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THE EFFECT OF CONNECTIVE TISSUE DYSPLASIA ON THE FORMATION OF COMORBID PATHOLOGY IN YOUNG PEOPLE

Vladimir Murga  , **Irina Ivanova** ,
Valentin Panteleev , **Vadim Belyaev** ,
Olga Zavyalova

Tver State Medical University, Tver, Russia



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 childtv@mail.ru

ABSTRACT

Deviations in the development of organs and connective tissue dysplasia (CTD) still remain an urgent interdisciplinary problem. The aim of this study was to study clinical and morphological changes of the maxillofacial system, skeletal deformities and blood parameters in 164 young people. Twice as much as in the control group, orthopedic pathology (68.4% and 32.9%) and manifestations of anemia were found in every fifth (21.5%) of the examined patient. The revealed multi-organ changes identified the need to select individual rehabilitation programs in patients with CTD.

Keywords: connective tissue dysplasia, joint hypermobility, prevalence, scoliosis, flat feet, anemia, magnesium, young age

RELEVANCE

Connective tissue dysplasia (CTD) is a genetically determined condition characterized by defects in fibrous structures and the basic substance of connective tissue, causing alterations in the formation of organs and systems, having a progressive course [2,3]. The basis of the formation of this pathology is a genetic predisposition due to the summing effect of functional polymorphic alleles of a large number of genes, and the influence of various external factors. The high prevalence of connective tissue in the body, the variety of functions performed by it in most cases lead to a polysystemic lesion of organs and tissues in the event of its pathology [1,2,4].

The aim of the study was to assess the prevalence of orthopedic pathology and deviations in blood parameters in young people with connective tissue dysplasia.

MATERIALS AND METHODS OF RESEARCH

On the basis of the Tver State Medical University polyclinic, a group of doctors of various specialties conducted a comprehensive examination of 164 second-year students of the Faculty of Dentistry (50.6% of boys, 49.4% of girls) aged 18 to 25 years.

The examined students were divided into two groups: group I – patients with manifestations of CTD (main group), 79 people (48.2%), group II – young people without manifestations of CTD (control group), 85 people (51.8%). Depending on the severity of CTD, two subgroups were identified in group I: A – students with mild external manifestations of CTD (6.1%), B – young people with moderate and pronounced clinical markers of dysplasia (42.1%). The study included examination by specialized specialists: examination by a dentist, orthopedist and surgeon, clinical and biochemical blood tests. The assessment of joint hypermobility was carried out according to the Beighton method.

Statistical processing of the obtained data was carried out using Microsoft Office ® Excel ® 2010 and IBM ® SPSS ® Statistics 23.0 programs.

RESULTS

According to the results of the examination, among all the examined young people, the frequency of revealed orthopedic pathology was 33.29% in the absence of complaints. The most frequent were various forms of flat feet (126 people, 76.83%), spinal column deformity (63 patients, 38.4%), dysfunction at the level of the cervical spine (38 observations, 23.17%). When comparing the groups, it turned out that in the group of patients with CTD, deformity of the spine and limbs was 2 times more common compared to the control group (68.4% and 32.9%, $p < 0.05$). The study showed that in the sample of patients with CTD, spinal deformities were present in 49.4% of those examined, and in the control group such disorders were noted only in 28.2% of young people.

In the main group, various variants of chest deformity were also markers of dysplasia (14 people, 17.7%): funnel shape of 1-2 degrees in 11 students, deformation of the rib arches – in 3 young people. No chest deformity was detected in the control group. Valgus deformities of the 1st toes were significantly more common in people with CTD (30.4% and 9.4%, respectively, $p < 0.05$).

Dysplastic skeletal changes in the form of posture disorders (kyphosis of the thoracic region, hyperlordosis of the lumbar spine, asymmetry of the waist triangles, etc.) were determined in all patients with CTD. Torsion deformities of the spinal column were detected in 39 people (49.37%) of the main group with signs of dysplasia and in 24 people (28.24%) of the control group.

Combined forms of flat feet, flat-valgus foot of 2-3 degrees were observed 2 times more often in young people of the main group. In the control group, the most frequent were longitudinal forms of flat feet of 1-2 degrees and clinodactyly of 5 fingers of both feet.

Dysplastic changes in connective tissue determined the instability of the ligamentous apparatus, primarily at the level of the cervical spine. In the group with CTD, this pathology was 2 times more common in comparison with the control (41.8% and 22.4%, $p < 0.05$). The volume of movements in the cervical region was within 60 ° (with a norm of 80-90 °). There was an asthenic, disproportionate type of physical development, myopathy with reduced muscle tone.

HMS was detected in 47.6% of young people, including HMS of the 2nd degree in 29.9%, HMS of the 3rd degree in 17.7% among all surveyed, which is a fairly high level compared to other studies [1,3]. Hypermobility was more common in girls than in boys (59.3% and 36.1%, respectively, $p < 0.05$), which corresponds to the literature data.

Comparison of groups with DCT and without CTD showed that HMS was more typical for students of the main group. The difference between joint hypermobility in boys and girls in the group with CTD was not so pronounced: HMS was detected in 70.7% of girls and 57.9% of boys, while in the control group gender differences were significant (47.5% for females and 17.8% for males, $p < 0.05$).

