ORIGINAL ARTICLE

Evaluation of Effectiveness of an Alternative Method in Complex Treatment of Diseases of Endodont

E. V. Ergesheva[1], A. A. Davidiants[1], A. E. Dorofeev[1], M. A. Sevbitova[2], M. D. Timoshina[2]

[1]Department of Propaedeutics of Dental Diseases, Sechenov University, Moskva, Russia, [2]Student of the Dental Faculty of the Institute of Dentistry, Sechenov University, Moskva, Russia

Abstract

Introduction: Rate of complications after conducted endodontic treatment remains high despite of constant introduction of the newest endodontic tools, materials, and technologies. Exacerbation of chronic apical periodontitis (CAP) is quite often accompanied by disturbance of general condition, pain syndrome, hyperemia, edema of mucous tunic of alveolar bone, and by collateral edema of soft tissues of face. During inflammatory processes the medium molecules are formed in tissues and biologic fluids, these molecules are considered to be non-specific markers of endogenous intoxication. Hirudotherapy (HT) is an example of the significant positive effect of a natural living organism on the person who suffers from pathologies of various systems. Secretion of medicinal leech (MP) contains such bioactive substances as hirudin, bdellines, hirustasin, destabilase, hyaluronidase, eglines, inhibitors of kallikrein of blood plasma, and unidentified compounds that provide analgesic, antioxidant, immunostimulant, bacteriostatic, lipolytic, and other properties. **Materials and Methods:** Clinical material from 82 patients was analyzed. They were divided into two groups: The main one and the comparison one. Conventional endodontic treatment was conducted in all cases. In case of exacerbation of CAP, the HT was used in the main group together with the conventional endodontic treatment in all patients; and pharmacotherapy was used in the comparison group. **Results and Discussion:** Conducted clinical and laboratory research showed clinical effectiveness of HT in patients with exacerbation of CAP.

Key words: Endodont, inflammation, hirudotherapy, periodontitis

INTRODUCTION

Rate of complications after conducted endodontic treatment remains high despite constant introduction of the newest endodontic tools, materials, and technologies.[1] Patients with diseases of periapical tissues amount to from 18% to 40% of the total number of persons seeking dental help.[2] Chronic apical periodontitis (CAP) can be a cause of development of odontogenous inflammatory processes of maxillofacial region and neck, it can complicate the course of diseases of inner organs and systems, can lead to tooth extraction, to deformation of occlusion and to decrease of masticatory effectiveness which causes the patient's physical and moral discomfort; these factors make the endodontics one of the most important parts of dentistry.

Exacerbation of CAP is quite often accompanied by disturbance of general condition, pain syndrome, hyperemia, edema of mucous tunic of alveolar bone, and by collateral edema of soft tissues of face.[3] Basis of the pathogenesis of an inflammatory process is formed by two main mechanisms: Action, which an irritator performs on tissue and a local reaction of tissues. On its part, reaction depends on the state of the organism, its local and general immunity.[4]

During inflammatory processes the unidentified toxic substances - medium molecules are formed in tissues and biologic fluids. Level of medium molecules is a non-specific indicator of the intensity of endogenous intoxication.[5]

Various methods and medicaments are used for the treatment of CAP in modern dentistry; their choice is to a

Address for correspondence:
E. V. Ergesheva, Department of Propaedeutics of Dental Diseases, Sechenov University, Moskva, Russia.
E-mail: dryergesheva@gmail.com

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large extent determined by both etiology and clinical picture of disease. Used methods and medicaments not always turn out to be effective enough. A full-fledged osteoanagenesis in the area of destruction is quite often absent despite high-quality endodontic treatment. Therefore, the growing attention of dentists is attracted by traditional methods of therapy including HT because it has a systematic and multicomponent effect on the course of inflammatory process; this effect is determined by the presence of bioactive substances in the secretion of salivary glands (cells) of medicinal leech (ML).[6]

For many centuries, the HT has been asserting its right to be a legitimate source of medicinal substances which are produced by salivary glands of ML; since these substances are humoral agents of a unique method, they have a positive effect during treatment of many diseases and have no negative side effect.[7] HT is an example of marked positive action of a natural living organism on the person who suffers from pathologies of various systems.[8]

Treatment of acute and chronic forms of apical periodontitis is one of the topical problems of dentistry. Inflammation in apical tissues in 98–99% cases is a cause of development of various forms of odontogenous infection (abscess, phlegmon, periostitis, etc.) which is a potential danger for the organism. Removal of teeth because of pulp diseases and periodontitis in various regions of RF has a high rate from 48% to 80%.[2,9] Acute course of the periapical inflammatory process is accompanied by an adverse effect on course of accompanying diseases of organism and causes their exacerbation.[10]

Secretion of medicinal leech contains such bioactive substances as hirudin, bdellines, hirustasin, destabilase, hyaluronidase, eglines, inhibitors of kallikrein of blood plasma, and unidentified compounds that provide analgesic, antioxidant, immunostimulant, bacteriostatic, lipolytic, and other properties.[11]

Objective of our research

The objective of our work was an evaluation of the effectiveness of HT in complex treatment of CAP; this evaluation was performed with the help of semi-quantitative method. We planned to study the disintoxication effect of HT on the basis of determination of the level of medium molecules in the mixed saliva of patients with CAP.

