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Clinical and radiological assessment of the quality of surgical treatment of chronic generalized periodontitis of moderate and severe severity

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Annotation

This article gives possible options for the etiology and pathogenetic mechanisms of the occurrence and development of inflammatory-dystrophic periodontal lesions. Also, taking into account clinical and radiological methods, the results of using osteoplastic materials to replace a bone defect were evaluated. The results are presented, the relevant conclusions are summarized.

Keywords: Osteoplastic material; dental computed tomography; chronic generalized periodontitis

RELEVANCE

The etiology and pathogenesis of inflammatory-dystrophic periodontal lesions over the past 5 years has been the subject of many scientific monographs, articles, and dissertations. According to L. M. Tsepov, the analysis of numerous studies of inflammatory periodontal diseases in the current period can be described as an accumulation of facts, and different researchers sometimes get directly opposite results.

Different types of chronic inflammation are described in the literature [3,6], but if we consider the problem as a whole, the key events of inflammatory processes are associated with the state of effector cells and products of their activity. It should be clearly understood that there is a variety of connections and it is difficult to single out the defining ones, considering inflammation inside the focus of inflammation, but not beyond. “Chronic factors of systemic alteration, as a rule, act cooperatively. In some cases, key triggers of chronic inflammation (CV) can be identified. ”

Inflammation in the maxillofacial region (MFA) progresses only after the physiological methods of maintaining homeostasis have been exhausted. The result is an inflammatory infiltrate. In MHF, the focus of inflammation is directly connected with bone and lymphoid tissue and with various body systems.

Over the past two decades, progress in studying the factors contributing to the development of periodontal diseases has led to a significant understanding of the complex interaction of various mechanisms of the body's immune defense, including both innate and acquired immunity.

Studies in this area have revealed several pro-inflammatory cytokines that have been identified as key molecules that contribute to the destruction of periodontal tissues. These are interleukin 1 (IL-1), tumor necrosis factor (TNF-α), interferon gamma (IFN-γ), interleukin 6 (IL-6), and the nuclear factor κβ activator receptor ligand (RANKL) [1,4]. AT Unlike the pro-inflammatory cytokines IL-1, IFN-γ, TNF-α and IL-6, which play a role primarily in the development and inflammatory response in periodontal tissues, RANKL, first identified as a cytokine, is now referred to as factors directly related to osteoclastogenesis.

The daily activities of doctors at periodontal appointments constantly put on the agenda and make it necessary to solve pressing issues of organizing the diagnostic process, which is impossible without a proper theoretical justification and without a worked out method-

ological base, which the related sections of clinical medicine have in these issues.

Due to the specific nature of periodontology, direct interpolation of the rules used in general medical specialties is impossible, and therefore adaptation of the provisions of general medicine and a theoretical justification for such adaptation are required.

An attempt to formulate the rules for constructing a diagnosis is available in a number of periodontology manuals by both domestic and foreign authors.

The existing differences in the occurrence and progression of periodontopathology in women and men dictate the need for a differentiated approach to diagnosis by gender [2,5].

Since there is insufficient data in the available literature on the use of the surgical method for the treatment of chronic generalized periodontitis of moderate and severe severity, it seemed to us relevant to conduct such a study.

Purpose of the Study

To evaluate the quality of surgical treatment of chronic generalized periodontitis of moderate and severe severity according to clinical and radiological research methods.

MATERIALS AND RESEARCH METHODS

To achieve this goal from the perspective of evidence-based medicine, we analyzed the results of clinical radiation examination and treatment of 151 patients with a diagnosis of Chronic periodontitis of moderate severity and 185 patients with chronic periodontitis of severe severity, divided into 2 groups:

Group 1 - the main group included 95 (46 men and 49 women) patients with chronic periodontitis of moderate severity and 110 (57 men and 53 women) patients with chronic periodontitis of severe severity who underwent bone grafting using osteoplastic materials (33 - chronic periodontitis of moderate severity and (32 - chronic periodontitis of severe severity) and using allograft (62-chronic periodontitis of moderate severity and 78 - chronic periodontitis of severe severity).

