

THE RELATIONSHIP BETWEEN ASBESTOS BODIES, SERUM IMMUNOGLOBULIN LEVELS AND X-RAY CHANGES IN ASBESTOS WORKERS

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Several authors have pointed to the immunological disorders which are the result of the fibrogenous effect of asbestos dust; this is a well-known phenomenon on which quite a few references exist.^{1,4,5}

This is why we wanted to establish the possible relationship between the X-ray changes, the number of asbestos bodies and the level of serum immunoglobulins in a group of asbestos workers.

MATERIAL AND METHODS

Out of 79 workers of the asbestos section in the factory for asbestos-cement products, 52 persons were studied. The examined workers were divided into three groups: Group 1 of the workers directly exposed to asbestos, with radiographic changes suggesting asbestosis, Group 2 of the workers also directly exposed to asbestos but without X-ray changes, and Group 3 of the workers who were not directly involved in the process of production. The lungs and the pleura of all the examined workers were x-rayed in PA projection. In all the studied workers the presence of asbestos bodies in the sputum was determined. The immunological status is concerned with the evaluation of the serum immunoglobulin levels (IgG, M, A) on RID plates.

For the evaluation of the results obtained adequate statistical methods χ^2 test and Student t-test were applied.

RESULTS AND DISCUSSION

In all the studied workers (fifty-two of them) the presence of asbestos bodies in the sputum was determined, on the native microscopic slide. Their number varied from 1 of 2 to over 20 within one field of vision. Most of them, as much as 36 of them had one to five asbestos bodies in a single (one) field of vision.

The statistical analysis pointed to the fact that there is no statistically significant difference between the groups with respect to the number of asbestos bodies in the sputum. Also, the statistical evaluation proved that there is no significant difference between the workers with radiographic (X-ray) changes suggesting asbestosis and those with normal radiographic findings (groups 2 and 3) with respect to the number of asbestos bodies.

This is an additional proof that the presence of asbestos bodies in the sputum is just a verification of a person's exposure to asbestos.

As far as the immunological status is concerned, with the evaluation of the level of the three classes of immunoglobulins: IgG, IgM and IgA, we obtained the following results:

In Group 1 (11 workers) workers with radiographic changes suggesting asbestosis, with respect to the immunoglobulin type G in 10 persons the level of the serum IgG was above normal and in one worker it was within normal. On one worker only belonging to this group the level of IgM was higher, and also, in one worker only the level of IgA was lower.

In group 2, including workers directly exposed to asbestos, while without radiographic changes, that is 34 of them, in two persons higher level of IgG was determined, in one person the level of IgM was lower and in two workers the level of IgA was higher.

In Group 3, which included workers in the asbestos section of the factory who were not directly exposed to asbestos dust, the level of IgG in all workers was within normal, the level of IgM was lower in one worker, the level of IgA was higher in one worker, and in one worker the level of this type of immunoglobulin was lower.

In the process of the evaluation of the immunological status of the examined workers, the mean value of the three classes of serum immunoglobulins was calculated, as well as the significance of the differences in the mean values among individuals, previously selected, workers.

As part of the statistic evaluation of the obtained results, the significance of the differences in the mean values of particular classes of immunoglobulins were also determined in separate groups of workers.

The Student t-test showed a statistically significant difference in the mean values of IgG between Group 1 and Group 2, Group 2 and Group 3, and Group 1 and Group 3.

With respect to the M and A type of immunoglobulins, no statistically important difference in the mean values was determined either.

Since we have not noticed any significant deviations in the level of IgM and IgA, neither in the groups nor in the individuals, our research concerning the relationship among the number of asbestos bodies, radiographic changes suggesting pneumoconiosis and the immunological status has

been reduced to the relationship between asbestos bodies radiographic changes and the IgG type.

The χ^2 test did not point to any statistically significant difference between workers with an increased level of IgG and those with normal or decreased level of this type of Ig in serum, all this of course with respect to the number of asbestos bodies.

This statistic evaluation indicated that there is a statistically important number of workers with radiographic changes in whom the level of IgG is increased, if compared to the number of workers without pneumoconiosis.

Numerous studies point to immunological disorders that are directly or indirectly connected with exposure to asbestos.^{1,2}

Pernis in his research suggested that these immunological changes pointed to the fact that asbestosis, similar to silicosis included in its pathomechanisms immunological reactions as well.⁴

The slow destruction of macrophages can be suspected as a factor contributing to pneumofibrosis.³ It is believed that

the very same mechanism causes immunological disorders in persons exposed to asbestos.

CONCLUSION

No connection between asbestos bodies in sputum, radiographic changes and the immunological status in the studied workers has been established. The obtained results indicated the statistically important increase in the level of IgG in Group 1, compared to Group 2, as well as to Group 3. There is a significantly larger number of workers with radiographic changes suggesting asbestosis, in whom the level of IgG is above normal.

REFERENCES

1. El-Sewefy, A. Z., Fasan, F.: Imunolectrophoretic pattern changes in asbestosis, *Ann. Occup. Hyg.* 14:25-29 (1971)
2. Lange, A., et. al.: Autoantibodies and Serum Immunoglobulin Levels in Asbestos Workers. *Int. Arch. Arbeitsmed.* 32:313-321 (1974)
3. Parazzi, E., et al.: Studies on "in vitro" cytotoxicity of asbestos dust, *Med. Lav.* 59:561-566 (1968)
4. Pernis, B.: Silicosis, In: A.P. Miescher/Eds., *Textbook of immunopathology*, Sect. II: Clinical immunopathology, Vol. I, pp. 293-301. Grune and Stratton, New York-London (1968).
5. Turner-Warwick, M. Doniach D.: Auto-antibody studies in interstitial pulmonary fibrosis. *Brit. Med. J.* 1:886-893 (1965).

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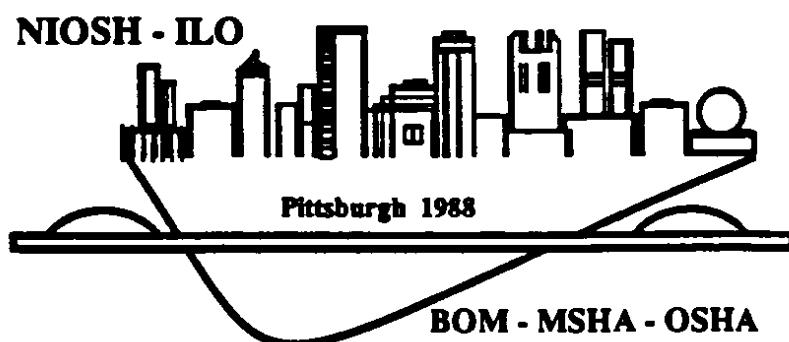
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