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Asbestos fibres released from thermic cloths: a true occupational hazard

Anna Maria Loi, Pier Luigi Paggiaro, Nadi Serretti, Fabrizio Franco,

Giovanni Viegi, Enrico Begliomini.

Loi AM, Paggiaro PL, Serretti N, Franco F, Viegi G, Begliomini E. Occupational exposure to asbestos fibres liberated from thermic cloths. G Ital Med Lav 1982; 4: 117 - 120. The authors point out the possibility that asbestosis can be detected or almost suspected in workers exposed to asbestos fibres released from thermic curtains or clothes in various industrial environments. They report the case of seven workers of a metallurgic plant; these workers had been exposed to a such kind of risk and showed, from 10 to 23 years later, a radiological appearance of interstitial fibrosis with a sligth or moderate respiratory impairment.

There are several reports that some overalls and thermic curtains of industrial use can release asbestos fibres in the environment (1, 3). Their concentration in the air varies from 0.3 to 26 fibres/ml, depending on the kind of tissues and from working conditions. However, asbestosis cannot easily be detected at this level of occupational exposure.

We report here some results obtained in a routine examination of a group of workers employed in a metallurgic plant in Massa (Italy). Ever since 1960 asbestos curtains were used to avoid a too rapid cooling of the welding and to protect the welders. In 1976 they were substituted by similar clothes made up with vitrous wool. When we began the plant revision and medical examination of the workers, we could not verify which kind of asbestos had been employed, but we knew from the workers examined that the environmental fibres were of white colour and their mean concentration in the plant was about 15 fibres/ml with a length above 5μ.

Material and methods

The factory production concerned hand-manifactured articles of big size for the chemical and petrolchemical industry. Dust level was not available at the moment of medical examination (1979), which was our concern. The working men were 736 and they were employed in several jobs such as calendering, welding, grinding and gathering, so that most evidence of occupational risk was given to metallic fumes, noise and radiant heat.

This paper refers about clinical findings of a group of workers (49 men) that had been exposed to asbestos fibres before the asbestos curtains and overalls were avoi-



Fig. 1 — Posteroanterior roentgenogram (a) and magnified view of the right lower lobe (b) of C.D. (case n. 3 of the Table). Interstitial reticulation is evident in the lower lung fields. Hila appear slightly enlarged and increased in density, showing an irregular contour. C Kerley lines are also present in the right mid-lower lung

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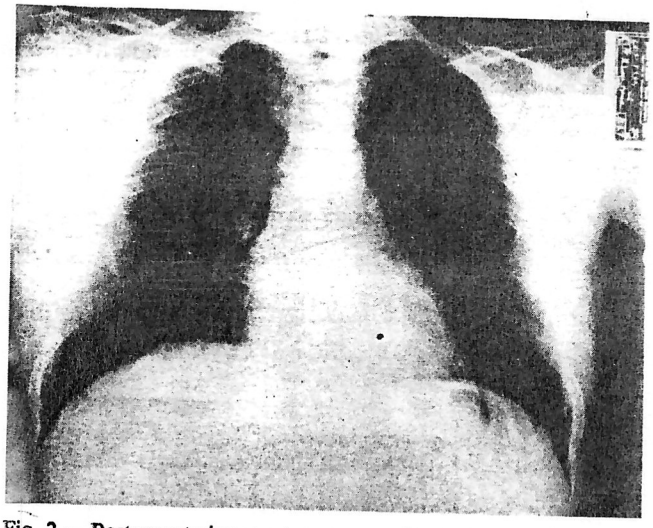


Fig. 2 — Posteroanterior roentgenogram of L.F. (case n. 5 of the Table). This chest film reveals an interstitial design of reticular pattern in both peripheral lung fields, more evident in the right zones, where some nodular shodows can be observed

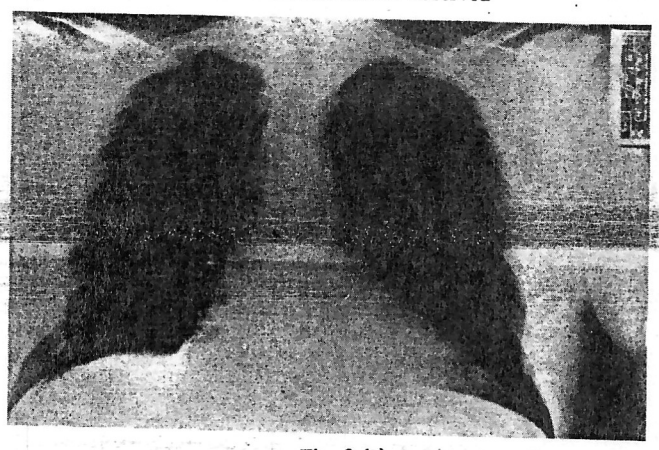


Fig. 3 (a)