Group 2 - a comparison group that included 66 (37 men and 29 women) patients with moderate periodontitis and 75 (36 men and 39 women) patients with severe periodontitis who used the traditional treatment method - closed / open curettage.

Before the start and in the long term (3, 6, 12 months) after complex treatment, all patients underwent a clinical study, which included clarifying complaints, collecting medical history, external examination and examination of the oral cavity. The oral hygiene status was determined using the simplified OHI-S hygiene index (Green J. C., Vermillion J. R.), the severity of inflammatory phenomena in periodontal tissues by the SBI gingival sulcus hemorrhage index (Muhlemann H. P.,); the intensity and prevalence of the inflammatory reaction with gingivitis using the PMA index (Schour I., Massler M., modified by Parma C.)), the prevalence and severity of inflammatory-destructive changes in periodontal tissues according to the periodontal index PI (Russel A.). Measured the depth of periodontal pockets (PC) and the loss of periodontal attachment with the filling of the periodontogram.

At the stage of the X-ray examination, the state of bone defects of the alveolar processes was studied before and after 6 and 12 months after surgery according to the following parameters: expansion of the periodontal gap of the teeth, vertical resorption of the interdental alveolar septa, bone pockets, furcational resorption, foci of osteoporosis of the peaks of the interdental septum, foci of the septum, tissue in the periapical region, a change in the position of the teeth in the dentition in the vestibulooral direction.

For radiation diagnostics, the OCG method was used, performed on a Planmeca apparatus (Finland) according to the standard method for both groups and dental volumetric tomography, which was performed on a dental volumetric tomograph for examining the head and neck i-CAT (USA) in high resolution modes, only in the Main group.

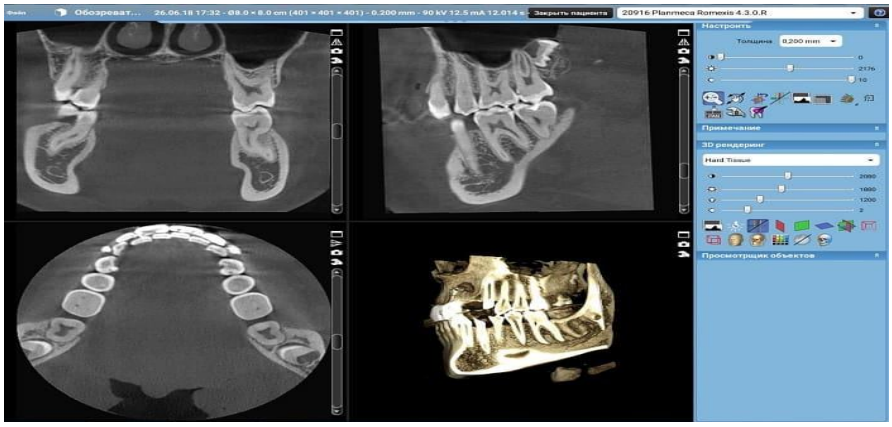

Figure 1: 3-D computed tomography for inflammatory-dystrophic periodontal lesions.

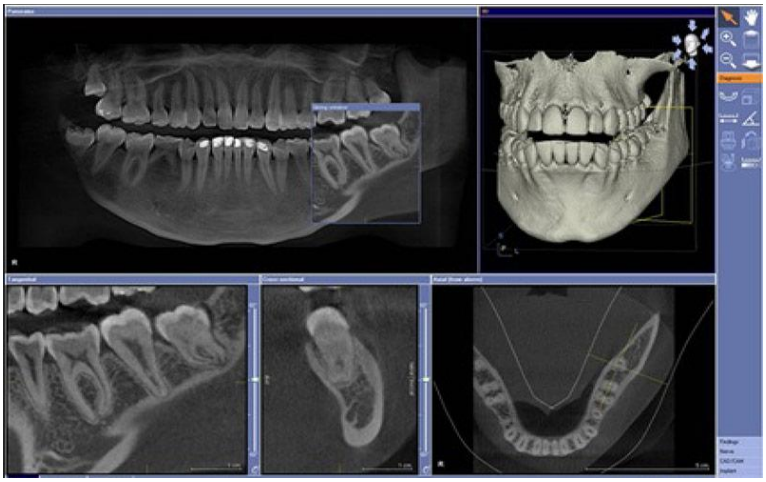

Figure 2: Isolation of individual fragments on 3-D images of a dental computed tomograph.

