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THERAPEUTIC AND PREVENTIVE EFFECT OF THE ANTIDIABETIC AGENT KVVERTULIN ON THE CONDITION OF THE ORAL CAVITY OF PATIENTS WHO RECEIVED ORAL APPLICATIONS OF FRIED SUNFLOWER OIL

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Abstract

Background. To determine the possibility of prevention of dental complications in the consumption of fried sunflower oil (FSO) with the antidiabetic agent Kvertulin.

Methods. Patients underwent oral FSO applications for 10 days. The antidiabetic agent was taken sublingually. The condition of the oral cavity was assessed by such indicators as salivation rate, hygienic indices, level in saliva of biochemical markers of inflammatory-dystrophic (elastase, MDA, urease), dysbiotic processes (urease, lysozyme, degree of dysbiosis) and antioxidant protection (catalase, index API).

Results. It was found that the consumption of FSO increases the level of elastase, urease, MDA and the degree of dysbiosis in saliva, but reduces the level of lysozyme, catalase and API index. Previous use of Kvertulin significantly reduced the level of elastase, urease, MDA and the degree of dysbiosis and increased the level of lysozyme, catalase and API index. The therapeutic and prophylactic efficacy of kvvertulin in the patients who consumption of FSO was 64.4 %.

Conclusion: Consumption of FSO causes the development of inflammatory-dystrophic and dysbiotic complications in the oral cavity, which can be largely prevented with the antidisbiotic agent Kvertulin.

Keywords: fried oil; oral cavity; antidisbiotic agent; inflammation; dysbiosis.

Introduction

In our experimental studies it was shown that the consumption of heat-treated dietary fats causes the development of inflammatory-dystrophic processes in the digestive system and, in particular, in the tissues of the oral cavity [1, 2]. Preliminary use of antidisbiotic drugs, which include prebiotics, antioxidants, adaptogens, largely prevents the development of pathological processes in the oral cavity [3, 4].

The aim of this study was to determine the possibility of preventing the development of dental complications in the consumption of fried sunflower oil (FSO) with a multifunctional antidisbiotic agent Kvertulin, which includes the prebiotic inulin, bioflavonoid quercetin and calcium citrate [5].

Materials and research methods

As FSO was used unrefined sunflower oil, which was heated at a temperature of +180 °C for 60 minutes in the presence of 1.5 % 30 % H₂O₂. The effect of FSO on the condition of the oral cavity in 51 patients aged 23-32 years, who had no acute dental diseases and somatic diseases, was studied. 24 patients (47 %) were men and 27 (53 %) were women.

All patients were divided into 3 groups: 1st (control), 2nd received oral applications of FSO in the amount of 1 ml daily after breakfast for 10 days, 3rd group of patients received 1 tablet of Kvertulin (600 mg, under the tongue) 30 minutes before application FSO, the second tablet – in 6 hours and the third – in 12 hours. The duration of treatment was 10 days.

Used the drug Kvertulin produced by the SPA "Odesa Biotechnology" (Ukraine) [5].

In patients of all three groups on day 11 on an empty stomach collected unstimulated mixed saliva for 10 minutes [7]. The protein content of saliva was determined [8], the activity of enzymes elastase [7], urease [7], lysozyme [7], catalase [7], as well as the content of malonic dialdehyde (MDA) [7]. According to the ratio of the relative activities of urease and lysozyme, the degree of dysbiosis was calculated according to A. P. Levitsky [9], and according to the ratio of catalase activity and MDA content the antioxidant-prooxidant index API was calculated [7].

The pathogenic effect (PE) of oral applications of FSO was determined by the formula:

$$PE = \Delta E + \Delta MDA + \Delta U + \Delta L + \Delta C, \text{ where}$$

ΔE – increase in elastase activity in %; ΔMDA – increase in the content of MDA in %; ΔU – increase in urease activity in %; ΔL – decrease in lysozyme activity in %; ΔC – decrease in catalase activity in %.

Therapeutic and prophylactic action (TPA) of Kvertulin was calculated by the same formula, but determined a decrease in elastase, MDA and urease in % and an increase in lysozyme and catalase activity in %.