MATERIALS AND METHODS

Clinical material from 82 (100%) patients was analyzed. Among them were 9.8% patients with chronic fibrous periodontitis, 18.2% with chronic granulomatous one, and 72% with chronic granulating one [Figure 1].

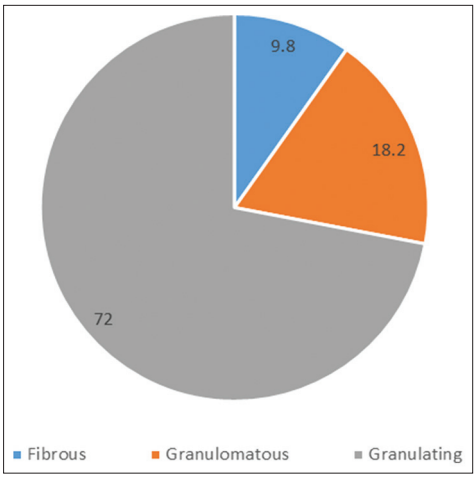

Figure 1: Percentage of various forms of chronic apical periodontitis

Conventional endodontic treatment in all cases included creation of access, forming of root canals by manual and machine instruments, irrigation, and ultrasonic processing of canals. Permanent filling of root canals was performed by gutta-percha pins with the help of method of lateral condensation with a sealer. In case of exacerbation of CAP, the HT was used in the main group together with conventional endodontic treatment in all patients; and pharmacotherapy (antibiotics, nonsteroidal anti-inflammatory drugs, and hyposensitization ones) was used in the comparison group, a cut was made on the mucogingival junction.

Evaluation of clinic results of treatment was performed with the help of semi-quantitative method in points. In addition, disintoxication effect of HT was determined according to the level of medium molecules in mixed saliva.

RESULTS AND DISCUSSION

The average age of patients in the main group was 32.5 ± 2.1 years; that one in the comparison group was 31.0 ± 1.9 years ($P > 0.05$).

Data of dental state revealed no significant differences between the patients of the main group and comparison group in case of exacerbation of CAP. No pathologic changes were found in the oral mucosa. Prevalence of caries in both groups was 100%. The intensity of caries in the main group was 13.3 ± 0.3 and 12.8 ± 0.4 in the comparison one. Greene–Vermillion hygiene index in the main group was 2.2 ± 0.7 and 2.3 ± 0.3 ($P > 0.05$) in the comparison group that corresponds to category "satisfactory" on scale of qualitative characteristics.

During evaluation of the state of parodont in patients, a chronic generalized catarrhal gingivitis was found in 24 patients (15 in the main group and 9 in the comparison one), a mild chronic generalized parodontitis was found in 10 and severe one in

2 patients. At the same time, the Russell periodontal index was 3.5 ± 0.2 in the main group and 3.2 ± 0.2 ($P > 0.05$) in the comparison one. Distribution of teeth (in total 54 teeth), which had been treated because of exacerbation of CAP was the following: In the main group - 28, among them 15 single-rooted teeth, and 13 multi-rooted ones; in the comparison group - 26, among them 14 single-rooted teeth and 12 multi-rooted ones.

Dental state of the compared groups is (partially) shown in Figure 2.

Before treatment (on the 1st day) the values of semi-quantitative evaluation of the intensity of painful sensations in patients with exacerbation of CAP did not differ reliably in the main group and the comparison one. At the time of the second visit, the values of intensity of pain in patients of the main group were reliably decreasing, and at the time of the third visit, the pain practically disappeared, i.e., a pronounced analgesic action of HT was observed. Values of the intensity of pain in the comparison group were decreasing on the 3–5th day but on the 7–10th they remained reliably higher than in case of using HT. Analgesic effect of HT is probably determined by the fact that level of kallikrein and bradykinin is reduced under the influence of secretion of salivary glands of ML because this level together with substance P is a mediator of pain.[4] Analgesic effect also can be probably connected with central mechanisms. For example, Khomiakov had proved in an experiment that hirudin intensifies inhibitory processes in CNS.[7]

HT had a marked decongestive (anti-edematous) action together with the analgesic effect. Values of the intensity of edema and hyperemia in patients of the main group were decreasing during treatment, and the edema fully disappeared by the 3rd visit. By the 7–10th hyperemia and edema in the comparison group decreased but did not disappear. Anti-edematous effect of HT can be probably connected with the improvement of microcirculation in oral mucosa and parodont; this improvement is expressed by an increase of vascular tone, an increase of effectiveness of blood flow, and increase of area of functioning capillaries.

