The literature dealing with industrial carbon disulfide (CS$_2$) toxicology describes polymorphous hazards to health. The picture of CS$_2$-poisoning consists in a chronic insidious, usually mild impairment of metabolism and psychological, neurological and endocrinologic functions.

The first observations of pancreatic alterations in animals poisoned with CS$_2$ go back to 1934$^1$. Furthermore, other Italian workers assessed the frequency of diabetes among workers professionally exposed to CS$_2$$^2,6,7,10$. However, some studies failed to show any alteration of carbohydrate metabolism$^8,11$. More recently, the prednisolone glucose tolerance test was carried out$^9$, which indicated decreased glucose tolerance in the CS$_2$-exposed group. Finally, a higher prevalence of abnormal triamcinolone glucose tolerance test was shown in 19 CS$_2$-exposed workers, but no reference group was studied$^{15}$.

MATERIALS AND METHODS

Sixty-six unselected male CS$_2$-exposed workers of a rayon viscose factory, whose ages ranged from 25 to 67 (mean 44.3) were individually matched with 66 never exposed subjects aged 22 to 70 (mean 44.4). Age ($\pm$ 3 years), height ($\pm$ 5 cm), weight ($\pm$ 4 kg), and place of birth (northern or southern Italy) formed the criteria for matching. Controls and CS$_2$-exposed workers had a negative history for familial diabetes.

Key-words: Carbon disulfide; Glucose tolerance test; Latent diabetes; Viscosa rayon factory.

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GLUCOSE TOLERANCE AND CS₂ EXPOSURE

An individual exposure index was assessed by calculating the total length of service (in years) multiplied by an exposure coefficient derived from the extent of the working site hazard.

The oral cortisone glucose tolerance test (OCGTT) was performed as stated by Fajans and Conn. Blood glucose was tested by the enzymatic method.

Statistical significance was evaluated by the χ² method and by the t-test.

RESULTS

Results are listed in tabs 1, 2 and 3, and in fig. 1.

In the CS₂-exposed group, fasting blood glucose values were significantly higher than in the control group; also 30-, 60- and 120-min after glucose load blood sugar values were significantly higher among CS₂-exposed subjects (p<0.001) (tab. 1 and fig. 1).

In tab. 2 percentage frequency of abnormal OCGTT is analyzed. Abnormal OCGTTs were found in 48 CS₂-exposed subjects (72.7%): the difference between these prevalences was significant (p<0.001).

Table 3 shows a significant correlation between exposure index and blood glucose, and no correlation between the length of exposure and blood glucose; furthermore, no correlation was found between age of both groups and blood glucose levels. There is evidence of a trend for prevalence of abnormal OCGTT to increase with both the intensity and duration of exposure, but not with age.

DISCUSSION

The results confirm the diabetogenic action of CS₂. The mean blood glucose levels both fasting and after glucose load and the prevalence of abnormal OCGTT

Fig. 1 - Blood glucose levels (mean ± SEM) during oral glucose tolerance test in controls and in CS₂ exposed workers.