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Methods of treatment of patients with cystic formations in the frontal part of the jaws

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Abstract: In the practice of the dental surgeon, odontogenic cysts make up 78–96% of the total number of cysts and 7–12% of the total number of diseases of the jaws. These figures indicate the relevance of the problem of treating this pathology. The priority tasks of surgical treatment of patients with odontogenic cystamias are the restoration of bone structure and the preservation of the function of the teeth. The main method of surgical treatment remains cystectomy with resection of the root apex. The disadvantages of cystectomy include the reduction of the function of the teeth in the area of the cyst, reinfection and residual bone cavities, which reduce the strength of the bone.
Disruption of the integrity of the bone in the surgical area is often associated with prolonged healing, the outcome of which is incomplete or incomplete restoration of bone tissue.

Keywords: odontogenic jaw cysts, cystotomy, cystectomy and two-step operation, platelet-rich plasma, osteo-inductive properties.

In the practice of a dental surgeon, odontogenic cysts account for 78-96% of the total number of cysts and 7-12% of the total number of jaw diseases. These figures indicate the relevance of the problem of treating this pathology. The priority tasks of surgical treatment of patients with odontogenic cysts are the restoration of the structure of bone tissue and the preservation of dental function. The main method of surgical treatment remains cystectomy with resection of the apex of the root. The disadvantages of the cystectomy technique include a decrease in the function of the teeth located in the cyst area, reinfection and residual bone cavities, which reduce bone strength. Violation of the integrity of the bone in the field of surgical intervention is often associated with prolonged healing, the outcome of which is incomplete or incomplete restoration of bone tissue.

Keywords: odontogenic cysts of the jaws, cystotomy, cystectomy and two-stage operation, platelet-rich plasma, osteoinductive properties.

Patients with cystic formations of various nature make up a significant part of patients at the dental reception. In the structure of other odontogenic diseases, they can be up to 17%. The relevance of the problem is evidenced by frequent relapses after surgery. The figures given vary greatly, however, according to some reports, they can reach up to 18% [5]. Such a number of relapses in diseases that are well studied and in which long-tested methods of surgical treatment are used is difficult to explain.

Cysts of the upper and lower jaws are often found in the practice of a dental surgeon. To date, effective methods of surgical treatment have been developed, including the use of various osteoplastic materials to fill bone cavities. This applies mainly to small-sized cystic formations, when cystectomy, platelet-rich plasma is indicated.

Improvement of methods of treatment of odontogenic jaw cysts continues to be an urgent problem of surgical dentistry. This is due to the wide prevalence of the disease, the possibility of complications such as suppuration of the cyst, the development of osteomyelitis, deformation of the jaws, tooth loss, the occurrence of a pathological fracture and even the so-called central cancer of the jaw from the epithelium of the cyst wall, as well as quite often occurring relapses after surgical treatment.

Currently, there is no consensus in the literature about the optimal shape of the incision of the mucous membrane of the alveolar edge of the jaw during operations for odontogenic cysts. One of the important tasks of surgical treatment of periroot cysts of the jaws is the preservation of teeth located in the cyst zone and adjacent to it, the restoration of their full function [1,2,4]. The presence of an infected root

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protruding into the cyst cavity dictates the need to resect the apex of the tooth root at the same time as the removal of the cyst membrane. Sometimes, when resection of the apex of the root of the tooth, the question arises of retrograde filling of the canal. Currently, there is no consensus in the literature on which filling material should be preferred. At the same time, the frequency of complications associated with poor-quality retrograde filling of the root canal of the tooth remains quite high.

