

CLINICAL CRITERIONS FOR BIODOSIMETRY AT WORKERS EXPOSED TO LOW DOSES OF IONIZING RADIATIONS

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In the course of routine general examination of workers who work under the circumstances of exposition to the low doses of ionizing radiations,15 of them with clinical indications were underwent to chromosome aberrations analyze,such as 64 workers without any clinical indications.In the first group there were 40.6% of subjects with increased frequency of chromosome aberrations,against the only 7.5% in the second group.Considering the kind of the ionizing source,it could be noticed the higher frequency of chromosome aberrations at nuclear medicine workers (27.7%),against the workers exposed to the sealed sources (9.8%).According to our results we consider the justification of clinical indications for chromosome aberrations analyze,as the very specific biodosimetric procedure.

INTRODUCTION

Chromosome aberrations analyze is of particular importance for estimation of ionizing radiations absorbed doses during the accidents (1).For the professional exposition,chromosome aberrations analyze has qualitative nature (confirming the effects of some radiation dose),and it is the case of possible irradiation indicated by medical criterions and biodosimetric data (2).Clinical criterions are decisive for further biodosimetric investigations during the general health examination of workers exposed to ionizing radiation.In the most cases it is appearance of presenile incipient bilateral cataract or some malignoma.More often there are present nonspecific discomfords,such as exhaustion,fatigue,headache,bad appetite for food all followed by some hematological disorders.Almost,it is always leucopenia with inverse leucocyte ratio,persisting hypochromic anemia,isolated thrombocytopenia and sometimes the immunodeficiency,all mentioned above without any other etiology.

Among the others indicators of chromosome aberrations,it is also personal dosimetry data showing the exceeding of annual (monthly) limit dose of radiation for professionals.Clinical criterions are completed with data about the kind of ionizing source and the time of professional exposition.

RESULTS

Based at the clinical criterions,15 subjects were underwent to chromosome aberrations analyze.All of them showed the most of the nonspecific discomfords,10 subjects had leucopenia (4 of them less than $4 \times 10^9/L$),and

5 of them (50%) had relative leucopenia followed by lymphocytosis. Only 1 person had presenile incipient cataract. There were no cases of malignant disease. The time of professional exposition was between 5 and 15 years.

Among these 15 subjects, there were 5 of them who showed dicentric chromosome (200 cells in the first in vitro partition by one subjects were analyzed), and 2 persons showing chromatide interchanges and triradials. The next 2 persons showed acentric fragments (within allowed limits for professionals considering the annual and monthly maximal dose). In this group, there were 40.6% of subjects with increased frequency for chromosome aberrations.

The chromosome aberrations analyze was performed at second group of 64 workers during the general health examination with no clinical indications. There were found dicentric chromosomes at 4 subjects (6.0%), only one person (1.5%) showed chromatide interchanges, and 10 persons (15.6%) had acentric fragments. In this group, there were 7.5% of subjects with increased frequency for chromosome aberrations.

If the both analyzed groups would be considered according to the ionizing radiation source (see table 1), the significantly higher frequency of chromosome aberrations (27.7%) could be noticed at the group of nuclear medicine workers, against to the workers exposed to sealed source of ionizing radiation (with similar time of exposition and working operations), showing the 9.8% of persons with increased frequency for chromosome aberrations.

CHROMOSOMAL ABERRATIONS AT THE GROUP OF PROFESSIONALS EXPOSED TO SMALL DOSES OF IONIZING RADIATION				
	number of cases analyzed	with dicentrics	with chromatide interchanges	with other aberrations
professionals selected by medical indications	18	5 (33%)	2 (10.6%)	2 (10.6%)
professionals in the course of routine examination	64	4 (6.%)	1 (1.5%)	10 (15.6%)
professionals exposed to radionuclides	18	2 (11.1%)	3 (16.6%)	3 (16.6%)
professionals exposed to sealed sources	61	6 (9.8%)	/	11 (18%)

TABLE 1

CONCLUSION

According to our results, it could be emphasized the role of well selected clinical indications by experienced clinician, as the very important indicator for performing complex biological tests (in this case it is chromosome aberrations analyze). This attitude needs to be supported by more strictly and continuous biodosimetric supervision at subjects exposed to small doses from opened source of ionizing radiations.

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