The results of clinical and radiological examination of patients were entered into a specially designed table in the PARODONTAL LIFE program. For objectification, the obtained data were subjected to statistical processing by the method of correlation analysis.

All statistical methods were based on the principles of evidence-based medicine. The effectiveness of radiation diagnostic methods was studied on the basis of determining their accuracy (Epsilon X), sensitivity (Se) and specificity (Sp), prognosticity of positive (PVP) and negative (PVN) results.

Surgical treatment included moderate curettage and open curettage with a flap, or a modified Widmann operation, in patients with CGP of moderate degree. In patients with severe CGP, the methods of choice were open curettage with flap folding, or a modified Widmann operation, as well as a Widmann – Neumann patch operation in combination with directed tissue regeneration.

The results of the study

After a comprehensive examination of 336 patients aged 25 to 65 years, CGP was detected in all patients. In the analysis of patients' complaints, their high frequency was noted in chronic generalized periodontitis of severe severity for both groups.

In the main group, at the time of treatment, a combination of several complaints was observed (from 3 to 7), with more gum bleeding, plaque, tartar, bad breath and mobility, tooth displacement. 3 months after the treatment, complaints of bleeding were observed in 14 (9.4%) patients with moderate CGP and 23 (12.5%) with severe CGP, which was associated with insufficient individual oral hygiene in these patients. During the observation of patients, a decrease in the growth of this indicator was noted, which indicated that patients followed proper oral hygiene 3 months after surgical treatment, patients of the main group noted an increased sensitivity of exposed roots of the teeth. Further, a decrease in this indicator was recorded, which was associated with the use of fluorine-containing drugs.

The frequency of complaints in patients of the comparison group was similar to the data of the main group.

The clinical indicators of periodontal disease in patients with CGP have changed as follows. According to the OHI-S hygiene index, during the initial examination, the examined patients of both groups had an unsatisfactory level of oral hygiene, pronounced bleeding when probing PCs (SBI index> 10%), and the presence of an inflammatory reaction in various gum zones (PMA index up to 48.0 ± 3 , 5% for moderate CGP and up to 67.0 ± 5.3% in severe CGP patients). The gingiva, as a rule, was cyanotic, swollen, in places the change in the scallop of the gingival margin was determined, the papillae were flattened or atrophied.

During the probe test, the depth of the PC in the main group averaged 4.3 ± 0.1 mm, in the 2nd subgroup - 7.6 ± 0.2 mm. After three months of surgical interventions, the values for PC probing were within the normal range for both subgroups, after six months - only in patients with moderate-grade CGP (2.9 ± 0.1 mm), and after a year the PC values did not exceed 3.1 ± 0 , 1 mm in the 1st subgroup and 3.8 ± 0.1 mm in the 2nd subgroup.

The results of the treatment of the comparison group were compared with the obtained data of the main group. In patients with CGP of the middle degree of the comparison group, the depth measurements of PC after 3 months exceeded those in the patients of the main group 1.3 times, after 6 and 12 months - 1.2 times, which was associated with defective surgical treatment of bone defects in the process open curettage. Reconstruction of bone pockets was not made due to the lack of reliable diagnostic information on the results of organized crime

groups. In patients with severe periodontitis in both groups, similar clinical data were obtained on the depth of the PC after treatment, this can be explained by the fact that during the patch operation a good overview of the surgical field was created, and bone defects not detected during OPG well visualized.

We compared the average and standard deviations of the measurement results of the following indicators: loss of periodontal attachment (PP), the degree of tooth mobility and the level of decrease in the height of the interdental bone septa (CP) according to OCG and DOT.

