

Brief Report



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Lung Cancer Cell Type and Asbestos Exposure

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• It is often claimed that adenocarcinoma is the most frequent type of lung cancer seen in workers exposed to asbestos. Careful review of the published data, however, fails to support this claim. Rather, it seems that all types of lung cancers occur in asbestos workers, and the presence or absence of a specific cell type cannot be used to prove or disprove an association of carcinoma and asbestos exposure.

(JAMA 1985;253:2984-2985)

VIRTUALLY every review article or textbook dealing with the area of occupational lung disease includes the statement that adenocarcinoma is the most common type of lung cancer found in those with asbestos exposure.^{1,2} This notion is so widespread and often repeated that the presence or absence of this specific type of tumor has become a frequent legal argument when a worker claims that exposure to asbestos caused his lung cancer.

It is instructive to assemble the data on which this statement is based. Table 1 gives the results of eight reports providing information on lung cancer cell type in 471 patients with asbestos exposure. The first three reports³⁻⁵ specifically deal with patients with asbestosis, and the others seem to have some proportion of patients with asbestosis mixed in. For comparison, I have arbitrarily picked a large series of patients with

lung cancers from the Veterans Administration⁶ to serve as controls; even casual observation indicates that, overall, the asbestos-exposed group has fewer adenocarcinomas and more small-cell and squamous carcinomas than do the controls.

Because it can be argued that the chosen control group was not an appropriate match, Table 2 details

five series that have internal controls. The report by Whitwell et al⁷ is the one most frequently cited as showing the preponderance of adenocarcinomas (35% of the total number of lung carcinomas). Using the comparison data provided in the same article, however, there is actually no statistical difference between the asbestos-exposed and control patients. None of the other studies have a preponderance of adenocarcinomas, and, in fact, the series of Martischniig et al⁸ and Blot (cited in Ives et al⁹) are rather heavily skewed toward squamous carcinomas.

These data demonstrate that squamous carcinomas accounted for 43% of the total 410 tumors, small-cell

Table 1.—Lung Cancer Cell Type in Eight Series of Patients With Asbestos Exposure

Reported Patient Series, N	Cell Types, No. (%)			
	Squamous Carcinoma	Small-Cell Carcinoma	Adenocarcinoma	Large-Cell Carcinoma*
Asbestos-Exposed				
Hourihan and McCaughey, ³ 28	7 (27)	5 (18)	12 (46)	2 (8)
Whitwell et al, ⁷ 93	21 (23)	26 (28)	33 (35)	13 (14)
Hess et al, ⁴ 12	4 (33)	2 (16)	6 (50)	0 (0)
Kannerstein and Churg, ⁵ 39	11 (30)	11 (30)	11 (30)	6 (10)
Martischniig et al, ⁸ 40	26 (53)	22 (46)	1 (2)	0 (0)
Finkelstein, ⁹ 23	9 (39)	7 (30)	6 (26)	1 (4)
Blot (cited by Ives et al), ⁹ 301	24 (67)	7 (19)	5 (14)	0 (0)
Auerbach et al, ¹⁰ 193	96 (50)	48 (25)	29 (15)	20 (10)
Total, 471	198 (42)	128 (27)	103 (22)	42 (9)
Nonexposed				
Cox and Yeager, ⁶ (1968-1977), 812	213 (35)	143 (23)	158 (26)	103 (17)
Cox and Yeager ¹¹ (1968-1977), 400	123 (31)	82 (21)	129 (32)	66 (17)

*Reports that do not use large-cell carcinoma have had this category counted as zero.

†Based on death certificates.

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carcinomas for 28%, adenocarcinomas for 19%, and large-cell carcinomas for 10%. There is no significant difference between the asbestos-exposed and control patients for adenocarcinomas or large-cell carcinomas, but squamous carcinomas are statistically less frequent and small-cell carcinomas statistically more frequent in the asbestos-exposed group.

