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Optimization of detection and treatment osteoporosis in children

Abstract: the combination of distal Us-densitometry and roentgenoabsorbtiometry is high informative method of diagnosis and monitoring for osteoporosis and osteopenia in pediatric practice. Timely pharmacotherapy correction osteoporosis and allows to prevent the decrease of bone mineral thickness and increase the given index.

Keywords: osteoporosis, osteopenia, bone mineral thickness, children.

Topicality. Osteoporosis (OP) is the most often metabolic disease of human skeleton, being characterized with the decrease of bone mass to the unit of bone volume without changing it's mineral and organic components' ratio, being accompanied with microarchitectural disorders of bone tissue, leading to increase of bones' breaking and fractures' risk [2; 5; 7]. Last decades carrying out epidemiologic studies convincingly proved, that OP problem is associated with the childhood (1). The disorder of bone formation process or chronic diseases lead to decrease of bone firmness already in the childhood, and, as sequense, to increase OP risk development, and, bones fractures in future [4].

Epidemiological data witness that maximum fractures in childhood cover from 5 to 7, and, from 13 to 14 years old people, and it can be caused with considerable enlargement of body length at that period on the background of age bone mass. Except that, last time the cases of osteoporosis in children became

more often as the symptom of different diseases, that allows to consider the children to have chronic pathology group with high risk of osteroporosis development [2]. Polyaetiologicity, polymorphism of clinical picture, small amount of diagnostic devices, allowing to reveal decrease of bone mineral thickness (BMT) at the early stages, make difficult the fight with OP. It leads to large material expenses at treatment the given patents and early disability in their working able age [1–4].

At the modern stage of orthopedics there is no possibility to work out algorithms combinations of ultrasound distal densitometry and reontgenoabsorbtiometry in ambulatory practice and program of complex treatment patients with given pathology, demanding further investigation.

The aim of study: evaluation of pilot introduction results in practice of ambulatory diagnosis for methods of distal Us-densitometry and reontgenoabsorbtiometry as the reviewer method.

Materials and methods: The study was carried out in out-patient conditions at 78 children (5–14 years old), having chosen with random sampling from the number of addressing to pediatrician, surgeon, traumatologist, endocrinologist. Boys were 37 (48%), girls were 41 (52%). According to the methods of taking diagnosis the patients were divided into 3 equivalent groups by anthropometric indices: group 1 (24) with taking standard diagnostic algorithm without Us-densitometry; group 2 (23) with Us-densitometry (Omnisens-7000) in children with osteopenia (OSP) and OP, when the treatment was performed only by the orthopedist; group 3 (31) with taking Us-densitometry at risk OSP and OP at joint treatment of orthopedist and specialist of X-Ray diagnosis. The reontgenoabsorbtiometry (DTX-200, Denmark) of forearm bones was carried out as reviewer method of evaluation BMT.

Table 1. – General age-sex characteristics of patients (%)

Groups	Total	Middle age	Boys		Girls	
			Abs	%	Abs	%
Group 1	24 (30,7%)	12,2 ± 1,3	11	14,1	13	16,6
Group 2	24 (30,7%)	13,1 ± 1,2	12	15,3	12	15,3
Group 3	30 (38,4%)	12,3 ± 1,2	14	17,9	16	20,5
Total	78 (100%)	12,4 ± 1,3	37	47,4	41	52,5

The initial data patients for group 2, who were prescribed Us-densitometry, being observed by the orthopedist, OSP was revealed in 16 children, and by the data of reontgenoabsorbtiometry it was in 15 (one boy's T-criterion was 0,98). The number of patients with revealed OP by the data of Us-densitometry were 7 people, and, in control reontgenoabsorbtiometry it was also 7.

In group 3 the initial number of patients with taken Us-densitometry were 30, number of persons with revealed OSP were 20 children, by the data of reontgenoabsorbtiometry they they were 20. Number of children with OP were 20, by the results of reontgenoabsorbtiometry they were 12.

Table 2. – Rate of primary revealing osteopenia and osteoporosis in examining groups (%), Number of patients (%)

Groups	Us-densitometry	Osteopenia	Osteoporosis	Fractures
Gr. 1 (n = 24)	–	–	–	6
Gr. 2 (n = 24)	24	15	7	2
Gr. 3 (n = 30)	30	20	12	1
Total 4 (n = 78)	54	35	19	9

The analysis of primary rate for revealing OSP and OP, coming from the ratio: the number of revealed osteopenia/osteoporosis/the general number x 100% in groups revealed, that the rate of osteopenia display in group 3 was 66,6%, that is by 0.6 times higher than in group 2, where the given index was 62.5%.

