Pulmonary Alveolar Proteinosis

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This 38 year old white male was noted to have an abnormal chest x-ray in 1977. Pulmonary alveolar proteinosis was diagnosed by open lung biopsy. The patient was asymptomatic with normal physical examinations and stable chest x-rays from 1977 to 1979. Lavage was done in 1980.

A chest x-ray done in April 1982 is shown in Figure 1. Pulmonary function tests done in May 1982 showed a mild restrictive impairment. The DLCO was moderately reduced. These test results were significantly improved compared to the 1980 results.

The only complaint known at the time of last contact in 1983 was exertional dyspnea.

Discussion

Pulmonary alveolar proteinosis (P.A.P.) is a rare disease characterized pathologically by an intra alveolar, extra cellular accumulation of large quantities of lipo proteinaceous material with normally preserved inter alveolar septa. The etiology is unknown. Peak age of onset is between 30 and 50, though it occurs in all ages, even in children. There is a male:female ratio of 3:1.

The typical x-ray appearance is that of a bilateral, symmetrical, mottled, alveolar (acinar) infiltrate with a predilection for the central (perihilar) and basal lung fields resembling pulmonary edema, the so called butterfly pattern. Cardiomegaly, pleural effusion and hilar adenopathy are absent.

Variations have been described including patchy asymmetric consolidation, coarse interstitial reticular infiltrate and even total bilateral pulmonary consolidation. Resolution usually proceeds from the periphery toward the hilar regions. Less commonly central clearing occurs first.

The diagnosis is usually made by open lung biospy. Positive staining of the intra alveolar material by the periodic acid-Schiff method is considered characteristic enough to be diagnostic. Electron microscopy and lipid composition studies suggest the material is in part pulmonary surfactant. This surfactant differs, however, from normal surfactant in that it lacks the usual surface active properties.[1] The material accumulates in response to an unknown stimulus, either from increased secretion and disintegration of Type II pneumocytes, or a defect in clearance.[2] Studies suggest the latter pathway is more probable. Pulmonary macrophage function may be defective in patients with P.A.P.[3,4] The intra alveolar proteinaceous material may hinder the migration of macrophages. This is suggested, though not proven, by the fact that at the time of initial lavage (or tissue section), relatively few macrophages are seen, whereas a greater than normal number can be seen on lavage from areas that had been lavaged a week earlier.[3] One theory suggests that "pulmonary injury" in a genetically susceptible person leads to exudation, diminished clearance and surfactant accumulation impairing macrophage function resulting in a vicious cycle.

Two types of P.A.P. have been described, the primary or idiopathic variety, and secondary alveolar proteinosis associated with conditions such as leukemia, lymphoma, acute silicosis and pneumocystis carinii infections. Both show similar staining properties with periodic acid-Schiff. However, an antibody to surfactant specific apoprotein has been prepared and when used to stain the intra alveolar material, differences between the two types are apparent.[3]

The condition usually presents insidiously with dyspnea and cough. Pulmonary function studies show a restrictive abnormality and diminished DLCO. A striking disparity may exist between extensive x-ray abnormalities and minimal clinical symptoms. Blood gas studies show hypoxia and LDH levels are often elevated.

The course of the disease is variable. Mortality statistics are hard to come by. It is estimated that if untreated, about 25% of patients have resolution of their disease, some 20% have stable disease, and the rest either partially resolve, or progress.[1] In 1965, a mortality of 30% was reported.[5] This, however, was before the use of whole lung lavage. After lavage, lung function improves dramatically. Recurrence is not predictable. Selicky reported on 12 lavaged patients followed for 5 months to 10 years.[5] Most (7 patients) remained asymptomatic after one lavage. Five patients required repeated