When assessing the magnitude of the bone defect formed after the removal of odontogenic cysts, the working classification of cavity defects of small, medium, large size and extensive was used[2,4]. The main surgical interventions in the treatment of extensive jaw cysts are cystotomy, cystectomy and two-stage surgery. Indications for cystotomy are large cysts of the upper jaw that grow into the maxillary sinus with the destruction of the bony bottom of the bottom cavity and the palatine plate, extensive cysts of the lower jaw with significant thinning of the bone walls of the jaw, senile age of the patient or the presence of severe concomitant diseases. Indications for cystectomy are small cysts within 1-2 intact teeth, an extensive cyst of the lower jaw, in which there are no teeth in its zone and the base of the jaw is preserved of sufficient thickness (up to 1 cm), a large cyst on the upper jaw, with the preserved bone wall of the bottom of the nasal cavity and maxillary sinus. The choice of the method of cystotomy or cystectomy in the treatment of extensive jaw cysts is debated by many authors. Some are supporters of cystotomy, believing that cystectomy is a traumatic operation with the possibility of damage to adjacent intact teeth, damage to the neurovascular bundle, pathological fracture of the lower jaw, the likelihood of opening the maxillary sinus and nasal cavity, the possibility of autolysis of a blood clot located in the bone cavity[6]. Others are supporters of cystectomy, arguing that cystotomy is a non-radical intervention in which cavities are formed, defects requiring long-term postoperative care associated with the periodic change of iodoform tampons, sometimes wearing obturators for 1-1.5 years. All this contributes to the deterioration of the cleansing of the oral cavity with oral fluid and creates conditions for the reproduction of microorganisms. The above, as well as the deformation of the external contours of the face, have a negative impact on the quality of life of patients in the early and late postoperative period.

However, after cystectomy, the question arises of restoring the formed bone defect with bone and plastic material, since with large defects in bone tissue and with suppuration of cysts, the organization of a blood clot often does not occur, it becomes infected and lysed. The experience of clinical observations has shown the low effectiveness of some materials, especially with significant sizes of bone defects, since they are not always completely replaced by bone, but are encapsulated by connective tissue, support chronic inflammation, enhance bone resorption or are partially rejected[1]. In this regard, the correct choice of bone and plastic materials to fill the bone defect with extensive jaw cysts plays a leading role for the favorable rehabilitation of patients.

According to the literature, one of the most effective means of increasing the regenerative capabilities of tissues when applied topically, to date, is the patient's blood plasma enriched with platelets. According to studies in recent years, it is platelets that contain growth factors in high concentration - tissue hormones that initiate regeneration processes:

- the main growth factor - β FGF, which affects the growth of all types of cells in the wound, stimulates the production of components of the extracellular matrix, accelerates the processes of angiogenesis, the proliferation of capillary endotheliocytes, their migration to collagen;
- transforming growth factors - TGF-alpha, which actively affects angiogenesis and TGT-beta , which stimulates chemotaxis of fibroblasts and their production of new collagen, elastin and fibronectin fibers;

Growth factors do not exist in the blood in free form and act locally, being released during the organization of a blood clot (8).

In 1998, R. E. Marx and co-authors developed a technique for producing platelet-rich plasma (P. R. P.) by centrifugation of the patient's blood and applied it in the clinic. R. P. is based on the high content of growth factors (approximately two orders of magnitude higher than in peripheral blood) and their powerful stimulating effect on regeneration processes. In particular, in the conditions of bone wound P. R. P. demonstrates pronounced osteoinductive properties, accelerating the formation and maturation of bone tissue, filling the defect, by 1.5-2 times. No less significantly, the drug affects the healing of soft tissue wounds.

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The purpose of our study was to increase the effectiveness of treatment of patients with odontogenic jaw cysts by improving the quality of examination and preparation of the patient for surgery, clarifying the indications for choosing the optimal surgical method of treatment, improving the methodology of individual stages of surgical intervention, justifying the use of the cystectomy method in the surgical treatment of extensive jaw cysts with filling the resulting bone defect with enriched plasma platelets (P. R. P).

Material and methods

Despite the differences in the origin of cysts, clinical manifestations are of the same type and are asymptomatic for a long time: growth is slow, painless, functional disorders are not determined. Cosmetic changes occur only when the tooth-containing cyst reaches a large size, and in cases of keratocists, growing, as a rule, along the length of the jaw, they are absent, which is why the cyst is detected in late periods. Cysts are sometimes detected by chance when examining the patient for other diseases or when inflammation occurs in the cyst.

