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REHABILITATION OF PATIENTS WITH APICAL PERIODONTAL CYSTS OF JAWS

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ABSTRACT — The present study shows that the processes of reparative osteogenesis start in the parietal area of the osseous defect and are directed to the apex. Synchronism of these processes is significant which occurs simultaneously being linked with the degree of demineralization of the implant induced into the osseous defect. It has been stated that indigenous bone grafting material «bioOst» with interfacial demineralization in filling of infected bone defects possesses both osteoinductive and osteoconductive properties.

KEYWORDS — apical periodontal cyst, osteoplastic materials, cystectomy.

The problem of bone regeneration is one of the challenging issues in modern dental surgery [1]. Bone tissue insufficiency in the jaws may result from different causes, for instance, after tooth extraction and intrabony defects, periapical surgery [4, 5, 6].

Presently, guided bone regeneration utilized in a variety of bone tissue engineering applications has been proved theoretically and clinically. However, in practice, application of osteoplastic materials does not always lead to an expected positive result. In a number of cases, adverse clinical outcomes such as loss of graft materials and formation of fibrous encapsulation over the graft may develop [3].

Owing to these facts, using indigenous bone grafting material «bioOst» may be a treatment choice in implant dentistry. «bioOst» matrix represents bovine bone tissue subjected to physico-chemically treatment. It is very similar to human bone tissue in its physical, immunologic and chemical composition. A review of the modern literature shows the efficacy of bone grafting material «bioOst» used in the sinus floor elevation and filling of extraction sockets. All papers underlie application of osteoplastic materials only in the absence of any chronic inflammatory process [2].

The objective of the study

is to evaluate the efficacy of bone grafting material «bioOst» in filling of infected bone defects.

MATERIALS AND METHODS

Surgical treatment of 63 patients with apical periodontal cysts of the jaws was performed. In the experimental group (31 — 49,2% of patients) a bone defect was filled with osteoplastic material «OsteoBiol Gen-Os» by TecnoSS (Italy). The material is bone granules with collagen / heterologous cortical-spongius mixed (pigs/horse) in the size of 250–1000 microns.

In the control group (32 — 50,8% of patients) osteoplastic matrix «bioOST-XENOGRAFT Collagen» — bone chips with underlying subtotal osteoinductive demineralization, made by «OOO Cardioplant» (Russia) was employed.

Cystectomy was performed using Parch II technique. Three, six and nine months after surgery a case follow-up was done. Activity in regeneration processes was assessed by taking a dental panoramic radiogram using Adobe Photoshop 7,0 software and calculating the coefficient of the bone mineral density in the parietal and middle area of the osseous defect.

The probability of obtained data was calculated by using the Student t-test (reliable data were at $p < 0,05$).

The conducted survey was approved by the local ethics committee of the Volgograd State Medical University (protocol № 2098-2019 dd 1.03.2019).

RESULTS

It has been estimated that before surgery in both clinical groups tissue density indexes in the parietal and middle area of the osseous defect showed no statistically significant differences ($p > 0,05$) and were 2 times lower than intact bone indexes.

Three months after surgery in both clinical groups the coefficient of the bone mineral density in the parietal area of the osseous defect equaled to $p > 0,05$. At the same time, in the control group difference of the coefficient of the bone mineral density in the parietal area ($128,34 \pm 1,43$ y.e) and middle area of the osseous defect ($124,67 \pm 1,47$ y.e) was statistically invalid, but in the experimental group it was pronounced ($125,41 \pm 1,37$ y.e and $120,27 \pm 1,34$ y.e; $p < 0,05$). The coefficient of the bone mineral density in middle area of the osseous defect in patients of the

control group was significantly greater ($p < 0,05$) than in patients of the experimental group.

Six months after surgery there were no statistically significant differences ($p > 0,05$) between the groups in the coefficient of the bone mineral density over the entire area, but they were lower in the intact bone ($p < 0,001$). Nine months after surgery the coefficient of the bone mineral density over the entire area equaled to the values in the intact bone ($p > 0,05$).

So, the results of the survey showed that processes of reparative osteogenesis started in the parietal area of the osseous defect in both groups, i.e. at the site of a bone grafting material adjacent to the wall of the defect and were directed to the apex. It is termed as *creeping substitution* meaning the initial resorption of the graft followed by secondary ingrowth of a new bone from the osseous defect. Synchronism of these processes must be emphasized which occurs simultaneously being linked with the degree of demineralization of the implant induced into the osseous defect. In series of studies it is noted that resorption of bone grafting materials with total demineralization occurs to a much greater extent than osteogenesis. Partially demineralized bone implants (interfacial, subtotal demineralization) possess higher osteoinductive activity supporting simultaneous occurrence of biodegradation and osteogenesis processes.

In the survey under study, in both groups simultaneous occurrence of biodegradation and reparative osteogenesis processes was established. At the same time, statistical analysis of the obtained data confirmed a pronounced activity of these processes in using indigenous bone grafting material «bioOst» with interfacial demineralization during the first three months after surgery. To the sixth month of monitoring the rate of reparative osteogenesis and resorption of implant material became even. To the ninth month of a post — operative period complete restoration of the osseous defect was observed.

CONCLUSION

Indigenous bone grafting material «bioOst» with interfacial demineralization in filling of infected bone defects possesses both osteoinductive and osteoconductive properties contributing to simultaneous occurrence of biodegradation and reparative osteogenesis processes. The advantage of this material is successful integration during the first three months after surgery. That is very essential in prognosis of clinical complications. This evidence based study underlines the necessity to conduct further investigations to reveal the efficacy of the material in filling of infrabony defects of different original.

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