

ORIGINAL ARTICLE

ANALYSIS OF THE RESULTS OF TREATMENT OF DESTRUCTIVE FORMS OF APICAL PERIODONTITIS WITH OSTEOTROPIC DRUGS IN A SHORT TERM

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ABSTRACT

The aim: The aim of the study was to evaluate the effectiveness of osteotropic drugs in the treatment of destructive forms of apical periodontitis.

Materials and methods: The study was conducted at Danylo Halytsky Lviv National Medical University, Department of Therapeutic Dentistry, Lviv, Ukraine. As a result of the research, 185 patients with destructive forms of apical periodontitis (DFAP) were examined and treated. To characterize the effectiveness of treatment using criteria based on the provisions of the European Society of Endodontology. Thermometric studies of the oral mucosa were performed according to the method of L.Ye. Smolyanko and A.V. Lysovogo.

Results: After 3 months, 145 treated patients (78.38%) out of the total number of subjects belonged to the 3rd category ("failure"). At the same time, this category included the largest share of patients of groups I and II of the study - 95.67% and 95.56%, respectively. In 70.21% of patients of group III, with transferred outside the apex PRP, and in 53.19% of persons of group IV, with the use of the composition «PRP + mp3 OsteoBiol» there were no clinical signs of DFAP. It was noted that 22 (46.81%) and 14 (29.79%) patients groups III and IV had no clinical signs of DFAP and radiologically determined a decrease in the focus of bone destruction of the periapical area, which allowed them to be classified as 2 - category of success - «incomplete recovery».

Conclusions: The results of the research convincingly testify to the effectiveness of our proposed therapy for the treatment of dystrophic forms of apical periodontitis.

KEY WORDS: destructive forms of apical periodontitis, osteotropic drugs, PRP

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INTRODUCTION

The problem of periodontitis treatment is one of the important and not completely solved problems of therapeutic dentistry [1, 2]. This is due to the high prevalence of this disease, the complexity and complexity of drug manipulations, the high percentage of failures and complications in treatment, as well as the frequent lack of stability of the results obtained using known treatments [3]. The main task in the treatment of periodontitis is the elimination of inflammation in the periapical area, the exclusion of pathogenic effects on the body of odontogenic inflammatory focus, regeneration of periodontal tissue structure and restoration of tooth function [4-6]. The effectiveness of conservative treatment of periodontitis is on average 85%, and this figure varies depending on the clinical form of the disease, means and methods of treatment, resistance of the patient and many other factors [7-9].

The importance of the problem also lies in the fact that the destructive focus in the periodontium is a source of chronic infection [10]. The inflammatory center at periodontitis (both acute and chronic) at normal reactivity of an organism represents protective reaction of an organism [11, 12]. At the same time at disturbance of functions of immune system long existence of the center of a chronic infection leads to decrease

in level of nonspecific resistance of an organism and, as a consequence, to development and complication of a course of systemic focal diseases [13]. The above reasons explain the socio-medical significance of the problem of chronic destructive periodontitis and the extreme urgency of the constant search for new effective methods of treatment [14, 15].

THE AIM

To evaluate the effectiveness of osteotropic drugs in the treatment of destructive forms of apical periodontitis.

MATERIALS AND METHODS

The study was conducted at Danylo Halytsky Lviv National Medical University, Department of Therapeutic Dentistry, Lviv, Ukraine. As a result of the research, 185 patients with destructive forms of apical periodontitis (DFAP) were examined and treated, divided into 4 groups, who complained of carious cavities, tooth discoloration, discomfort when biting, etc.