The rate of osteoporosis revealing in group 3 is 40% that is in 1.8 times more than in group 2, where it was determined with 29.1% index. The rate of osteopenia and osteoporosis revealing in the examined patients group 3 was higher than in group 2, that shows the more effective algorithm of revealing OSP and OP with the way of Us-densitometry, being coordinated between orthopedist and X-Ray doctor.

At revealing OSP (T-criterion is from – 1 to 2, 5) in children of group 2 and 3 the preventive and dietary recommendations were given. At revealing OP (T-criterion from – 2, 5 and lower) in children of groups 2 and 3 the continuous course of calcitonin per 200 ME intranasally in combination with calcium (500–1000 mg/daily) and VitD (400–800 ME/daily) were prescribed.

The children with revealed OSP and OP, on the background of treatment the control of Us-densitometry once per 6 months, were recommended. The reontgenoabsorbtiometry was carried out once a year.

Results and discussion: There are presented data on age and sex contingent of examined children, being compared with the age criteria, marked with little overweight of the girls' number, in table 1.

The number of prescribed Us-densitometries at children in group 2 were by 1.84 times more than it was in group 3.

The analysis of taken of taken results in examined groups revealed, that in group 1 the standard diagnostic algorithm was used without Us-densitometry and reontgenoabsorbtiometry. In group 2 from 24 children 15 revealed OSP, and 7 had OP. In group 3 the number of prescriptions for Us-densitometry by the treating physician together with X-Ray doctor were 30 patents, from those 20 revealed OSP and 12 revealed OP.

At analysis of taken results for Us-densitometry in patients with osteoporosis, belonging to examining groups 2 and 3 on the background of treatment with calcitonin in combination with calcium and Vit. D, the true statistic increase of BMT is observed for 3 years of observation. The data, being taken with the method of reontgenoabsorbtiometry, prove the data of Us-densitometry (table 4).

By the data of reontgenoabsorbtiometry in patients with osteoporosis, belonging to groups 2 and 3, on the background of treatment with calcitonin in combination with calcium and Vit. D, it is observed the true increase of BMT for the next 3 years of observation. It can be marked the positive effect of treatment with calcitonin in children of groups 2 and 3, being proved with increase of BMT.

Table 3. – Results of Us-densitometry (Laverage significances of T-criterion ± CKO)

Month of examination	Patients with osteoporosis (n = 19) T-criterion
March is primary examination	-2.87 ± 0.41
November is control in 6 months	-2.56 ± 0.26
May is control in 6 months	-2.19 ± 0.18
December is control in 6 months	-1.79 ± 0.31
March is control in 6 months	-1.55 ± 0.22
December is control in 6 months	-1.34 ± 0.19
March is control in 6 months	-1.22 ± 0.21
December is control in 6 months	-23 ± 0.36

Table 4. – The results of roentgenoabsorbtiometry (average) significanse of T-criterion ± CKO

Months of examination	Patients with revealed osteopenia (n=35) T-criterion
March is primary examination	-2.78 ± 0.37
May is secondary examination	-2.21 ± 0.31
March is control examination	-1.49 ± 0.24
March is control examination	-1.25 ± 0.18

Conclusions: Putting into practice of children's examination the method of Us-densitometry with the aim of diagnostic algorithm on revealing OP and OSP in children allows to make timely diagnosis, and, to treat the given pathology, that leads to decrease the fractures' number in the examining

contingent. The combination of distal Us-densitometry and roentgenoabsorbtiometry is high informative method of diagnosis and monitoring for OP and OSP in pediatric practice. Timely pharmacotherapy correction OP and allows to prevent the decrease of BMT and increase the given index.

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Comparative evaluation of methods of amputation related to tibiotartus with severe forms of diabetic foot syndrome

Abstract: The results showed that the improvement of technology implementation in mioplastic amputation lead to a significant shortening of the surgery time, decrease the likelihood of infection of the wound surface during surgery and a dramatic reduction of postoperative wound infections from the amputation stump of the tibia from 15.4% to 3.5% of cases.

Keywords: mioplastic amputation, diabetic foot syndrome, critical limb ischemia.

The rise in the number of people suffering from diabetes is triggering a proportional increase in severe complica-

tions such as diabetic foot syndrome (DFS). The development of necrotic suppurative process in diabetes mellitus