The presence of vertical defects of the alveolar bone in orthopantomograms was detected in 25.0% for the 1st subgroup and 45.8% for the 2nd subgroup, while DOT found this symptom in 43.8% of the 1st subgroup and 87.5% of the 2nd subgroup

Table 1: The results of radiation examination of patients of the main group

Indicators	Orthopantomography		Dentalvolumetrictomography	
	1st subgroup (n = 47)	2nd subgroup (n = 54)	1st subgroup (n = 47)	2nd subgroup (n = 54)
Vertical resorption of interdental alveolar septa, bone pockets	11 (25,0%)	24 (45,8%)	20 (43,8%)	47 (87,5%)
Furcationresorption	0	29 (54,1%)	0	42 (79,2%)
Foci of osteoporosis of the peaks of the interdental septa	11 (25,0%)	23 (43,7%)	7 (15,6%)	13 (25,0%)
Expansion of periodontal gap of teeth	26 (56,2%)	45 (83,3%)	41 (87,5%)	54 (100,0%)
Foci of rarefaction of bone tissue in the periapical region	13 (28,1%)	28 (52,0%)	17 (37,5%)	36 (66,7%)
Changing the position of the teeth in the dentition in the vestibulo-oral direction	0	0	8 (18,7%)	12 (22,9%)

Extremely important in our opinion, was the ability of the DOT method to additionally detect the expansion of periodontal gaps in the teeth, which may be a sign of increased chewing load on the tooth or a consequence of pulp lesion, which required the necessary measures to achieve positive treatment results.

The advantage of DOT over OPG in the visualization of fine periodontal structures became obvious, which was useful in the diagnosis of initial pathological changes. The diagnostic efficacy of DOT in detecting bone defects with a depth of less than 1 mm was evaluated and confirmed by X. Liang et al. (2010), which correlated with the data of our study.

A comparison of radiation methods in the ability to recognize the involvement of inter-root tooth partitions in the pathological process showed that the corresponding symptom was not found on orthopantomograms in molars and premolar molars of the upper jaw due to the palatine (buccal) root superimposed on the furcation area. In this case, the quality of treatment depended more on the personal experience of the operator and the ability to recognize the pathology at the stage of the clinical study.

It remains undeniable that a high-quality endodontic intervention positively affected the result of periodontal treatment. Additional detection with the help of DOT of foci of rarefaction of bone tissue in the periapical region contributed to the timely conduct of therapeutic measures or tooth extraction.

The data obtained on a comparative assessment of the effectiveness of radiation diagnostic methods in the main group showed that the OPG made it possible to identify patients with CGP in 76.0% of cases for the 1st subgroup and in 77.5% for the 2nd subgroup and put the correct diagnosis in 78, 0% of cases for all patients of the main group. The ability of the OCG method to not give false positive results was 83.0% in patients with moderate CGP and 82.6% in the subgroup of patients with severe CGP. The predictability of a positive result showed that the probability of a patient having a disease with positive results of an OCG study was 86.3% for the 1st subgroup and 94.5% for the 2nd subgroup. The predictability of a negative result revealed a low probability of absence of the disease in the presence of negative research results.

DOT surpassed the OCG in all indicators of diagnostic effectiveness in assessing the condition of periodontal tissues. Thus, patients with CGP were identified in 97.4% of cases in both subgroups, and the correct diagnosis after a comprehensive examination was made in 98.4% in the 1st subgroup and in 97.9% for the 2nd subgroup. The high specificity of the DOT method determined that positive examination results confirmed the diagnosis of chronic generalized periodontitis in 100.0% of cases in all

patients of the main group. The predictability of a negative result was 96.1% in the 1st subgroup and 89.4% in the 2nd subgroup, which indicated a high probability of absence of the disease with negative results of radiation examination by DOT.

CONCLUSIONS

An analysis of the results of applying radiation diagnostic methods from the perspective of evidence-based medicine showed that dental volumetric tomography is superior to orthopantomography in all indicators of diagnostic effectiveness in assessing the condition of periodontal tissues. The advantage of dental volumetric tomography is the ability to study bone defects of the alveolar bone from the oral and vestibular surfaces of the teeth in three mutually perpendicular planes: frontal, sagittal and axial, as well as obtaining an arbitrary section of the zone of interest.

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