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CLINICAL SIGNIFICANCE OF LAMININ AND ELASTINE LEVELS IN CHILDREN WITH UNDIFFERENTIATED CONNECTIVE TISSUE DISEASE

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ABSTRACT — This research aims to study levels of laminin and elastine in 64 children with undifferentiated connective tissue disease (UCTD). All the children underwent clinical, laboratory and instrumental examination. It was found that changes in the levels of laminin and elastin are directly related to the severity of UCTD in children. Thus, clinical values of laminin and elastin levels can serve as additional criteria of UCTD severity. Using them, along with early detection of the phenotypic and visceral signs, helps prevent the development of severe forms of the disease.

KEYWORDS — undifferentiated connective tissue disease (UCTD), laminin, elastine, blood serum, severity criteria, children.

INTRODUCTION

The importance of detecting the undifferentiated connective tissue disease is challenged by its high incidence (up to 80%) and ambiguous interpretation of phenotypic and visceral signs. The diagnostic criteria for the degree of its severity are proposed by researchers from different countries [1, 2, 3, 4].

Evaluating the UCTD severity basing on phenotypic and visceral manifestations has often resulted in uncertainty and frustration, thus urging the search of additional biochemical criteria, including such important non-collagen proteins as elastine, laminin, etc. They control interrelation between the elastic core and microfibrils [5, 6, 7]. Considering their sensitivity and extensive diagnostic range, their detection may improve the evaluation of UCTD severity in children [8, 9]. All that justifies the urgency of the issue.

The aim of the research is to study clinical significance of laminin and elastine levels in children with UCTD.

CHARACTERISTIC OF THE CHILDREN; METHODS OF RESEARCH

64 children aged 3 to 10 years with UCTD have been under observation. 27 of them had mild UCTD severity (the 1st group), 19 possessed medium UCTD severity (2nd group), and 18 suffered from severe UCTD (3rd group). The control group consisted of 18 conditionally healthy children.

UCTD diagnosis was performed basing on life record data, phenotypic and visceral signs, excluding genetic syndromes. Over 6 external phenotype data was analyzed. Ultrasonic scans of visceral organs were carried out.

The levels of elastine and laminin in blood serum were examined with the help of sandwich-type polarization fluoroimmunoassay, using the kits produced by «Cloud-Clone Corp» (USA) to determine elastine quantifiable concentration (serial number HBE-337Hu No 4 DF58C0861) and laminin quantifiable concentration (serial number HBE082Hu No 7B578DDCCD). Data processing was performed with the methods of variable-based statistics (Statistika-10).

RESULTS AND INTERPRETATION

We defined 6–7 phenotypic signs in the first group. 65% of cases presented visceral signs of UCTD, including 13 cases of minor cardiac abnormalities (50%), 6 cases of mild pyelectasis (22,2%), 3 cases of nephroptosis (11,0%), and 3 cases of hypotension and cholecystis anomaly (11,0%). The levels of laminin and elastine in this group were close to normal range ($p1 > 0,05$; $p2 > 0,05$).

Within the second group of children, 95,8% had 10–12 moderate phenotypic signs, early evidence of which was observed in 5 children (26,3%). The visceral signs were presented in 14 (72,8%) of minor cardiac abnormalities, 5 cases of pyelectasis (26,3%), 3 cases of nephroptosis (15,8%), 3 cases of gallbladder volvulus (15,8%), and 5 cases with combination of signs (26,3%). The combination of phenotypic and visceral signs is 20% higher in the second group comparing with the first one.

The increase of elastine and laminin levels is statistically-valid (Table 1, $p_1 < 0,01$, $p_2 < 0,05$). The increase of proteins levels was associated with incidence of visceral signs combination ($k_1 = 0,72$; $k_2 = 0,61$).

As for the third group, the infantile onset of UCTD (in the first years of life) dysplastic indicants in 7 children (36,7%) was interpreted as *dysplastic march* with early incipience. All the children under observation showed 13–19 common phenotypic signs of mild and medium severity.

15 children under observation (83,4%) had combination of 15–17 phenotypic signs. Visceral signs were presented in 17 cases of minor cardiac abnormalities (95%), 7 cases of pyelectasis (38,8%), 4 cases of nephroptosis (22,2%), 3 cases of hydronephrosis (16,6%), 5 cases of gallbladder hypotension (26,7%), and 5 cases of gallbladder volvulus (26,7%). Comorbid syndromes (2,7) of renal and renocardial UCTD were present in 9 children (50,0%). Comorbidity of visceral signs in the third group was observed by 25% more often than in the second group, and was associated with increase in laminin and elastine levels correspondingly ($k_1 = 082$; $k_2 = 0,57$).

Statistically significant difference ($p_1 < 0,01$, $p_2 < 0,01$) was observed between the levels of laminin and elastine in groups with mild, medium and severe UCTD (see Table 1). Consequently, we detected changes in laminin and elastine levels in direct dependence on UCTD severity in children. The determined values of these proteins' levels may be used as additional criteria for evaluation of UCTD severity (Table 1).

Table 1. *The levels of laminin and elastine in groups with mild, medium and severe UCTD*

Data	Group			
	First (n=27)	Second (n=19)	Third (n=18)	Control (n=18)
laminin, (pg/ ml)	*, # 47,2 ± 6,3	*** 56,3 ± 7,8	*** 62,3 ± 8,2	24,20 ± 7,1
elastine (ng/ml)	*, # 9,2 ± 2,5	** 14,3 ± 1,7	*** 16,5± 1,4	7,2 ± 2, 2

Note: ** — reality in comparison of data of the 1st, 2nd and 3rd groups with control: (* >0,05, ** p<0,05, *** p<0,01; # — reality in comparison of data of the 1st and 2nd groups: # — p>0,05; ## — p<0,05*

CONCLUSION

Early evidence of visceral signs and their comorbidity are significant for UCTD diagnosis. It was found that changes in the levels of laminin and elastin are directly related to the severity of UCTD in children. Levels of laminin and elastine may serve as reasonable evaluation criteria of UCTD severity. The use of phenotypic, visceral and biochemical indicators of undifferentiated connective tissue disease may contribute to timely and exact diagnosis. Moreover, it may help to start the treatment sooner.

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