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Study of cytogenetic changes in lymphocytes of peripheral blood of patients with osteosarcoma

D. Polatova, **K. Abdikarimov**, M. Gikdiyeva, U. Islamov, S. Urunbaev, B. Sultonov, R. Davletov
National Cancer Center, Tashkent, Uzbekistan

Introduction: Registration of aberration of chromosome in lymphatic peripheral blood of the patients with osteosarcoma for the assessment of conducting treatment efficacy.

Methods: The research was carried out in the specimen of peripheral blood of 198 patients with osteosarcoma aged from 10 to 45. Primary cytogenetic investigation of patients was conducted before their clinical examinations (background). Cytogenetic value, which was taken in background investigation, may be one of the criteria for determination of the following treatment efficacy. All the patients were divided into 3 age groups, fourth group consisted of healthy volunteers of appropriate age.

Results: Cytogenetic analysis showed that the frequency change of genome were 1,2 times higher in children and adolescents than in patients under 30 years (10,3±0,9% and 8,4±1,0%, $p<0,05$), 1,7 times higher in comparison with patients elder than 30 and 6,1 times higher than in healthy people (1,7±0,3). It was established, that chromosome instability frequency in healthy people of different population (historical control) is within 5%, that we accepted this size to discriminatory level. We compared the level of aberration of chromosome in patients of higher discriminatory and lower with different indexes of tumour process in osteosarcoma (OS). It was shown that the connection of frequency in patients with various levels of aberration of chromosome with degree of differentiation of OS, prevalence of tumour process by system TNM and with clinical stages of this given disease. The data after the analysis showed that in majority (76,7%) patients with the level of frequency of aberration of chromosome lower than 5%; high level of differentiation of tumour (G1) average in 12,7±2,4%(G_2) and low in 11,0±2,3% (G_3) were observed. These patients had IB and II A-B clinical stages of OS.

Consequently, the increase of chromosome aberration was higher than discriminatory ($P > 0, 05\%$) caused the decrease of differentiation of tumour (G_3) in 70,8% patients. The prevalence of tumour process by scheme TNM did not depend on the changes of chromosome aberration level. The number of patients with OS did not differ as in group patients with high level of aberration of chromosome and low level as well.

However, III and IV A clinical stages of OS were interconnected with high chromosome aberration level ($p<0,05$). So, in detection of big tumour, the increase of chromosome aberration level is observed relatively to discriminatory. In this median of tumour volume the patients with high instability of genome had 2 times (545,8±46,0 sm3 and 273,2±24,8 sm3; $p<0,05$) higher volume of tumour than in patients with low level of chromosome aberration. Chondroblast histological version of OS occurred 3.4 times more often in patients with high level of chromosome aberration, but periosteal OS -was 2.5 times more. In other histological versions of this disease, the reliable difference in frequency was not observed.

The investigation results showed that the decrease of tumour up to 50% occurred 1,4 times more often in patients with low level of chromosome aberration (30,5±3,3% and 15,0±2,5%; $p<0,05$), but the growth of tumour was observed 2,6 times more often in patients with high chromosomal instability (22,5±3,0 and 8,5±2,0; $p<0,05$).

Pathomorphism of I stage was 4,4 times more often in patients with high level of chromosome aberration (46,3±3,5% and 11,9±2,5%; $p<0,05$), but III and IV stages were 2,8 and 6,4 times more often in patients with low chromosomal instability, total regression was observed 2,1 times more often in the same patients with tumour (21,2±2,9% and 10,0±2,1%; $p<0,05$).

There were not reliable differences in the periods of appearance of relapses and remote metastasis up to one year, but their occurrence in the period -over one year was 1,5 times earlier in patients with high level of chromosomal instability (20,5±2,9 months and 32,7±3,3% months; $p<0,05$).

Life interval was shorter by 1, 8 times in OS patients with high instability chromosome, median of life interval

in these patients compiled from 28 months in comparison with 46 months in patients with low level of chromosome aberration.

Conclusion: Thus, the level of chromosomal instability of higher discriminatory is prognostic unfavourable factor and is connected with growth of tumour process, low level of pathomorphism and differentiation of tumour, increase of the size of tumour and chondroblastic histological version and also with comparative-life interval of the patients.