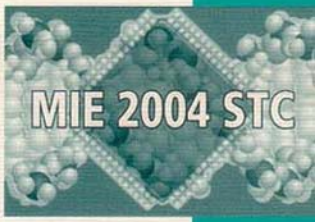

Bernd Blobel, Günther Gell,
Claudia Hildebrand, Rolf Engelbrecht (Eds.)

Contribution of Medical Informatics to Health

Integrated Clinical Data and Knowledge to Support Primary, Secondary, Tertiary Home Care

**Proceedings of the
European Federation for Medical Informatics
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Medical and hygienic aspects of aging and rehabilitation of information technologies utilization in health care

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Introduction

The work of medical personnel is distinguished by a much wider spectrum of adverse and dangerous factors of the complex computer equipment compared ordinary computer work. It is more intensive, and the personnel works under specific conditions where it is subjected not only to the radiation from the monitor's Cathode-Ray Tube (CRT), keyboard [1], but to other harmful factors as well [2]. Over the last decade one of the key trends in the hygiene was to investigate the reactions of the biological systems to the adverse factors and revealed general mechanisms and regularities of these reactions. But there are no criteria for evaluating the initial manifestations of the effect of these factors. The information on the influence of the set of adverse factors accompanying the work with complex computer equipment on the POL and AOS processes is scarce [3, 4], incomplete and scattered. This makes it impossible to evaluate the mutual relation of disturbances in this system.

Methods/ Methodologies

The present investigations should concentrate on studying the mechanism of aging on the level of cells and molecules. We have investigated the immune status, antibodies to the antigens of the thyroid gland, the hormonal status, the peroxidation of lipids. The variations in the processes of peroxidation of lipids (POL) and antioxidation system (AOS) are an important pathological factor, that have a high informative value on the investigation of the functional state of the free-radical oxidation system of lipids for detecting the disturbances of cell and tissue homeostasis when evaluating the biological effect of adverse low-intensity factors of physical nature characteristic for working with computers .

Results

The investigations have revealed substantial disturbances in the course of the POL processes and the state of general antioxidant activity of the blood serum of the users. Special attention deserves our results of biochemical investigations revealing the dependence of the changes in POL and AOS processes on the subject's age. We have detected a substantial (1.5 to 2 times the check values) increase in free-radical oxidation of lipids on the background of progressing suppression of antioxidant defence with the user's age. This can indicate accelerated aging of the organism caused by the damaging effect of lipid peroxides on the DNA synthesis, structure and function. We have conducted advanced investigation of the system of antioxidant defence of the users simultaneously to the investigation of all POL stages using both enzymatic (glutationperoxidase, catalase) and non-enzymatic (reduced glytation, cerulonadmin) links, including vitamins E and C. On the basis of these results the methods of pathogenetic correction (vitaminization) of revealed disorders in the POL and AOS systems have been developed. So, the analysis of the resulted data allows to conclude, that immune system, undoubtedly, is very sensitive to action of factors of the physical nature, formed by videodisplay terminals (VDT) that is especially important for a substantiation concrete levels of VDT radiations by development of guiding normative documents, limiting harmful influence on health of medical workers - VDT users. Regulating normative documents have been created and predicated [5, 6].

Discussion of factors for success & failure

The most significant conclusions first obtained are: 1.On the tendency of the immune status to develop autoimmune processes confirmed by the presence of antibodies to the antigens of the thyroid gland; 2. On the misbalance of the hormonal status; 3.On the disturbance of peroxidation of lipids in the users of the complex computer equipment, which indicates premature aging of their organisms. In recent years more and more attention has been paid to the biomedical gerontology. It is possible to ascertain, regretfully, that medical establishments are not paying sufficient attention to this problem. It is important, that a complex of protective and rehabilitation actions, which have to be carried out by the medical personnel working with computer equipment, is fixed legislatively and that the performance of fixed rules is supervised.

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