There are some cautions that should be exercised in interpreting the data just cited. Uncertainty arises from the arbitrary fashion in which pathologists subclassify lung can-

cers.^{16,17,18} Also, most of the series are quite small, so that only a few changed diagnoses could alter the proportion of the tumor types. There is also a mix of surgical and autopsy cases, a factor that definitely influences the apparent proportion of cell types.^{16,18} Nonetheless, it appears that there is no real evidence for a preponderance of adenocarcinomas in those with asbestos exposure; rather one can conclude that all histological types of lung cancer occur in these workers and that cell type cannot be used as an argument for or against

the involvement of asbestos in a given case.

References

1. Becklake MR: Asbestos-related diseases of the lung and other organs: Their epidemiology and implications for clinical practice. *Am Rev Respir Dis* 1976;114:187-227.
2. Parkes WR: *Occupational Lung Disorders*, ed 2. London, Butterworths, 1982.
3. Medical Advisory Panel to the Asbestos International Association: Criteria for the diagnosis of asbestosis and considerations in the attribution of lung cancer and mesothelioma to asbestos exposure. *Int Arch Occup Environ Health* 1982;49:357-361.
4. Hourihane DO'B, McCaughey WTE: Pathological aspects of asbestosis. *Postgrad Med J* 1968;42:613-622.
5. Whitwell F, Newhouse ML, Bennett DR: A study of the histological types of lung cancer in workers suffering from asbestosis in the United Kingdom. *Br J Ind Med* 1974;31:298-303.
6. Hasan FM, Nash G, Kazemi H: Asbestos exposure and related neoplasia. *Am J Med* 1978;65:649-654.
7. Kannerstein M, Churg J: Pathology of carcinoma of the lung associated with asbestos exposure. *Cancer* 1972;30:14-21.
8. Martischnig KM, Newell DJ, Barnsley WC, et al: Unsuspected exposure to asbestos and bronchogenic carcinoma. *Br Med J* 1977;1:748-749.
9. Finkelstein MM: Asbestosis in long-term employees of an Ontario asbestos-cement factory. *Am Rev Respir Dis* 1982;125:496-501.
10. Ives JC, Buffer PA, Greenberg D: Environmental associations and histopathologic patterns of carcinoma of the lung. *Am Rev Respir Dis* 1983;128:195-209.
11. Auerbach O, Garfinkel L, Parks VR, et al: Histologic type of lung cancer and asbestos exposure. *Cancer* 1984;54:3017-3021.
12. Cox JD, Yesner RA: Adenocarcinoma of the lung: Recent results from the Veterans Administration Lung Group. *Am Rev Respir Dis* 1979;120:1025-1029.
13. Feinstein AR, Gelfman NA, Yesner R, et al: Observer variability in the diagnosis of lung cancer. *Am Rev Respir Dis* 1970;101:671-678.
14. Yesner R: Observer variability and reliability in lung cancer diagnosis. *Cancer Chemother Rep* 1973;4(pt 3):55-57.

Table 2.—Lung Cancer Cell Type in Reports With Asbestos-Exposed Workers and Internal Controls

Reported Series, No.	Squamous Carcinoma	Small-Cell Carcinoma	Adeno- carcinoma	Large-Cell Carcinoma*
Kannerstein and Churg				
Exposed, 36	12 (33)	11 (31)	11 (31)	6 (16)
Control, 43	12 (28)	14 (33)	9 (21)	8 (19)
Whitwell et al ⁵				
Exposed, 93	21 (23)	26 (28)	33 (35)	13 (14)
Control, 96	17 (18)	35 (40)	29 (30)	12 (13)
Martischnig et al ⁸				
Exposed, 48	26 (54)	22 (46)	1 (2)	0 (0)
Control, 112	77 (68)	27 (24)	6 (7)	0 (0)
Auerbach et al ¹¹				
Exposed, 193	98 (51)	48 (25)	29 (15)	20 (10)
Control, 648	336 (52)	102 (16)	122 (19)	89 (14)
Slut (cited by Ives et al ¹⁰)†				
Exposed, 36	24 (67)	7 (19)	5 (14)	0 (0)
Control, 181	103 (57)	27 (15)	31 (17)	0 (0)
Total				
Exposed, 410	178 (43)	114 (28)	79 (19)	39 (10)
Control, 1,060	544 (51)	206 (20)	199 (19)	109 (10)

*Reports that do not use large-cell carcinoma have had this category counted as zero.
†Based on death certificates.