Treatment of DFAP was performed:

- 46 people (Group I, control) according to the protocols of medical care in the specialty "Therapeutic Dentistry";

Table I. Analysis of the success of DFAP treatment in patients of the study groups at different observation times

Terms of observation	Research groups	Success criteria for DFAP treatment			
		1 „Complete recovery”	2 „Incomplete recovery”	3 „Failure”	4 „Unsuccessful treatment”
Immediately after root canal filling	Group I (control) (n=46)	-	-		
	Group II („Kalasept”) (n=45)	-	-		
	Group III (PRP) (n=47)	-	-		
	Group IV („PRP + mp3 OsteoBiol”) (n=47)	-	-		
After 3 months	Group I (control) (n=46)	-			-
	Group II („Kalasept”) (n=45)	-			-
	Group III (PRP) (n=47)	-			-
	Group IV („PRP + mp3 OsteoBiol”) (n=47)	-			-

Table II. Temperature indicators of the oral mucosa in the projection of the apex at the stages of DFAP treatment

Terms of observation	Temperature indicators	Group I (control) (n=46)	Group II („Kalasept”) (n=45)	Group III (PRP) (n=47)	Group IV („PRP + mp3 OsteoBiol”) (n=47)
Before treatment	Xp	32,4±0,32*	33,0±0,34*	32,20±0,32*	32,60±0,32*
	Xn	34,60±0,45	34,80±0,46	34,70±0,45	34,70±0,45
	SNR	-6,36±0,37	-5,17±0,23	-7,20±0,39	-6,05±0,26
After 3 months	Xp	32,80±0,36*	33,20±0,38**	32,80±0,36*	33,40±0,39**
	SNR	-5,20±0,25 ^{oo}	-4,60±0,21	-5,48±0,29 ^o	-3,74±0,18 ^o

Notes:

°p<0,01; °°p<0,05 – significant difference in values relative to treatment data.

*p1<0,01; **p1<0,05 – significant difference of values in relation to the data Xn.

- in 45 patients (group II), in whom root canal obstruction was performed using “Kalasept” material;
- in 47 patients (group III) which transferred outside the apex of root therapy of PRP with subsequent obturation of root canals with gutta-percha with sealer;
- in 47 patients (group IV) in whom apical therapy and root canal obturation were performed using a combination of PRP and osteotropic material “mp3 OsteoBiol”.

To characterize the effectiveness of treatment using criteria based on the provisions of the European Society of Endodontology [16]. Thermometric studies of the oral mucosa were performed according to the method of L.Ye. Smolyanko and A.V. Lysovogo using an electronic thermometer [17]. To assess the probability of the obtained results of the study used a variation-statistical method of analysis using Microsoft Excel. Statistical calculation of the results of clinical studies was carried out according to conventional methods [18].

RESULTS

According to Table I, it was found that immediately after treatment in 93 patients (50.27%) there were pain on biting, soreness of the transition fold on palpation, positive per-

ussion in the area of the causative tooth, which required pharmacological correction with nonsteroidal analgesics. This category of patients was assigned by us to the 4th category of criteria for treatment success (“unsuccessful treatment”).

At the same time, 92 people (49.73%) did not have any clinical complaints immediately after the treatment, which corresponded to the 3rd category of success (“failure”). It was noted that the smallest number of patients in this category was objectified among the treated groups I and II of the study - 36.96% and 42.22%, respectively, while the pronounced clinical signs of DFAP were absent in 55.32% of persons of group III and in 63.83% of the studied group IV.

After 3 months of follow-up, 145 treated (78.38%) out of the total number of subjects belonged to the 3rd category (“failure”). At the same time, this category included the largest share of patients of groups I and II of the study - 95.67% and 95.56%, respectively. In 70.21% of patients of group III, with transferred outside the apex PRP, and in 53.19% of persons of group IV, with the use of the composition “PRP + mp3 OsteoBiol” there were no clinical signs of DFAP. It was noted that 22 (46.81%) and 14 (29.79%) patients groups III and IV had no clinical signs of DFAP and radiologically determined a decrease in the focus of

bone destruction of the periapical area, which allowed them to be classified as 2 - category of success - "incomplete recovery". It should be added that only 4.35% and 4.44% of patients groups I and II, respectively, belonged to the 2nd category of success DFAP.

