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DYNAMICS OF ASBESTOSIS AND ASBESTOTUBERCULOSIS AND CERTAIN FACTORS WHICH DETERMINE IT

F. M. Kogan, et al

Foreign Technology Division
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Block	Italic	Transliteration	Block	Italic	Transliteration
А а	*А а*	A, a	Р р	*Р р*	R, r
Б б	*Б б*	B, b	С с	*С с*	S, s
В в	*В в*	V, v	Т т	*Т т*	T, t
Г г	*Г г*	G, g	У у	*У у*	U, u
Д д	*Д д*	D, d	Ф ф	*Ф ф*	F, f
Е е	*Е е*	Ye, ye; E, e*	Х х	*Х х*	Kh, kh
Ж ж	*Ж ж*	Zh, zh	Ц ц	*Ц ц*	Ts, ts
З з	*З з*	Z, z	Ч ч	*Ч ч*	Ch, ch
И и	*И и*	I, i	Ш ш	*Ш ш*	Sh, sh
Й й	*Й й*	Y, y	Щ щ	*Щ щ*	Shch, shch
К к	*К к*	K, k	Ъ ъ	*Ъ ъ*	"
Л л	*Л л*	L, l	Ы ы	*Ы ы*	Y, y
М м	*М м*	M, m	Ь ь	*Ь ь*	'
Н н	*Н н*	N, n	Э э	*Э э*	E, e
О о	*О о*	O, o	Ю ю	*Ю ю*	Yu, yu
П п	*П п*	P, p	Я я	*Я я*	Ya, ya

* ye initially, after vowels, and after ъ, ь; e elsewhere. When written as ё in Russian, transliterate as yё or ë. The use of diacritical marks is preferred, but such marks may be omitted when expediency dictates.

DYNAMICS OF ASBESTOSIS AND ASBESTOTUBERCULOSIS AND CERTAIN FACTORS WHICH DETERMINE IT

F. M. Kogan, K. A. Mokronosova, N. A. Gusel'nikova, M. R. Gulevskaya, G. I. Bunimovich, and T. D. Andreyeva (Sverdlovsk)

Institute of Industrial Health and Occupational Diseases, Medical and Sanitary Section of the "Uralasbest" Combine

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In sclerogenic pneumoconioses with asbestosis the most unfavorable course was observed in the post-dust period (M. A. Kovnatskiy, K. P. Molokanov, and co-authors, A.V. Greenberg and T. V. Orlova, et al.). However, these data are based on a relatively small number of observations and over short periods. Furthermore, the role of individual factors which affect the dynamics of the process is unclear (Anspach, Cartier, Champeix et al.). In view of this, materials were developed for a dynamic observation carried out at the Medical and Sanitary Section [MSS] of the "Uralasbest" Combine from 1947 to 1969 on 390 individuals afflicted with uncomplicated asbestosis (of these 40 are suspected of having asbestosis) and 50 individuals afflicted with asbestotuberculosis. The initial diagnosis was confirmed at the Sverdlovsk Institute of Industrial Health and Occupational Diseases.

Due to the fact that the workers afflicted with asbestosis were placed on pension, either due to age or for some other reasons, a dynamic observation of some was terminated at various times after the diagnosis. Therefore, it was not until 1969 that a large group of the afflicted (160 people) were subjected to a thorough clinical x-ray study, i.e., after a prolonged interruption in the observation period (in the majority of cases, over 10 years).

The intensification of the inherent fibrotic process (a transition from one stage to another) or the development of lung tuberculosis in addition to the previously uncomplicated asbestosis were the disease progression index. Of the 40 people suspected of asbestosis, 39 who continued to work under the conditions of dust have developed asbestosis of the I stage; 37 people developed it over a period of 5 years of observation; and 2 - after 6-10 years. Along with the progressive fibrosis, 4 people developed tuberculosis of the lungs.