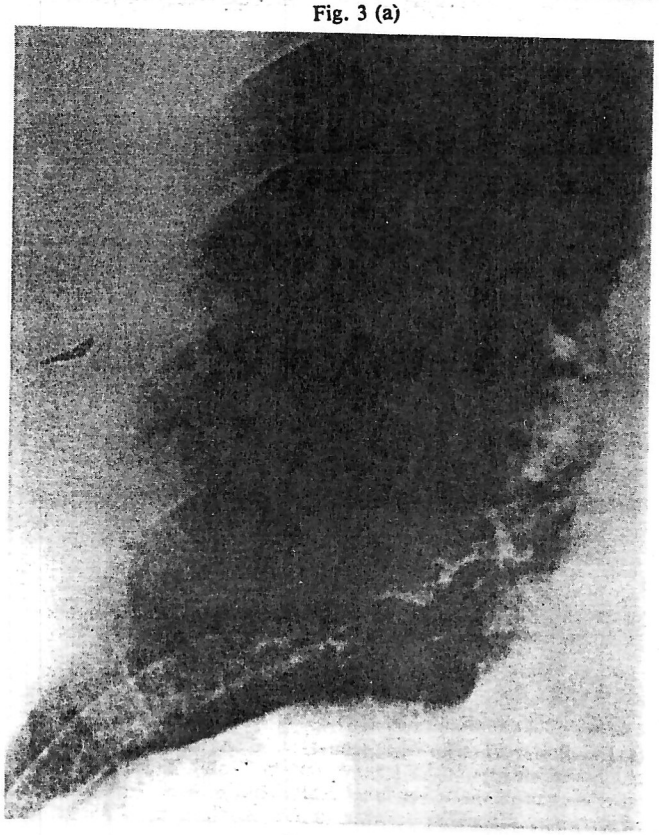


Fig. 3 (b)



Fig. 3 — Posterosanterior roentgenogram (a) and magnified views of the right (b) and left (c) lower lung fields of S.A. (case n. 6 of the Table). Cardiac and hilar shadows appear moderately enlarged with an irregular and blurred contour. Interstitial network shows a reticular pattern in basal and peripheral regions in both sides. Some micronodular opacities are also evident. The right hemidiaphragm contour is slightly irregular and ill defined. A pleural thickening is present in both sides near the costophrenic angle

ded. All 49 men underwent the following examinations: CECA questionnaire for chronic bronchitis, chest radiograph, medical examination, tests of ventilatory function with a wedge spirometer.

Seven out of 49 men having a radiological appearance of interstitial fibrosis were subsequently examinated for arterial blood gasanalysis and diffusion lung test by means of CO transfert test ($DLCO_{SB}$ and $DLCO_{SS}$). For one out of 7 men a chest radiograph of 3 years earlier was also available.

Results and discussion

Chronic bronchitis, according with CECA questionnaire, was present in 11 out of 49 workers (22%). In 16 out of 49 men the questionnaire was positive for other symptoms different from chronic bronchitis and in 22 was negative.

Chest radiograph was normal in 27 workers; in 15 men there were various abnormalities as cardiomegaly, marked bronchovascular design, hilar enlargment and

TAB. I - *Age, risk exposure and respiratory findings of 7 workers with radiological appearance of interstitial fibrosis*

	Age yr	Exp. time yr	VC	FEV_1	FEF_{25-75}	pO_2	pCO_2	pH	$DLCO_{SB}$	$DLCO_{SS_2}$
				% predicted		mmHg	mmHg	—	% predicted	
1) B.A.	51	23	103	109	110	68	37	7.39	77	97
2) B.R.	37	19	92	93	88	—	—	—	69	77
3) C.D.	45	17	81	91	90	70	36	7.40	65	60
4) G.P.	43	18	77	84	100	76	39	7.40	63	69
5) L.F.	29	10	77	87	120	65	35	7.41	74	78
6) S.A.	35	19	80	74	62	65	35	7.41	70	71
7) V.A.	36	17	89	93	77	65	38	7.43	67	66

• Predicted values from CECA and Morris et al.[4]
= Predicted values from Cotes and Hall[5] for $DLCO_{SB}$ and Bates et al.[6] for $DLCO_{SS_2}$