Evaluation of the results of thermometric measurements of the mucous membrane in the projection of the apexes of the tooth roots with DFAP and without it allowed to trace the dynamics of temperature, which objectively reflects changes in the pathological process in groups with different treatments (table II).

As a result of our research, we found that the average value of the local temperature of the oral mucosa in the projection of the apex of the teeth without DFAP (Xn) was 34.70 ± 0.45 °C. In this case, the values of oral mucosa temperature in the projection of the apex of the teeth with DFAP (Xp) before treatment were probably lower relative to the data of Hn, $p < 0.01$, and ranged from 32.40 ± 0.32 °C in persons I (control group) to 32.60 ± 0.32 °C in the studied group IV. Prior to treatment, the standardized rate (SNR) in the study groups ranged from 5.17 ± 0.23 - in patients of group II to 7.20 ± 0.39 - in persons of group III.

After 3 months of observations, the value of local temperature oral mucosa in the areas of projection of the apexes of the teeth with DFAP increased: by 1.23% - in the first group; by 0.60% - in the second group; by 1.86% - in the third group and by 2.45% - in group IV, $p > 0.05$, and remained significantly lower for similar temperature data in teeth without DFAP, $p < 0.01$; < 0.05 .

At the same time, the values of the temperature gradient of SNR probably decreased in persons I, $p < 0.05$, III, IV, $p < 0.01$, study groups, but were equal to the data before treatment in patients of group II, $p > 0.05$.

DISCUSSION

Numerous studies have proven the therapeutic effect of autologous platelet-enriched plasma in the healing of bone and soft tissue after reconstructive and reconstructive surgery in dentistry [19, 20]. The high therapeutic efficacy of the procedure is combined with the ease of obtaining platelet concentrate by differential centrifugation of whole blood [21, 22].

In 1994, Tayapongsak et al. proposed to add autogenous fibrin glue to the cancellous bone in large reconstructive interventions on the mandible [23]. During radiography, earlier bone consolidation was observed, the authors explained this effect by the improvement of osteoconductive properties of bone material due to the fibrin network of autogenous fibrin glue.

Platelet-enriched plasma contains platelet-derived growth factor (PDGF), transforming growth factor (TGF), vascular endothelial growth factor (VEGF), epithelial growth factor (EGF), and adhesive molecules (fibrin, fibronectin, vitronectin) [24]. The fibrin component of the platelet gel binds the particles of bone material and promotes osteoconduction through the formation of a network that acts as a skeleton that supports the growth of new bone. The combination of these factors allowing reduce the terms of growth and maturation of bone tissue [25, 26].

Growth and differentiation factors are a class of biological mediators that play an important role in stimulating and regulating wound healing, as well as key cellular processes, including mitogenesis, chemotaxis, differentiation and metabolism [27]. All these factors play a leading role in the process of osseointegration. The use of these growth factors in combination with bone materials can improve and even accelerate the normal process of bone regeneration [28]. One way to use the valuable properties of growth factors is to deliver platelet-enriched plasma to the bone graft. The use of growth factors is particularly interesting in cases where the effectiveness of bone materials and osteointegration is questionable (for example, in severe osteoporosis or scar tissue changes).

As a result of our research the dependence of the success of DFAP treatment on the method of treatment in the nearest terms of supervision was revealed. Data from clinical evaluation of treatment success, dynamics of thermometric parameters in the projection of tooth apexes showed that 3 months after treatment more pronounced bone regeneration of teeth affected by chronic apical periodontitis was observed in patients of group IV, in whom treatment was carried out using our proposed composition based on PRP and osteoplastic material "mp3 OsteoBiol". The positive treatment trend was emphasized by the 2nd category of treatment success in 46.81% of people in group IV against 29.79% of patients in group III and 4.40%, on average, treated in groups I and II of the study.

CONCLUSIONS

Therefore, the results of the research convincingly testify to the effectiveness of our proposed therapy for the treatment of dystrophic forms of apical periodontitis.

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