Of the 314 people afflicted with asbestosis of the I stage, 61 people (19.4%) had progressive fibrosis and 25 (8.6%) - tuberculosis complication. In 7 cases the progressive fibrosis was associated with the development of lung tuberculosis. In the majority of individuals (70.3%) the progression was detected in the first 5 years after the diagnosis; in 23.2% - after 6-10 years and in 7.5% - after more than 10 years. In 4.6% of the cases the asbestosis of the I stage was complicated by interstitial pneumonia.

Of the 36 afflicted with asbestosis of the II stage, 9 (25%) had progressive fibrotic changes and 4 (11.1%) developed a complication of lung tuberculosis. In the 69.2% of the cases the progression was observed in the first 5 years after the diagnosis and only in 30.8% - during the next 5 years. Asbestosis of the II stage was complicated by interstitial pneumonia in the 8.3% of the cases. Seventeen of the 50 afflicted (34%) had progressive asbestotuberculosis.

In the majority suffering from asbestosis (about 60%), changes on the part of the heart muscle were observed (myocardidystrophy). It is manifested clinically in the form of dullness of heart tones and intensified dyspnea. The in-depth studies of the heart's functional state (T. D. Andreyeva, I. D. Bakhireva, B. M. Stolbun et. al.) have revealed a number of deviations in the bio-electrical activity of the myocardium, its contractile function. There are reasons to assume that hypoxia is the basis of these heart muscle changes, caused by diffuse peribronchial and peri-vascular fibrosis which is characteristic of asbestosis. They are more pronounced with asbestosis than with other progressive forms of pneuomoconioses, for example, silicosis.

The majority of the afflicted worked in asbestos enrichment plants, while a considerably smaller number worked mining for the asbestos ores, incidently, prior to 1955. At that time, all phases of asbestos enrichment were associated with the continuous effect of high dust concentrations (average values of 100-500 mg/m^3 and higher); in the pits the dust content was lower and varied from 3.2 to 114 mg/m^3, in this case its effect was not constant. During the last 20 years a complex of dust-removing measures was instituted which accounted for a decrease in air dust, especially at the asbestos-enriching plants: in 1957-1961 the dust concentration was from 10.1 to 22.7 mg/m^3, in 1964-1967 - from 9.1 to 14.6 mg/m^3.

The effect of "dust load" on the subsequent dynamics of asbestosis of the I stage (Table 1) is clearly visible when we compare the indicators of frequency of progression of the fibrotic process itself and lung tuberculosis complications of workers who work at the pits and asbestos-enrichment plants. As seen from Table 1, in those who worked primarily before 1955 asbestosis of the I stage progressed certainly more often than in those who worked mostly after 1955. This fact again illustrates the positive effect of the instituted health measures. Almost all individuals suffering from asbestosis of the II stage worked at the enrichment

plants prior to 1955; furthermore, among these, the percent of individuals in which the disease progressed is higher than in those suffering from asbestosis of the I stage.

Table 1. Dynamics of uncomplicated asbestosis depending on the "dust load" which preceded the illness.

Стадия асбестоза (a)	«Пылевая нагрузка» (b)	Число больных (c)	Число лиц с прогрессированием болезни (d)		Число лиц с прогрессированием фиброза (e)		Число лиц с осложнением туберкулезом легких (f)	
			abs	%	abs	%	abs	%
(g)	Участок работы:							
	обогатительные фабрики	290	77	26,5*	59	20,3*	25	8,6
	карьеры	24	2	8,3*	2	8,3*	—	—
(h)	Периоды работы до выявления:							
	преимущественно до 1955 г.	283	78	27,5*	60	21,2*	24	8,4
	преимущественно после 1955 г.	31	1	3,2*	1	3,2*	1	3,2
(g)	Участок работы:							
	обогатительные фабрики	34	12	35,3	8	23,5	4	11,8
	карьеры	2	1	—	1	—	—	—
(h)	Период работы до выявления:							
II	преимущественно до 1955 г.	35	13	37,1	9	25,7	4	11,4
	преимущественно после 1955 г.	1	—	—	—	—	—	—

Note: By the "principal" working period (prior to 1955 or after 1955) we means the situation at which over 50% of the "dust" period pertains to one or another period. The asterisk denotes the differences between the indices which are statistically reliable ($P < 0.05$).

