

Table 1.—Distribution of Asbestos Bodies in Lung Smears According to Age and Sex

Age	Males			Females			Both Sexes		
	Positive	Negative	Total	Positive	Negative	Total	Positive	Negative	Total
15-24	...	6	6	...	3	3	...	9	9
25-34	4	1	5	1	...	1	5	1	6
35-44	3	6	9	3	1	4	6	7	13
45-54	2	1	3	1	4	5	3	5	8
55-64	9	6	15	4	5	9	13	11	24
65-74	3	5	8	5	7	12	8	12	20
Over 74	4	3	7	2	11	13	6	14	20
Total	25	28	53	16	31	47	41	59	100
%	47%	53%	100%	34%	66%	100%	41%	59%	100%

cases, 53 men and 47 women, ranging in age from 17 to 91 years. Twelve subjects were Negroes. The occupation of the women was given as housewife in most cases, those of the men ranged from manual workers to executives. In no case was any connection established with manufacture of asbestos products, although the occupations were taken from the charts, and neither the patients nor their families were questioned directly. The presence of the asbestos bodies was determined by the use of lung smears² taken from the upper and lower lobes of both lungs (four slides from each case). The smears were obtained by an incision into the lung tissue from which a small quantity of blood or edematous fluid was expressed onto a glass slide and spread evenly over an area approximately 12 sq cm. The slides were air-dried and mounted without staining. In each slide approximately 400 low-power (16-mm objective) fields were examined, and the total number of asbestos bodies was registered. Some smears were stained for iron (Pearls reaction) which colored the iron-containing protein globules blue. Routine histological sections of unexpanded lungs stained with hematoxylin and eosin were also examined in all cases.

Results

The problem of absolute identification of asbestos in asbestos bodies is a difficult one, and to our knowledge no successful histochemical procedure has been devised. Chemical examination of lung tissues for acid insoluble residues yields a value for total silica that might represent asbestos or other silicates. No chemical determinations were done in these cases. An attempt was made to identify the element silicon in asbestos bodies (from a known case of asbestosis) by electron probe analysis. Although iron was readily identified, no silicon was encountered.³ The bodies seen in talcosis are identical to those in asbestosis and are thought to be the result of contamination with tremolite, another fibrous silicate. It is possible that the bodies seen in our material are associated with tremolite. With the above limitations in mind, the term asbestos body is used here to mean the typical segmented, iron-encrusted structure known to be associated with clinical and experimental asbestosis.

Asbestos bodies were found in 41 of the 100 subjects. The incidence of positive cases was higher in men, 47%, than in women, 34%. Up to the age

of 24 years (six persons) no asbestos bodies were encountered. These data are summarized in Table 1. Considering the age groups separately, the highest relative incidence of positive cases was found between 25 to 34 years as compared with any other age group (Fig 1). Since these are all relatively small groups the significance of the differences is doubtful.

Positive cases were more frequent among manual workers than among professional and administrative occupations. The number of Negro subjects was only 12, but in seven subjects asbestos bodies were encountered.

In the majority of the positive cases, one to ten asbestos bodies were found (Table 2). The maximum number of 473 was counted in a male subject, aged 63 years, whose occupation was a sales engineer for a pump company. However, no particular importance can be attached to the actual frequency of the asbestos bodies encountered in each case because the concentration of the bodies depends on the site from which the smear is taken and on the amount of edema and congestion in the lung at the time of death.⁴ In this investigation samples were not taken specifically from the basal portions of each lobe, where the number has been reported to be highest, but from random sites.

In the lung smears, asbestos bodies were readily recognized, because of their typical orange-brown color and segmented appearance (Fig 2). They were often partly enclosed by macrophages. Only those cases with typical bodies such as seen in Fig 2 were accepted as positive. In some positive and some negative cases, atypical elongated structures were seen, but these were not considered as asbestos bodies. In 24 positive cases, some macrophages

Table 2.—Number of Asbestos Bodies Found in Positive Cases*

No. of Asbestos Bodies	Males	Females	Total
1	7	6	13
2-10	14	6	20
11-20	1	2	3
29	1	...	1
36	...	1	1
41	...	1	1
51	1	...	1
473	1	...	1
Total	25	16	41

*1,600 low power fields examined in each case.