

Extrinsic allergic alveolitis: a disease commoner in non-smokers

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Warren, C. P. W. (1977). *Thorax*, 32, 567-569. **Extrinsic allergic alveolitis: a disease commoner in non-smokers.** The smoking habits of 18 patients with extrinsic allergic alveolitis, 22 with cryptogenic fibrosing alveolitis, and 75 patients with sarcoidosis were compared with the smoking habits of the normal population of the Prairie Region for 1973. The patients were diagnosed at the same two hospitals over the four-year period November 1971-75 and were of comparable age. Non-smoking was significantly associated with allergic alveolitis in men and the three cases in women were all non-smokers. For the other two diseases, smoking habits were similar to those of the local population.

Extrinsic allergic alveolitis is one of many causes of pulmonary alveolar fibrosis (Scadding, 1974). The disease is the result of an over zealous immune response to inhaled antigens. During studies of lung mechanics in allergic alveolitis I noticed that most patients were non-smokers (Warren *et al.*, 1975), and this contrasted sharply with other causes of pulmonary alveolar fibrosis studied locally (Ostrow and Cherniack, 1973). The smoking habits of patients with pulmonary alveolar fibrosis were therefore examined.

Material and methods

PATIENTS

Patients with extrinsic allergic alveolitis, cryptogenic alveolitis, and sarcoidosis attending the Health Science Center and St. Boniface General Hospital, the University of Manitoba teaching hospitals, were chosen. The smoking habits of all patients with these diagnoses seen between November 1971 and November 1975 in the same age range as those with allergic alveolitis were examined.

Eighteen patients with extrinsic allergic alveolitis were seen, three females and 15 males with an age range of 15 to 64 years. Thirteen were farmers and the other five were, respectively, housewife, secretary, teacher, businessman, and pilot. Eleven had farmer's lung and seven bird fancier's lung, precipitating antibodies to appropriate antigens being demonstrated in the serum

of each. All the subjects were non-atopic. Lung function tests demonstrated restricted lung volumes and reduced carbon monoxide transfer in all, and 16 had abnormal chest radiographs with reticulonodular infiltrates at the onset of their illness. Five patients had lung biopsy with appropriate histological findings for the disease. Seven patients were challenged with the appropriate antigen and developed the typical late pulmonary reaction of allergic alveolitis.

Twenty-two patients aged 15 to 64 years with cryptogenic fibrosing alveolitis were included. All patients had shortness of breath, basal crepitations on auscultation, and lower zone reticulonodular infiltrates on the chest radiograph. All had evidence of restricted lung volumes. None was a farmer or known to have been exposed to birds. Lung biopsy in 13 patients had shown appropriate histological changes (Scadding and Hinson, 1967).

Seventy-five patients, also in the age range 15-64 years, in whom sarcoidosis had been diagnosed and with compatible histology (Mitchell and Scadding, 1974) on lymph node or liver biopsy were included. Twelve were farmers but their disease did not relate historically to mouldy hay exposure, and precipitins were not detected in the serum of seven examined.

Smoking histories

The smoking histories of all patients were obtained either personally or from hospital and lung function laboratory records, crosschecking where

possible. For the purpose of this study the following definitions were used: non-smoker—never smoked cigarettes, pipe, or cigars; ex-smoker—stopped smoking cigarettes, pipe, or cigars more than one month before the symptomatic onset of the illness under study; smoker—currently smokes cigarettes, pipe, or cigar or stopped less than one month before the symptomatic onset of the illness.

The smoking habits of men and women in the Prairie Region for 1973 were obtained from a random sample in the same age range by the Department of Health and Welfare, Canada (1973). These were used to represent the habits of the normal local population. One hundred farmers, with whatever diagnosis aged 15 to 64 years, entering hospital consecutively were questioned on their smoking habits.

Results

The smoking habits of all the patients aged 15 to 64 years are shown in Table 1 for men and in Table 2 for women. They are divided by disease category—allergic alveolitis, cryptogenic fibrosing alveolitis, and sarcoidosis, and the number of smokers, ex-smokers, and non-smokers in each group is given. Below are shown the numbers of men and women in each smoking category for the same age range in the Prairie Region and for male farmers admitted to hospital. The mean age and standard deviation of each group of patients are given. The ratio of smokers, ex-smokers, and non-

smokers in each disease was compared, using a Chi-squared analysis, with the ratio of these habits in the local population and farmers admitted to hospital. For men with extrinsic allergic alveolitis smoking habits differed significantly ($P < 0.05$) from those of men with the other two diseases combined, and the proportion of non-smokers in the allergic alveolitis group is significantly greater ($P < 0.05$) than in the local population or farmers admitted to hospital with other diseases. All women with allergic alveolitis were non-smokers, but the number was too small for the significance to be assessed.

Discussion

It appears from this study of hospital admissions in Winnipeg that smoking is an uncommon habit in patients with allergic alveolitis.

In the literature of extrinsic allergic alveolitis non-smokers predominate in those papers in which smoking habits are recorded (Hapke *et al.*, 1968; Schlueter *et al.*, 1969; Schofield *et al.*, 1976). Studies of the prevalence of precipitating antibodies against *Micropolyspora faeni* in farmers have shown that they are detected significantly more often in non-smokers than in smokers (Morgan *et al.*, 1975).

Smoking hinders the deposition of coal dust in the lung (Gough, 1960). Smoking hastens the clearance of inhaled particles from the lung (Albert *et al.*, 1975). Smoking also interferes with

Table 1 Smoking habits of men patients with extrinsic allergic alveolitis, cryptogenic fibrosing alveolitis, and sarcoidosis compared with the male Prairie population (random sample) and 100 farmers admitted consecutively to hospital (age range 15–64): mean age and standard deviation, number of men in each smoking category, and percentage of non-smokers

	Age (mean \pm standard deviation)	Smokers	Ex-smokers	Non-smokers	Percent of non-smokers
Extrinsic allergic alveolitis	39.9 \pm 15.3	2	2	11	73
Cryptogenic fibrosing alveolitis	46.6 \pm 13.3	5	3	4	33
Sarcoidosis	40.8 \pm 12.3	22	7	15	34
Farming patients	43.6 \pm 14.2	38	20	42	42
Prairie population 1973		604	169	499	39

Table 2 Smoking habits of women patients with extrinsic allergic alveolitis, cryptogenic fibrosing alveolitis, and sarcoidosis compared with female Prairie population (random sample, age range 15–64): mean age and standard deviation, number of women in each smoking category, and percentage of non-smokers

	Age (mean \pm standard deviation)	Smokers	Ex-smokers	Non-smokers	Percent of non-smokers
Extrinsic allergic alveolitis	50.3 \pm 10	0	0	3	100
Cryptogenic fibrosing alveolitis	44.8 \pm 14.8	4	1	5	50
Sarcoidosis	43.6 \pm 13.3	9	7	15	48
Prairie population 1973		406	92	679	57

the immune responses of the lung at several levels—pulmonary macrophages (Harris *et al.*, 1975), antibody formation (Thomas *et al.*, 1973), and T and B cell actions (Roszman *et al.*, 1975).

Thus there is evidence from patient studies and from the epidemiological prevalence of serum antibodies associated with farmer's lung that extrinsic allergic alveolitis occurs more often in non-smokers. Whether this is due to the effects of smoking on particle handling or the immune response in the lung is unknown.

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