KEY: (a) Stage of asbestosis; (b) "Dust load"; (c) Number of afflicted; (d) Number of individuals with progressive disease; (e) Number of individuals with progressive fibrosis; (f) Number of individuals with lung tuberculosis complication; (g) Area of work: enrichment plants pits; (h) Time before disease was detected: principally before 1955, principally after 1955.

Among those afflicted with asbestosis of the I stage the highest rate of progression was observed in individuals with up to 10 years of tenure (Table 2). The unfavorable course of the silicosis which has developed relatively early was reported by many authors (D. M. Zislin and co-authors, O. A. Pavlova and co-authors, Ahlmark and co-authors, Mautner et al.). Evidently, this is also valid with respect to asbestosis of the I stage. Among the individuals with asbestosis of the II stage, the disease

progressed relatively more frequently in workers with over 16 years of tenure; incidently, the difference in frequencies is statistically unreliable.

Table 2. Dynamics of uncomplicated asbestosis depending on the working period under dust conditions which preceded the onset of illness.

Стадия асбестоза (a)	Стаж работы (b)	Число больных (c)	Число лиц с прогрессированием болезни (d)		Число лиц с прогрессированием фиброза (e)		Число лиц с осложнением туберкулезом легких (f)	
			abs	%	abs	%	abs	%
I (g)	До 10 лет (а)	108	32	29,6*	23	21,3	14	12,9*
	11—15 » (б)	94	27	28,7	21	22,3	7	7,4
	16 лет и более (в)	112	20	17,8*	17	15,1	4	3,6*
II (g)	До 10 лет (а)	7	2	28,5	2	28,5	—	—
	11—15 » (б)	11	2	18,1	2	18,1	—	—
	16 лет и более (в)	18	9	50,0	5	27,7	4	2,2

KEY: (a) Stage of asbestosis; (b) Period of work; (c) Number of afflicted; (d) Number of individuals with progressive disease; (e) Number of individuals with progressive fibrosis; (f) Number of individuals with lung tuberculosis complication; (g) under 10 yrs (a), 11-15 yrs (b) 16 yrs and over (c).

*The differences between groups a and b are reliable.

We did not detect any significant differences in the dynamics of asbestosis with respect to age at which the afflicted started to work under the effect of dust and also the age when the disease was detected.

Of the 314 afflicted with asbestosis of the I stage only 80 were removed from the place of work (were given easier jobs without the effect of dust) or stopped working immediately after the disease was diagnosed; 234 afflicted continued to work under the same conditions (and 97 of these never left); 137 individuals were removed from the job or left it 2-10 years after it was recommended that they change jobs; of the number afflicted with asbestosis of the II stage only 9 were removed from the job rationally or stopped working immediately.

As seen from Table 3, in those afflicted with asbestosis of the I stage who continued to work under dust conditions the progressive process was observed more than twice as often as in those removed from the job immediately after asbestosis was detected.

Table 3. Dynamics of uncomplicated asbestosis depending on the timely removal from the job.