For the period 2020-2022, 80 patients with odontogenic jaw cysts were under our supervision, of which 35 were classified as extensive. Of the total number of patients with extensive jaw cysts, 15 were women and 20 men between the ages of 18 and 64. Radicular cysts occurred in 21 cases, follicular cysts in 9 patients, residual in 5 patients. Extensive cysts on the upper jaw were found in 18 patients, on the lower in 17.

Complaints of patients with non-suppurating extensive cysts upon admission were reduced to the presence of jaw deformities or fistulas on the alveolar process, and on the lower jaw, 6 patients noted numbness of the lower lip. With the suppuration of the cysts, the general condition worsened, patients complained of the appearance of pain and swelling.

During the external examination of patients, facial deformity was rarely observed. More often, facial asymmetry was observed in the presence of cysts in the frontal part of the upper and lower jaws. In one patient, when a cyst germinated into the nasal cavity during rhinoscopy, Gerber's roller was observed. With non-suppurated cysts, when examined from the oral cavity, 19 patients determined the smoothness or bulging of the rounded shape of the anterior jaw wall in the region of the transitional fold. Palpation of deformities was painless, the boundaries of the bulges were clear. Dupuytren's symptom was observed in 18 patients. In 5 patients with cysts in the area of the large molars of the upper jaw, there was no visible deformation of the jaw due to the growth of the cyst towards the maxillarysinus. In the case of follicularcysts, intraoral examination revealed the absence of one or two permanent teeth, and in some cases - the presence of milk teeth in adult patients. In the presence of a defect in the jaw bone under the mucous membrane, the bone window was palpated, in the center of which fluctuation was determined.

Diagnosis of odontogenic extensive cysts was carried out by puncture biopsy, X-ray examination (orthopantomogram and X-ray of the jaws) and, if necessary, computed tomography. During the puncture, the cysts received an opalescent clear liquid. With the suppuration of the cyst in the punctate, pus appeared. The X-ray picture of the cysts was characterized by the presence of a site of rarefaction of bone tissue of a rounded shape with clear boundaries. In the case of follicular cysts, the crown of the retinated tooth or the entire tooth is projected into the cystic cavity.

All patients underwent cystectomy with filling of a residual bone cavity of platelet-rich plasma (P. R. P). In 19 patients, the operation was performed under local anesthesia (Sol.Ubistesiniforte 4 %, Sol. Supercaini 6.0 ml), in 11 under general endotracheal anesthesia.

Cystectomy for all patients was performed according to the classical technique. Removal of cysts in these cases was performed by the type of enucleation. Teeth whose roots were in the cystic cavity and were of functional value were preserved. Previously, their depulpation and endodontic treatment were carried out. After complete removal of the cystic membrane, the resulting bone cavity was treated with antiseptics and filled with platelet-rich plasma (P. R. P). The wound was sutured tightly.

Results and discussion.

Dynamic observation of patients included, first of all, a clinical examination, which was carried out according to the generally accepted methodology on the 2-7th, 14th day, 1,3,6 months later and a year after surgery. X-ray inspection included panoramic radiography of the jaws. On the first day, pronounced

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infiltration of the edges of the wound was noted in 2 patients. Elimination of postoperative edema was observed on 6-7 days. Divergence of sutures in the postoperative period was not observed in any case.

With a second examination after 1 month. and the subsequent terms of observation, patients did not complain, the mucous membrane in the area of surgical intervention was pale pink, without swelling. At the 6th month, a complete recovery of the defect was observed radiologically, but no homogeneity was observed. Mature organotypic bone tissue was traced along the periphery of the defect. In the central areas, the bone pattern did not show signs of organotypypality: there were no formed haversian channels, a typical bone pattern, bone mineralization. With control radiography, after a year, all patients had a complete restoration of the bone defect with an organic structure and mineralization. A decrease in bone tissue height was not observed in any case, which is very important for further implantological rehabilitation of patients.

The use of correctly selected bone-plastic materials (in our case, platelet-rich plasmaa (P. R. P) in combination with hydroxyapol) contributes to the restoration of large bone defects with the formation of an organotypic bone corresponding to the anatomy of this site, in the optimal time, which shortens the postoperative rehabilitation period of patients and contributes to the early functional load of the organ.

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