

USE OF A MATERIAL BASED ON BIOACTIVE GLASS IN CASES OF BENIGN BONE TUMORS

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INTRODUCTION. Generally accepted method of treatment of benign tumors and tumor-like bone disease is surgical. Bone defects that require replacement sometimes occur in the surgical treatment of benign tumors and tumor-like bone diseases. For substitution of bone defects are used: allografts, autografts, bone cement and other various synthetic plastics [2, 3, 4]. Many different biological grafts, organic, and synthetic inorganic materials are proposed in orthopedics to replace residual bone defects. Recently are actively studied properties of the new materials based on biocomposite bioactive glass [1]. These materials have much less intense inflammatory reaction and are much better in comparison with hydroxyapatite, as they have more effective osteostimulating factor [5].

THE PURPOSE OF THE WORK. To show the advantages of osteoplastic operations using implant material based on bioactive glass by substituting post-resection bone defects in children with benign tumors and tumor diseases.

MATERIAL AND METHODS. During the period from 2009 to 2017 in a clinical department osteoplastic operations using material based on bioactive glass in benign tumors and tumor-like bone diseases were performed in 59 children. The average age of patients was 13,3 years (range from 9 to 17 years), girls amounted 31 (52,5%), boys — 28 (47,5%). The localization of the tumor: the femur — 14 (23,7%), shoulder — 14 (23,7%), hand bones — 11 (18,6%), foot bones — 9 (15,3%), tibial — 9 (15,3%), pelvis — 2 (3,4%). Morphologically met: enchondroma — 17 (28,8%), giant cell tumor of bone — 15 (25,4%), aneurysmal bone cyst — 13 (22%), chondroblastoma — 6 (10,2%), solitary bone cyst — 6 (10,2%), eosinophilic granuloma — 2 (3,4%). Material based on bioactive glass is a multi-phase inorganic material synthesized by chemical vapor deposition and ceramic technology. The phase composition of the material based on bioactive glass: bioactive glass —

50–65 wt.%, hydroxyapatite — 14–17 wt.%, whitlockite — 14–17 wt.%, wollaston — 9–7 wt.%. Material based on bioactive glass is osteoinductive and osteoconductive biomaterial that quickly integrates with the bone, the bone-forming ceramic complex and in some period of time is converted into bone. Surgery was performed in the following amounts: intraosseous bone tumor resection, the substitution of the bone defect by implant material based on bioactive glass in the form of granules or powder. Depending on the location and size of the bone defect a plaster splint on the limb was imposed in order to prevent bone fractures at the site of implantation.

RESULTS AND DISCUSSION. As a result of bone and plastic surgery for benign tumors and tumor diseases of hand bones, using plastic bone material based on bioactive glass, postoperative complications of surgical wounds were found in 59 patients who underwent resection of intraosseous bone tumor. Recurrences of benign tumors or tumor diseases were detected in 5 (8,5%) patients. In connection with recurrent tumors patients underwent repeated surgery: removal of tumor recurrence and bone defect replacement by material based on bioactive glass. In the dynamics of observation by X-ray control was observed adjustment and replacement by the plastic material of the newly formed bone tissue. Patients used the operated limb on average in 3–6 months.

CONCLUSIONS. The use of material based on bioactive glass as a plastic material in osteoplastic surgery has several advantages — reduces the amount and time of the operation, stimulates reparative osteogenesis in bone that helps to restore the operated bone and limb function, and thus the quality of life of patients.

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