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USAGE PROSPECTS OF BIOLOGICAL HYDROXYAPATITE CERAMICS, SATURATED WITH MICROELEMENTS, FOR EXTREMITY BONE DEFECTS PLASTICS UNDER CONDITIONS OF REPEATED OSTEOPOROSIS

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Introduction, aim of the research

The problem of choosing the material for bone defects substitution remains relevant under conditions of repeated osteoporosis, which arises after surgical ablation of benign tumours, tumor-like and dysplastic diseases. The usage of synthetic hydroxyapatite ceramics with this aim attracts special interest today.

We have analyzed the results of clinical usage of compositional material of biological origin on basis of hydroxyapatite, which was made in Ukraine and was called

“ceramic osteoapatite”- CO.

Material, methods

In experiments on rats and in clinic the peculiarities of rebuilding CO-100 in the form of powder, particle size 100 mkm, pore-granular CO-015-5000 with particle size 1000-5000 mkm, pore size 90-600 mkm and OC-1, 5 in the form of blocks, saturated with microelements Cu, Zn, Se, have been studied. When using CO, saturated with Cu, Zn, the conditions for improving the repair regeneration in the place of ceramoplastics are made. Selenium combinations have an important anticarcinogenic influence on the neoplasm development, due to its antioxidant and immune response modulating characteristics. When filling in the defects of CO bone, saturated with selenium, some conditions of anticarcinogenic effect, from the side of implant, are made, thus, the probability of illness relapse is reduced and that is especially relevant in treating giant cell tumour.

The clinical part of the work includes the observations among 86 patients, in which defects plastics was performed with one of CO types, saturated with microelements, after surgery of benign tumours, tumour-like and dysplastic ailments of extremity bones.

The patients were from 7 till 52 years of age. Children aged until 15 years old were 25,6%. The majority were men (69-80,2%). Solitary bone cyst was observed in 17, aneurismal – in 4, fibrous dysplasia – in 16, enchondrome – in 19, osteochondrome – in 11, osteoma – in 4, and giant cell tumour in 15 cases.

Depending on the data, parietal and intracavitary resection was applied. In one case segmental resection was carried out at the lesion of distal radius part. The defect was removed with pore – granular CO-015, which at hardening was adapted to the form of the defect. If bone stability suffered insignificantly firm low porous block of CO-1, 5, which was placed along load axis, was applied and the rest of the cavity around the block was filled with pore granular CO-015.

Results, conclusions

Remote results were traced in 90,7% of patients. There were no signs of inflammation and implant rejection. Only one patient with giant cell tumour developed disease recurrence, which required repeated surgery. Biodegradation assessment of CO implants was conducted according to 4-points scale.

The application of different forms of CO, saturated with microelements, enables to obtain good results of treatment in the majority of patients. And namely with the study of these types of implants we connect perspectives of reconstructive orthopaedy of bone defects after operative treatment of benign tumours, tumour like and dysplastic ailments of extremities bone.