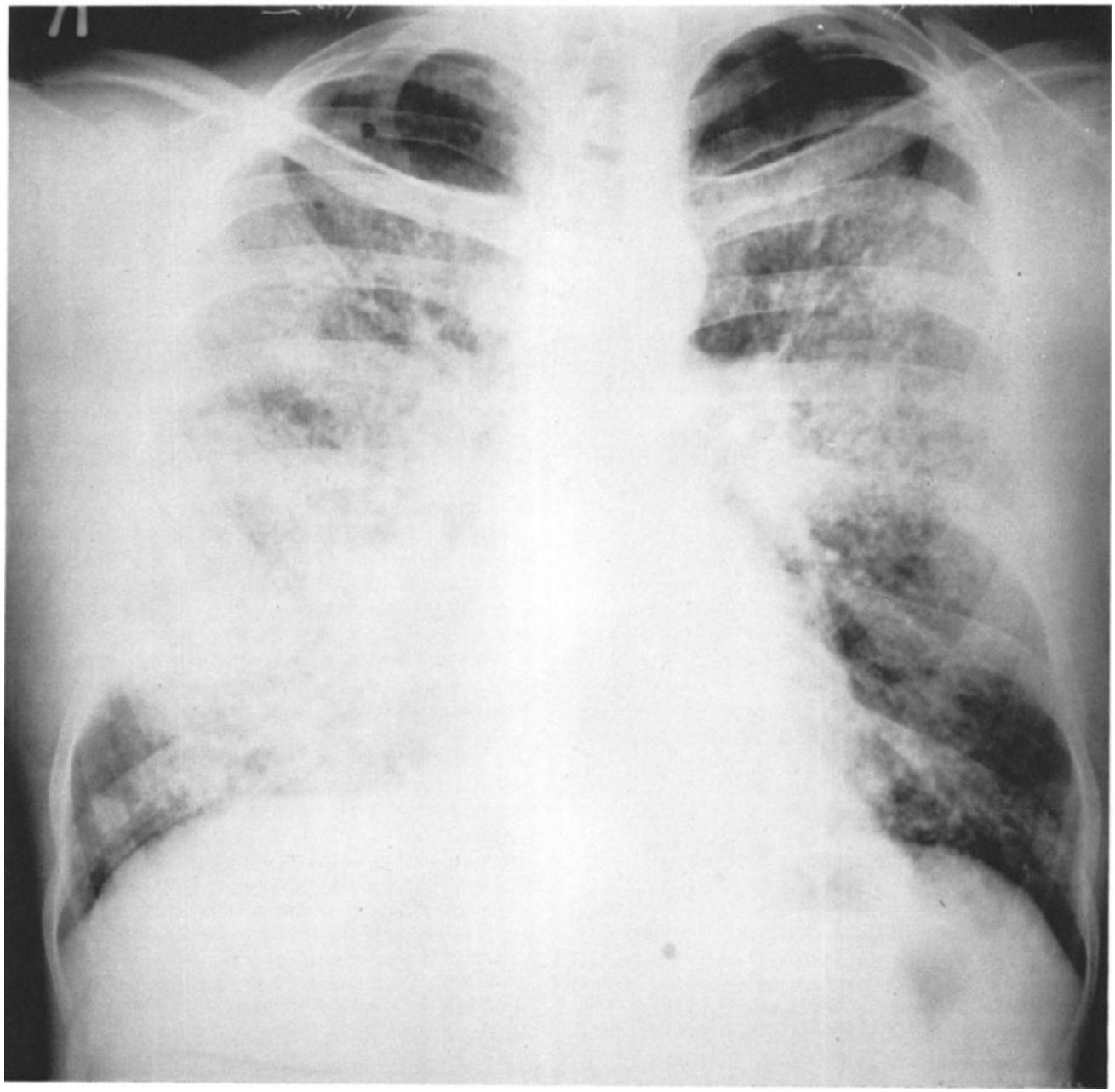

Figure 1

lavages at varying intervals. In these latter five patients, initial recurrence was noted within one year. But, symptom free periods of up to five years after one repeat lavage have also been reported.[5]

References

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