showed clubbing of fingers. In seven the heart was displaced to one side and seven had a spinal curvature. In four this was a kyphoscoliosis and in three a scoliosis. Three had a flattening over the worse lung, and in two the trachea was displaced to one side. The spinal deformity was sometimes very great. The breath sounds were altered in eight, usually bronchial, but one or two had areas of weak breath sounds. There were ordinary adventitious sounds—that is, rales or rhonchi—in five cases, but in 11 the added sounds were in the nature of creaks. These are very distinctive sounds, usually loud, something like a pleural rub, but quite distinguishable from that. They are heard over the affected lobes or segments.

X-ray Findings.—Cysts were noted on both sides in 10 cases, in three on the left only—these were extensive. In the remaining four one side was definitely involved and the other doubtfully.

Treatment.—One patient had undergone radical treatment—that is, lobectomy—and had been much improved as a result. He was not cured, as cysts remained in the other lung, and he is being kept under observation. Of the others, one or two were very anxious to have operative treatment, but the difficulty was to find beds for non-tuberculous surgical cases. Many of the other cases were too far advanced or the patients were too old for radical treatment.

As more attention comes to be drawn to this condition it should be possible to undertake surgery at an earlier stage and prevent the serious disability that in time overtakes sufferers from this disease.

Palliative treatment with antibiotics tides a number of patients over their acute respiratory episodes, but life during the winter months has to be extremely sheltered for some of them.

Summary

Seventeen cases of cystic disease of the lung have been investigated in West Cumberland.

The patients were aged from 8 to 65, and many gave a history back to the first year of life.

TABLE II.—Symptoms

	Present	Absent
Cough	16	1
Sputum	15	2
	(2 were offensive)	
Haemoptysis	12	5
Dyspnoea	13	4
Pain in chest	11	4
Insomnia	7	10
Loss of appetite	6	11
Catarrh and colds	11	6

When fully established the disease is grossly disabling. Earlier recognition should lead to the more frequent use of surgery in appropriate cases.

ADDENDUM.—Since writing this account another patient has had operative treatment—a successful pneumonectomy. He was one of the three extensive left-sided cases.

My thanks are due to the Cumberland County Council for permission to undertake this work. I am indebted to Dr. R. Hambridge, chest physician to West Cumberland, for drawing my attention to these cases, advising me on this paper, and putting me in touch with the patients and their clinical and x-ray records.

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AN EPIDEMIC OF ACUTE BRONCHIOLITIS IN INFANCY

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During October, November, and December, 1953, 164 children under the age of 2 years were admitted to the Children's Hospital in Sunderland suffering from acute bronchiolitis. This number represents over 30% of all admissions under the age of 12 years for this period; many other cases were taken into the Hospital for Infectious Diseases and have not been included in this paper. The objects of this report are to record briefly the explosive nature of the outbreak, the clinical picture of the illness, the mortality, and one possible system of treatment.

Clinical Description

In most of the cases an adult in the family developed a cold. A few days later the infant began to show signs of upper respiratory infection with nasal obstruction and cough; there was little systemic upset at first, but after two to four days there was a sudden increase in the severity of the illness with the appearance of persistent distressing cough, wheezing, cyanosis, frothing at the mouth, and sometimes collapse. Often the baby was seen by his family doctor in the morning, when his symptoms and signs caused no particular alarm, and yet was admitted, acutely ill, on the same evening. The younger infants suffered the most severe illness and the highest mortality.

The clinical picture of the babies during the course of this illness showed certain constant features, although the severity of these features varied from case to case. It was thus possible to recognize the disease quite easily after the first few cases had been seen.

The baby was often restless and had a constant cough; this was hard and irritating, and would sometimes be so persistent that it was almost paroxysmal. The baby had a wheeze, and on watching the chest wall there could be seen retraction of the lower ribs on respiration. Some cyanosis was present, and often a fine froth was present on the lips.

Clinical examination usually showed a tachycardia—the faster the heart the more ill the baby. Rhonchi were present over both lungs and fine crepitations could be heard, usually at the lung bases but sometimes over the whole chest. A

prominent feature was often the very poor air entry at the lung bases, and unless the baby was crying, or in some other way taking deep breaths, the crepitations could be missed. In a few cases the spleen tip could be palpated. In the most severe cases, especially those that died, the liver would be noted to be enlarged and signs of heart failure would be superadded to the clinical picture.

This clinical picture of the acute stages was often maintained for three or four days, and then usually quite suddenly the patient seemed much better, but some bronchospasm would remain for several more days, and in certain babies this persisted for several weeks, although they were otherwise well. In the acute stages the baby was loath to take fluids and took a long time over small amounts. As the infant improved, the feeding returned to normal, and this in itself was of importance in assessing recovery.

Investigations

Radiographs of all the infants were taken and white blood cell counts were carried out. The Public Health Laboratory Service examined blood sera from a small number of cases during the acute and convalescent stages, but no rise in the titre of antibodies to the viruses of the two types of influenza, streptococcus MG, or psittacosis was found. No cold agglutinins were present, and examination of specimens which were frozen immediately after removal from the upper respiratory tract was unproductive. Radiographs constantly showed increased translucency at the lung bases and there were small areas of segmental collapse in 20% of cases, more commonly in the older babies. The total white blood cell count was in the region of 14,000 per c.mm. and there was no constant pattern in the differential count.

Mortality

The mortality was 6%, all 10 deaths being in infants under 1 year of age (see Table). Complications included diarrhoea in 10%, otitis media in 2%, and convulsions in

Age Group	Total	No. Requiring O ₂	Mortality
0-6 months ..	108	68 (60%)	8 (7%)
6 months-1 year ..	34	17 (51%)	2 (6%)
1-2 years ..	22	9 (42%)	0

1%. Relapse after apparent recovery occurred in 2.5%. The deaths seemed to be due to right-sided heart failure, and the necropsies which were carried out on four of the cases showed terminal bronchiolitis with areas of emphysema, collapse, and oedematous infiltration of a proportion of the alveoli; the heart was dilated and there was generalized venous congestion.

Treatment

Treatment was arbitrary, and to some extent standardized. Oxygen was the most important single factor, and 60% of cases were sufficiently cyanosed or distressed to warrant immediate nursing in "oxyginaire" tent or Queen Charlotte box. Although the disease appeared to be of virus origin, antibiotics were given to all cases to prevent superimposed bacterial infection. A combination of intramuscular penicillin in doses of 25,000 to 100,000 units six-hourly, to produce an immediate effect, and chlortetracycline 25 to 100 mg. six-hourly, by virtue of its broader spectrum, was used. Oxygen was rarely needed for more than four days, and the antibiotics could be stopped within the week in almost every case. Because the pressure on hospital accommodation was so great and the rate of relapse so low, some babies were returned home after four or five days, and these were given an additional prophylactic course of sulphadimidine after discharge. In the earliest stages, feeds of glucose-saline were given, and milk was introduced as soon as the infant showed signs of improvement. Cases were seldom in hospital for more than 14 days, most of them having to be discharged after a week to make room for others.