The results of a clinical blood test in a group of young people with CTD revealed the initial manifestations of anemia in every fifth (21.5%). In addition, another 36.7% in this group had changes indirectly indicating latent iron deficiency: borderline low hemoglobin values, low color index, corresponding changes in erythrocyte indices. Representatives of the control group did not have anemia. About a fifth of students with CTD (17.7%) have unusually large platelets, which can be regarded as a manifestation of thrombocytopeny. In the control group, white blood counts for the main sprouts were higher, which indirectly indicated a higher level of cellular immunity.

ALKALINE PHOSPHATASE AND OSTEOCALCIN

The total alkaline phosphatase in the majority of the examined (94.5%) was within the normal range, but its bone fraction in half of the young people in the group with CTD (55.6%) was increased, which indicates the active division of osteoblast cells. Despite the fact that the students have come out of childhood, the processes of bone formation in them, apparently, are still actively continuing. An increased level of osteocalcin was detected in patients with TMJ pathology, which potentially indicates the processes of osteomalacia in general and in particular in this joint.

In our work, the magnesium of erythrocytes was evaluated. It turned out that this indicator was reduced in the majority of individuals of both groups without significant differences between them, i.e. for the population of our region. These results are consistent with the literature data on the high prevalence of hypomagnesemia in the population [6], which may conceal the direct pathogenetic role of magnesium in the development of CTD.

DISCUSSION

The survey revealed a high prevalence of signs of CTD among young people (48.2%), which corresponds to the conclusions of other studies [3,5]. According to our data, orthopedic pathology in general (68.4% and 32.9%) and spinal column deformity in particular are 2 times more common in young people with DCT compared to the group of people who do not have manifestations of dysplasia. Chest deformity can be considered a marker of CTD, because according to our data, it was noted only in the group of patients with CTD. Deformities of the feet were equally common in the majority of examined young people of both groups. However, young people with CTD have more pronounced forms of flat feet and a predominance of combined deformities of the foot. The presence of CTD is reflected in the indicators of clinical and biochemical blood tests, which indicates the need to monitor their parameters and consult with doctors who are aware of the problems of CTD.

CONCLUSION

In connective tissue dysplasia, the predominance of orthopedic and dental pathology in young people was revealed. According to the results of the examination, among all the examined young people, the frequency of revealed orthopedic pathology was 33.29% in the absence of complaints. Dysplastic skeletal changes in the form of posture disorders were detected in all patients with CTD. The polysystemic manifestations of CTD, the emerging pathology of the blood system determine the need for examination of such patients by various specialists and the preparation of individual rehabilitation programs.

CONTRIBUTORS:

1. Vladimir Murga - collecting, analyzing material and writing the manuscript.
2. Irina Ivanova-collecting, analyzing material and writing the manuscript.
3. Valentin Panteleev- collection, analysis of the material.
4. Vadim Belyaev- collection, analysis of the material.
5. Olga Zavyalova- collection, analysis of the material.

REFERENCES:

1. Boudoulas H., Kolibach A., Baker P. et al. Mitral valve prolaps and the mitral valve prolaps syndrome: a diagnostic classification and pathogenesis of symptoms // Amer.Heart J. 1989. Vol. 118, No 4. P 796-818. DOI: DOI: 10.1016/0002-8703(89)90594-2
2. January C. T., Wann L. S., Alpert J. S., Calkins H., Cigarroa E. J., Cleveland Jr. C. J., Conti B. J., Ellinor T. P., Ezekowitz D. M., Field E. M., Murray T. K., Sacco L. R., Stevenson G. W., Tchou J. P., Tracy M. C., Yancy W. C. [et al.]. AHA/ACC/HRS Guideline for the Management of Patients With Atrial Fibrillation: Executive Summary. *J. Am. Coll. Cardiol.* 2014;64(21):2246-3. DOI: [10.1161/CIR.0000000000000041](https://doi.org/10.1161/CIR.0000000000000041)
3. Arkatova V.V., Anikin V.V., Arsentiev V.G. et al. Connective tissue dysplasia. Clinical recommendations of the RNMOT // *Therapy.* - 2018. - No. 6. - pp. 10-58. <https://dx.doi.org/10.18565/therapy.2018.6.10-58> DOI:10.23888/PAVLOVJ20164164-172.
4. Gromova, O.A. Magnesium deficiency as a problem of modern nutrition in children and adolescents / O.A. Gromova // *Pediatric pharmacology.* - 2014. - Vol. 11, No. 1. - pp. 20-30. <https://doi.org/10.15690/pf.v11i1.891>
5. Dedova, V.O. Prevalence of connective tissue dysplasia (literature review) / V.O. Dedova, N.Ya. Dotsenko, S.S. Boev [Electronic resource] // *Medicine and education in Siberia.* - 2011. - No. 2. - URL: http://www.ngmu.ru/cozo/mos/article/text_full.php?id=478 (accessed: 29.07.2018)
6. Ibragimova, E.E. Analysis of the frequency of hypermobility syndrome among students / E.E. Ibragimova // *Bulletin of Surgut State University.* - 2018. - No 4 (22). - Pp. 73-79.

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