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Clinico-Pathogenetic Substantiation of Zinaxin-Based Periodontal Dressing Administration

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Our investigations resulted in optimal adjustment of a medicinal agent for Zinaxin-based periodontal dressing. We developed two types of this drug formulation for patients suffering from generalized periodontitis with chronic and exacerbated course considering features of the clinical course. To detect an effective concentration of Zinaxin in the periodontal dressing used for local administration we examined 39 patients suffering from generalized periodontitis at the age of 35-44. Clinical and laboratory investigations showed an increase of gum fluid eicosanoids (prostaglandins and leukotrienes) of patients suffering from generalized periodontitis before treatment by contrast to patients with clinically healthy periodontium. We found out that Zinaxin-based periodontal dressing continued to be effective for about 12 hours, during which a positive decrease of gingival fluid eicosanoids was observed. As a result of a number of experimental dilutions of Zinaxin we detected that optimal concentration of this medication formulated into the periodontal dressing was 1:100.

Keyword: Generalized periodontitis, eicosanoids, prostaglandins, leukotrienes, gum fluid, Zinaxin.

1. Introduction

The search and use of pathogenetically substantiated medicines possessing multifactor action and influencing upon different aspects of generalized peroidontitis development is one of the main areas of clinical periodontology [1, 2, 3]. Nowadays there is a wide spectrum of pharmaceuticals affecting pathogenesis of the disease, but depending upon their toxicity, and numerous side effects more of these medications don't have long-term therapeutic effect and can't cause permanent remission [4, 8, 9]. That's why, clinico-laboratory investigation of effective drugs, trial of generalized peroidontitis optimal therapy is continuous, and currently important for the development of clinical periodontology [10, 12].

Recently periodontal dressings have been widely used in the treatment of periodontium diseases. Periodontal dressing has a long-lasting therapeutic effect and reduces the period of treatment and trips to the dentist, saves time of both a patient and a dentist [5, 6, 7]. It is achieved by the combination, in one medication, of different components with various mechanisms of action on the periodontal tissues. Thus, periodontal dressings are multifunctional, possessing antimicrobial, anti-inflammatory and keratoplastic characteristics [11].

It is very important to find optimal concentration of the medicinal agent being a component of periodontal dressings with a potential adequate therapeutic action within the clinical, functional and laboratory normal ranges of periodontal tissues [13, 14].

Our study is aimed at the detection of optimal concentration of Zinaxin in the periodontal

dressing used for local administration based on the investigation of the dynamics of gum fluid eicosanoids content in patients with generalized peroidontitis and its correctability under the influence of Zinaxin

2. Materials and Methods

Taking in consideration the above we offered to introduce Zinaxin-based periodontal dressings (medication of plant origin containing extracts of two ginger species (Zingeber Officinale (4-hydroxy-3-methoxyphenyl) and Alpinia Galanga (1'acetooxy-eugenol-acetate, p- hydroxyl-trans-cinnamaldehyde) into combined treatment of patients with generalized peroidontitis.

In generalized peroidontitis exacerbated course painful, alternative and exudative components of inflammation prevail. That's why we developed the following formulation to be taken in this period prepared ex tempore: Zingeber Officinale – 0.15, Alpinia Galanga – 0.015, Polyethylenoxydi-400 – 16.5.

In chronic generalized peroidontitis it is necessary to activate receptive processes in addition to effects on the inflammatory agents of periodontium diseases pathogenesis. That's why in this period we offer periodontal dressing containing Zingeber Officinale – 0.15, Alpinia Galanga – 0.015, Boli albae – 15.0, Olei olivari q.s. ut fiat pasta.

In the exacerbated course the solution is introduced into the periodontal pocket for 20-30 minutes. Curative paste is used after elimination of acute events. This paste is introduced into the periodontal pocket under occlusive periodontal dressing („Septopack" by„Septodont"). Occlusive periodontal dressing is applied to the lingual (palatine), vestibular aspects of the gum line and into the interdental spaces. The dressing surface is pressed by gloved fingers on all sides and molded in such a way that tooth cutting edges and masticatory surface should remain free and dressing edges shouldn't reach the attached area. Patients are not recommended to eat solid food for 2-3 hours and rinse the oral cavity.

We followed-up 37 patients. To detect an optimal concentration of Zinaxin in the periodontal dressing we examined 27 patients with the first degree and second degree generalized periodontitis at the age of 35-44 divided into 3 subgroups (every subgroup group consisted of 9 patients). All patients were applied Zinaxin-based periodontal dressings for 24 hours under occlusive periodontal dressing „Septopack" („Septodont"). Concentration of Zinaxin in the periodontal dressings used for subgroup 1 patients was 1:10, subgroup 2 patients – 1:100, subgroup 3 patients – 1:1000.

