Scripta Scientifica Medica, vol.28, Suppl.1,pp.223-224

THE CYTOPHOTOMETRIC ANALYSIS AS AN AID OF CLASSIFICATION OF *ALL* IN CHILDHOOD

I. Galabov

Department of Pediatrics, Varna

Modern science looks for objective criteria for clear and precise differentiation between various cells and for methods helping a more correct and exact classification thus enabling a more appropriate current therapy. The purpose of this work is to find a correlation between variants of acute lymphoblastic leulemia (ALL) according to French-American-British Classificantion (FABC) and values of examined parameters of cytophotometric analysis.

Leukemic cells from 40 ALL children at the initial stage of the disease and peripheral blood lymphocytes from 20 healthy children have been studied. Peripheral blood smears stained after Feulgen's method have been observed on an "OPTON" microscope-photometer. From every case a total of 50 nuclei have been studied. In every nucleus transparency of 50 randomly selected points with an exploration field of 1 μm at object plane has been measured. Nuclear diameter has been measured by means of a screw ocular micrometer. According to formulae, the following main parameters have been calculated for every nucleus: mean optic transparency (T), entropy of frequency distribution of optic transparencies (H), mean equatorial nuclear surface (S), and DNA mass (M). Our results are presented on tables.

T a b l e 1. Distribution of ALL patients at initial stage according to nuclear T depending on variants after FABC

Variant after FABC	Mean optic transparency (T)		
	T< T control	T = T control	T >T control
L_1	2 (7,2 %)	5 (17,8 %)	21 (75 %)
L_1/L_2	-	-	2 (100 %)
L_2	-	-	8 (100 %)
L_2/L_1	-	-	2 (100 %)

Mean optic transparency of the whole L_1 group is 40,80 ± 2,55 while of the L_2 group it is 55,37 ± 3,28. Mean equatorial nuclear sur-

face of the whole L_1 group is 52,25 ± 2,11 while of the L_2 group it is 84,42 ± 7,11. These results are statistically reliable which indicates that both T and S can serve as criterion for distinguishing between both main ALL subgroups, i. e. of L_1 and L_2 forms.

T a b l e 2. Distribution of ALL patients at initial stage according to S depending on variants after FABC

Variant after FABC	Mean equatorial nuclear surface (S)		
	up to 41,16	up to 82,00	over 82,00
L_1	3 (10,7 %)	24 (84,7 %)	1 (3,6 %)
L_1/L_2	-	2 (100 %)	-
L_2	-	2 (25 %)	6 (75 %)
L_2/L_1	-	1 (50 %)	1 (50 %)

T a b l e 3. Distribution of ALL patients at initial stage according to M in leukemic cells depending on variants after FABC

Variant after FABC	DNA mass (M)		
	M< M control	M = M control	M> M control
L_1	18 (64,3 %)	3 (10,7 %)	7 (25 %)
L_1/L_2	-	1 (50 %)	1 (50 %)
L_2	4 (50 %)	2 (25 %)	2 (25 %)
L_2/L_1	-	-	2 (100 %)

Mean DNA mass of L_1 variant of ALL is 20,76 ± 0,80 and of L_2 one - 22,78 ± 1,48. These mean values differ significantly. There is a trend towards hyperdiploidization in L_2 forms.

It is known that nuclear chromatin structure is one of FABC criteria for ALL. Changes of its functional state which obligatorily relate to changes of its spherical organization, too, lead to essential alterations of nuclear size. The possibility to quantitatize nuclear morphology by using of a series of metric and microdensitometric examinations creates preconditions for its practical usage when specifying single clinical forms and variants of ALL.