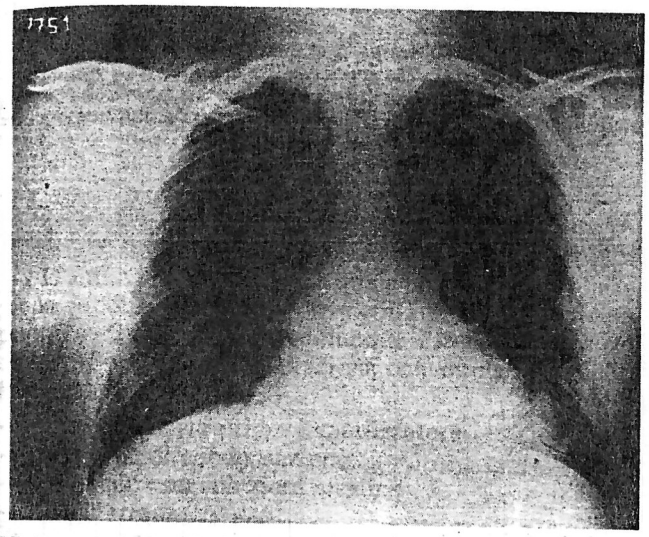


Fig. 4 — Chest film of the same worker of Fig. 3, three years before. Interstitial markings and pleural thickenings were less evident, but cardiac and hilar abnormalities were already present

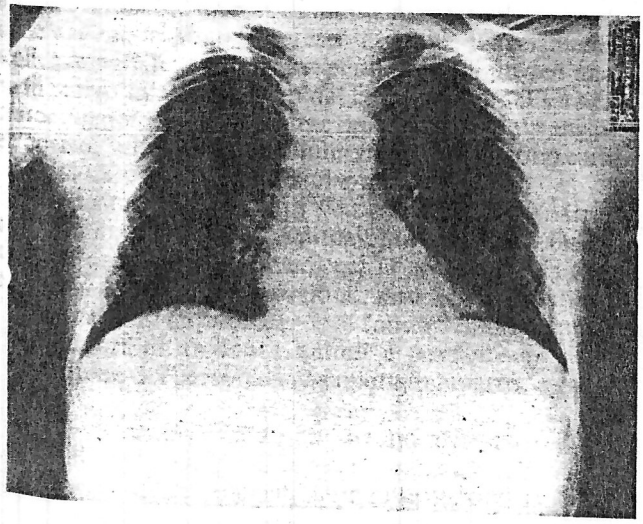


Fig. 5 — Posteroanterior roentgenogram of V.A. (case n. 7 of the Table). Here also an interstitial network of reticular pattern is present. In both lung peripheral zones micronodular opacities are evident with a "pin head" aspect. Hila appear increased in size and density

emphysema. Chest films of the 7 workers with an interstitial involvement of the lung are reported in Fig. 1-5.

Medical examination of the 49 workers gave a few alterations. In several workers (5 out of 49) fine basilar rales were present and in 15 pleural frictions were also found.

In Table I are reported the results of ventilatory function, blood gasanalysis and diffusion test of the 7 men with a radiological appearance of interstitial fibrosis. We can see that VC was slightly reduced in 2; pO_2 was abnormally low in 6, one worker did not undergo the examination. Diffusion lung test was alterated in all 7 men with the $DLCO_{SB}$ and in 6 men with $DLCO_{SS_2}$ was considered.

The mean age of the workers was 39.5 years (range: 29-51 years) and all had an exposure time of 10 or more years.

These data of respiratory impairment and radiological appearance of interstitial involvement suggested that asbestosis can be detected or almost suspected in many industrial exposures, even when the risk is neglected in the course of routine environmental survey.

In effect occupational exposure to asbestos fibres liberated from thermic clothes is rarely reported, but it can be easily detected in many industrial environments and we think that it may represent a true risk of pneumoconiosis.

Loi AM, Paggiaro PL, Serretti N, Franco F, Viegi G, Begliomini. Fibre di asbesto liberate da teli termici : un vero rischio professionale. G Ital Med Lav 1982; 4: 117 - 120. Gli autori riferiscono la possibilità di riscontrare o almeno di sospettare la presenza di asbestosi in lavoratori esposti a fibre di asbesto che si liberano da coperture o indumenti termici utilizzati in vari settori industriali. Si riportano i casi di sette lavoratori di un impianto metallurgico che erano stati esposti in passato ad un rischio di questo tipo e che, 10-23 anni più tardi mostravano una fibrosi interstiziale radiologicamente evidente, accompagnata da una lieve compromissione della funzione respiratoria.

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