All patients were performed oral cavity sanation. Professional hygiene of the oral cavity was made using antiseptics (chlorhexidine 0.05% solution, 3% hydrogen dioxide). Control group included 10 persons with clinically healthy periodontium, without concomitant pathology. They were of the same age as those of the study subgroups.

Sampling of the gingival fluid taken from periodontal pockets was made using paper points (№ 30) during 1 min. The level of gingival fluid eicosanoids was evaluated using enzyme immunoassay. To evaluate PGE_2 we used Prostaglandin E_2 Elisa kit manufactured by RDS (UK), and to evaluate LTB_4 – leucotriene B_4 Elisa test kit manufactured by Neogen (USA). Findings were processed using mathematical statistics with „Statistica 5" computer programme considering discrepancy fidelity ($p<0.05$) by Student's criterion.

3. Results and Discussion

Laboratory findings showed that 12 hours later gingival fluid eicosanoids content (both PGE_2 and LTB_4) significantly decreased in all subgroups of patients with generalized periodontitis by contrast with the input data (Table 1). 24 hours later a definite decrease of gingival fluid PGE_2 and LTB_4 content (by contrast with input data) was revealed only in patients of subgroup 1 and subgroup 2. Comparing response to the treatment of patients of all subgroups we obtained a significant difference of PGE_2 and LTB_4 content (12 hours later) in the gingival fluid of patients belonging to subgroup 1 and subgroup 2 by contrast with patients of subgroup 3 in which the weakest medication concentration (1:1000) was used. Analysis of eicosanoids content of subjects in subgroup1 and subjects in subgroup 2 12 hours

later demonstrated that LTB_4 content was significantly lower in subgroup 1. However it must be admitted that administration of periodontal dressings with Zinaxin concentration 1:10 ensures curative action falling outside the physiological level of LTB_4 content in the periodontium tissues. 24 hours later gingival fluid eicosanoids content increases (by contrast with data obtained 12 hours later), but the content of PGE_2 and LTB_4 is significantly lower in subgroup 1 and subgroup 3 by contrast with subgroup 2. Thus, we consider periodontal dressings with Zinaxin concentration (1:100) used in subgroup 2 to be optimal because they provide adequate therapeutic outcome, don't inhibit eicosanoids synthesis below the physiological level, provide tempostable effect within 24 hours.

Therefore as a result of the treatment performed to adjust optimal concentration of Zinaxin concentration for its local administration formulated into periodontal dressings we chose that concentration (1:100) that on one hand ensures the required curative effect, and on the other hand – doesn't cause eicosanoids content decrease in the periodontium tissue falling outside the physiological level. Action duration of the periodontal dressing containing Zinaxin is about 12 hours during which we observed a significant decrease of proinflammatory mediators content (PGE_2, LTB_4) in the gingival fluid (group I). And it necessitates additional administration of Zinaxin (one capsule a day) to maintain therapeutic effect. Considering a significant role of proinflammatory eicosanoids in the generalized periodontitis pathogenesis it is very important and of interest at this time to study their activity and content in the gingival fluid in the course of treatment regimen ascertaining and to find whether this treatment is effective.

Table 1: Level of prostaglandin E_2 (PGE_2), leukotriene B_4 (LTB_4) in gingival fluid (pkg/ml) in patients suffering from generalized periodontitis in administration of different concentrations of Zinaxin

Indices		**Clinically healthy parodontium n=(10)**	**Group I**		
			Subgroup 1 n=(9)	**Subgroup 2 n=(9)**	**Subgroup 3 n=(9)**
PGE_2	Before treatment	48,4±13,4	694,7±88,0*	628,1±88,4*	645,4±91,1*
	12 hours		*149,9±22,3**	*194,6±25,8**	*415,7±26,8
	24 hours		*604,7±27,8	*328,1±25,0** p<0,05	511,2±37,4
LTB_4	Before treatment	81,2±23,2	707,9±64,8*	637,7±65,5*	656,3±72,7*
	12 hours		*51,4±10,2** p<0,05	*148,3±11,6**	*368,3±14,9
	24 hours		*436,9±54,9	*298,2±33,5** p<0,05	482,1±57,9

Note: * on the right – statistically significant difference by contrast with clinically healthy periodontium,

*on the left – statistically significant difference by contrast with input data,

** – statistically significant difference by contrast with subgroup 3, p – statistically significant difference between subgroup 1 and subgroup 2.

4. Conclusions

1. Zinaxin formulated into the periodontal dressing possesses significant anti-inflammatory activity and efficacy in its local administration.
2. Administration of periodontal dressings consisting Zinaxin (at a dilution of 1:100) is effective within 12 hours as evidenced by a significant decrease of gingival fluid eicosanoids content (PGE2, LTB4) in patients suffering from generalized periodontitis.

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