(a) Стадия асбестоза	(b) Трудоустройство	(c) Число больных	(d) Число лиц с прогрессированием болезни		(e) Число лиц с прогрессированием фиброза		(f) Число лиц с осложнением туберкулезом	
			abs	%	abs	%	abs	%
(g)	Продолжали работу в пылевых условиях (а)	97	33	34,0*	28	28,8*	10	10,3
(h)	Трудоустроены, но оставили работу с запозданием (б)	137	34	24,8	24	17,5	10	7,3
(i)	Обе группы (в)	234	67	28,6*+	52	22,2+	20	8,5
(j)	Трудоустроены, оставили работу сразу (г)	80	12	15,0*+	9	11,2*+	5	6,2
(g)	Продолжали работу в пылевых условиях (а)	11	3	27,2	2	18,1	1	9,1
(h)	Трудоустроены, но оставили работу с запозданием (б)	16	7	43,7	5	31,2	2	12,5
(i)	Обе группы (в)	27	10	37,0	7	25,9	3	11,1
(j)	Трудоустроены, оставили работу сразу (г)	9	3	33,3	2	22,2	1	11,1

Note: The differences between the groups a-d* and c-d(+) are statistically reliable (P = 0.05).

KEY: (a) Stage of asbestosis; (b) Removal from job; (c) Number of afflicted; (d) Number of individuals with progressive disease; (e) Number of individuals with progressive fibrosis; (f) Number of individuals with tuberculosis complication; (g) Continued to work under dust conditions (a); (h) Were removed from the job but did not leave work immediately (b); (i) Both groups (c); (j) Were removed from work and left the job immediately (d).

Conclusions: 1. Progressive fibrosis or tuberculosis complication was observed in all individuals suspected of asbestosis, in 25.1% afflicted with asbestosis of the I stage and in 36.1% afflicted with asbestosis of the II stage; asbesto-tuberculosis was progressive in 34% of the observed. The process occurred principally during the first 5 years after the disease was detected

2. The progression rate of asbestosis of the I stage is more than 3 times higher in those working at the asbestos-enrichment plants than among those working in pits and 8 times higher among those who worked mostly before the dust-removing measures were implemented as compared with those who began to work after the dust in the air was reduced considerably.

3. In those afflicted with asbestosis of the I stage, acquired during the dust period of less than 10 years, the progressive process was observed certainly more often as compared with those who worked longer under the dust conditions.

4. Among those afflicted with asbestosis of the I stage who were rationally removed from jobs and who stopped working immediately the disease was diagnosed, the frequency of progressive disease was certainly lower than in those who continued to work under dust conditions and 1.6 times lower than in those not immediately removed from work.

BIBLIOGRAPHY

Андреева Т. Д. В кн.: Вопросы гигиены труда, профпатологии, промышленной токсикологии. Свердловск, 1957, т. 2, с. 501. — Бахирева Н. Д. Материалы к оценке сократительной функции миокарда при силикозе и асбестозе. Дисс. канд. Свердловск, 1967. — Гринберг А. В., Орлова Т. В. Вестн. рентгенол и радиологии, 1961, № 5, с. 16. В кн.: Материалы научной сессии Ленинградск. ин-та гигиены труда и профзаболеваний, посвящ. итогам работы ин-та за 1959—1960 гг. Л., 1961, с. 83. — Зиселин Д. М., Тюшнякова Н. В. В кн.: Вопросы гигиены, физиологии труда, профпатологии, промышленной токсикологии. Свердловск, 1961, т. 6, с. 32. — Ковнацкий М. А. В кн.: Экспертиза трудоспособности и трудоустройство инвалидов. Л., 1940, с. 166. — Молоканов К. П. и др. В кн.: Вопросы экспертизы трудоспособности при профессиональных заболеваниях. М., 1957, с. 37. — Павлова О. А. и др. В кн.: Вопросы пневмокониоза. Киев, 1963, с. 60. — Столбун Б. М. Легочное сердце при пневмокониозах (Клинико-физиол. характеристика). Дисс. докт. Свердловск, 1970. — Ahlmark A. et al. В кн.: Proceedings 13-th International. Congress Occupational Health. New-York, 1961, p. 653. — Cartier P., Arch. Industr. Hlth., 1955, v. 11, p. 204. — Mautner B., Pracov. Lek., 1967, T. 19, c. 74.