Procedure of HT is shown in Figure 3.

During treatment, the summed semi-quantitative value of clinical manifestations of exacerbation of CAP was decreasing in patients of the main group and the comparison one [Table 1].

On the 3–5th day of treatment, the summed value of clinical manifestations in the main group of patients with exacerbation of CAP, who were treated by HT, decreased 5.8-fold and on the 7–10th day decreased 29-fold. Decrease of summed value was less marked in the comparison group. On the 3–5th day of treatment, the value decreased 1.5-fold and on the 7–10th day 1.6-fold.

Before treatment, in case of exacerbation of CAP, the values of level of medium molecules of mixed saliva in compared groups were increased with regard to norm [Figure 4].

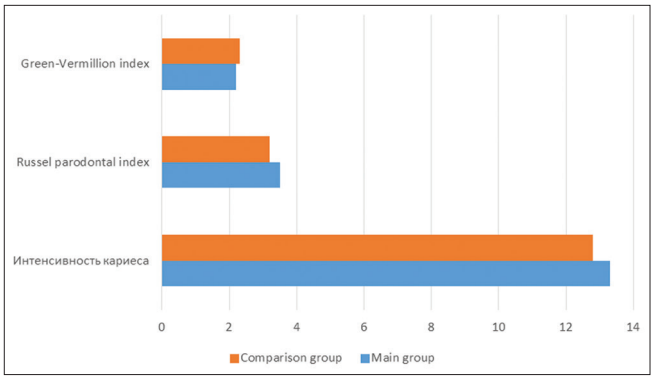

Figure 2: Dental state in the compared groups

Figure 3: Procedure of hirudotherapy

Table 1: Values of summed evaluation (in points) of the intensity of clinical manifestations of exacerbation of chronic apical periodontitis in the main group and the comparison one during treatment

Days of visits	Groups		Reliability of differences
	Main one	Comparison one	
1st	8.70±0.47	8.63±0.50	>0.05
From 3rd to 5th	1.50±0.40	5.63±0.68	<0.001
From 7th to 10th	0.30±0.15	5.25±0.75	<0.001

At the same time, the value in the main group of patients was reliably higher than in the comparison group. At the time of the second and third visits, the level of medium molecules was progressively decreasing after treatment by ML but did not reach control values whereas the level of medium molecules in the comparison group was not reliably changing.

Decrease of the value of the level of medium molecules of mixed saliva due to HT is probably connected with anti-inflammatory action and reduction of forming of plasmic and cellular mediators in inflammation focus and with bactericidal effect of secretion of salivary glands of ML. For example, Khomiakov had proved that destabilize of secretion of ML has a 10-fold marked bactericidal effect than egg lysozyme.[7]

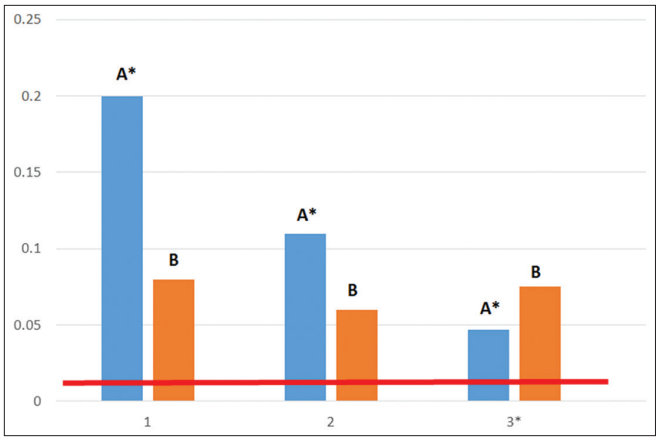

Figure 4: Level of medium molecules in mixed saliva of patients with exacerbation of chronic apical periodontitis in the main group (A - with hirudotherapy) and comparison group (B - without hirudotherapy) on the 1st(1), 3–5th (2), 7–10th (3) - day of treatment;-(horizontal red line) - norm; * - differences in values of compared groups are reliable

CONCLUSION

Conducted clinical and laboratory research showed that after patients with exacerbation of CAP had been treated by HT, a clinical improvement of state of the patients was observed, this improvement is connected with a quick resolution of inflammatory process and is determined by a marked analgesic and decongestive action of secretion of ML. HT in complex treatment of patients with CAP has a marked disintoxication action and increases effectiveness of treatment of diseases of parodont.

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