Therapeutic and prophylactic efficacy (TPE) of Kvertulin was calculated by the formula:

$$TPE = TPA / PE \times 100 \%$$

The state of oral hygiene was determined by the Green-Vermillion method [10] and by the Fedorov-Volodkina method [10].

Statistical processing of the study results was carried out in accordance with [11].

Results and discussion

Table 1 presents the results of determining the dental indicators of the oral cavity, namely the indices of hygiene and salivation rate. These data show that all three indicators in group № 2 have only a tendency to increase, possibly due to the very short duration of the study (only 10 days). Also, only a downward trend is observed in group № 3.

Table 1. The condition of the oral cavity in patients receiving oral FSO applications and the drug Kvertulin

Indexes	Control	FSO	FSO +Kvertulin
Green Vermilion Index	1,11±0,15	1,32±0,17 p>0,3	1,27±0,19 p>0,3; p ₁ >0,5
Fedorov-Volodkina Hygiene Index	1,43±0,27	1,59±0,28 p>0,3	1,49±0,24 p>0,5; p ₁ >0,5
Salivation, ml / min	0,65±0,12	0,83±0,15 p>0,3	0,79±0,14 p>0,3; p ₁ >0,5

Notes: p – in comparison with gr. "CONTROL"; p₁ – in comparison with gr. "FSO".

Table 2 presents the results of determining the biochemical parameters of saliva of patients. As can be seen from these data, in patients who received FSO significantly increased protein concentration (in 44.6 %), significantly increases the activity of elastase (in 85.9 %),

which is a biochemical marker of inflammation [12]. The content of MDA increases in 60 %, which indicates the activation of lipid peroxidation [6]. The activity of the bacterial enzyme urease, which is a marker of microbial contamination, increases more than twice (by 107.7 %) [13].

Table 2. Influence of FSO and quertulin applications on biochemical parameters of mixed saliva of patients

Indexes	Control	FSO	FSO +Kvertulin
Protein, g/l	1,86±0,19	2,69±0,17 p<0,05	2,08±0,17 p>0,3; p ₁ <0,05
Elastase, mc-cat/l	0,85±0,12	1,58±0,13 p<0,05	1,08±0,14 p>0,05; p ₁ <0,05
MDA, mmol/l	0,30±0,04	0,48±0,05 p<0,05	0,27±0,03 p>0,3; p ₁ <0,05
Urease, mc-cat/l	0,14±0,05	0,29±0,03 p<0,05	0,20±0,04 p>0,3; p ₁ >0,05
Lysozyme, units/l	221±12	163±13 p<0,05	214±14 p>0,3; p ₁ <0,05
Catalase, mcat/l	0,31±0,02	0,26±0,03 p>0,05	0,33±0,03 p>0,3; p ₁ >0,05

Notes: see table 1.

At the same time, the activity of lysozyme, which is an indicator of nonspecific immunity, is reduced in 26.2 % [14]. The activity of the antioxidant enzyme catalase is also reduced, but p>0.05.

Pre-use of Kvertulin (group 3) reduces elastase activity in 31.6 %, urease activity in 31 % and MDA content in 43.7 %. The use of Kvertulin increases the activity of lysozyme in 31.3 % and the activity of catalase in 26.9 %.

In fig. 1 shows how the consumption of FSO affects the API index (it is reduced in half) and how it increases (in 2.4 times) by the use of Kvertulin.

In fig. 2 shows that the consumption of FSO significantly increases (in 2.8 times) the degree of dysbiosis in the oral cavity, but the use of Kvertulin reduces it in 2 times.

The pathogenic effect (PE) of FSO applications was determined by the sum of changes in the level of inflammation (urease, MDA and elastase) and protection (lysozyme and catalase). It turned out to be equal to 295.6 %.

Therapeutic and prophylactic action (TPA) of Kvertulin was determined by the sum of changes in inflammation (decreased urease, MDA and elastase) and protective indicators (increased lysozyme and catalase activity). It was equal to 164.5 %.

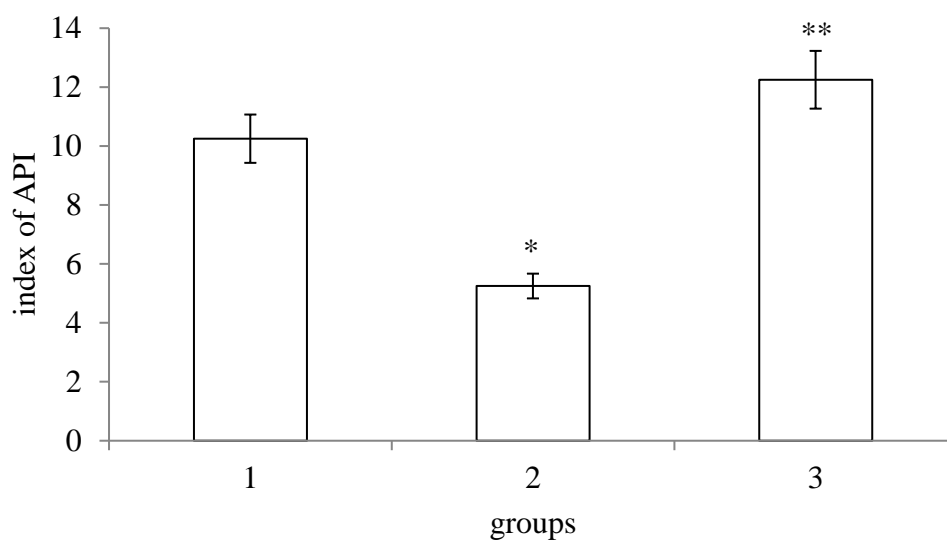


Fig. 1. Effect of Kvertulin (3) on the antioxidant-prooxidant index of API in the saliva of patients receiving oral FSO (2). 1 – control

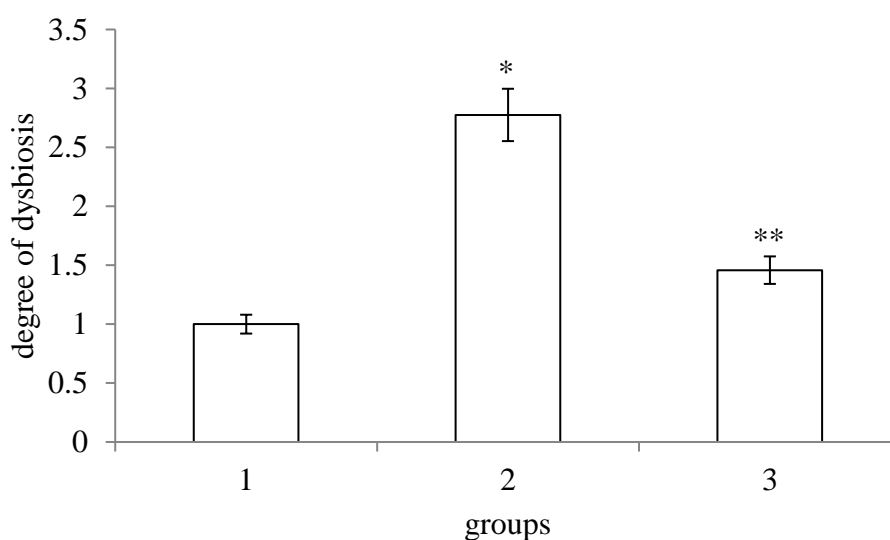


Fig. 2. The effect of Kvertulin (3) on the degree of dysbiosis in the oral cavity of patients receiving oral FSO (2). 1 – control

The therapeutic and prophylactic efficacy of quertulin was calculated according to the ratio of TPA and PE, which was equal to 64.4 %.

Conclusions

1. Consumption of fried sunflower oil causes the development of inflammatory-dystrophic and dysbiotic processes in the oral cavity.

2. The use of the antidiabetic agent Kvertulin has a therapeutic and prophylactic effect on pathological complications in the oral cavity with the application of fried sunflower oil.

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