

**PATHOGENESIS OF CHANGES IN THE MOUTH WITH SUGAR
DIABETES**

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Annotation. Diabetes mellitus (lat. diabetes mellitus) is a group of endocrine diseases that develop as a result of an absolute or relative deficiency of the hormone insulin, resulting in a persistent increase in blood glucose.

Diabetes is a global problem that has only grown over the years. According to statistics, 371 million people suffer from this disease in the world, which is 7 percent of the total population of the Earth.

The main reason for the growth of the disease is a radical change in lifestyle. According to statistics, if the situation does not change, by 2025 the number of diabetics will double.

In the ranking of countries by the number of people diagnosed are:

1. India - 50.8 million;	6. Germany - 7.6 million;
2. China - 43.2 million;	7. Pakistan - 7.1 million;
3. USA - 26.8 million;	8. Japan - 7.1 million;
4. Russia - 9.6 million;	9. Indonesia - 7 million;
5. Brazil - 7.6 million;	10. Uzbekistan - 245 thousand.

The maximum percentage of the incidence rate was found among residents of India, China and the United States, where about 20 percent of the total population of the country suffer from diabetes. In Russia, this figure is about 6 percent. Ministry of Health: In Uzbekistan, the number of patients with diabetes is more than 245 thousand, of which more than 2.3 thousand are children, 879 teenagers.

Despite the fact that in our country the level of the disease is not as high as in the United States, scientists say that the inhabitants of Russia have come close to the epidemiological threshold.

Experts note that in developed countries the number of diabetics is doubling every 15 years, and this increase has not yet been stopped. According to forecasts, by 2040 the number of diabetics will reach 642 million and 540 thousand of them will be children under 14 years of age. Because of the seriousness of this problem, WHO has declared diabetes mellitus an epidemic of the 21st century.

Keyword. Diabetes mellitus, CD-1, CD-2, Insulin, hyperglycemia, pancreas, glucosuria, glucose.

Аннотация. Сахарный диабет (лат. diabetes mellitus) - группа эндокринных заболеваний, развивающихся вследствие абсолютной или относительной недостаточности гормона инсулина, в результате чего развивается стойкое увеличение содержания глюкозы в крови.

Сахарный диабет представляет собой мировую проблему, которая с годами только растет. Как показывает статистика, в мире этим заболеванием страдает 371 миллион человек, что составляет 7 процентов от всего населения земли. Основная причина роста болезни – кардинальное изменение образа жизни. По подсчетам статистиков, если ситуацию не менять, к 2025 году количество диабетиков возрастет в два раза.

В рейтинге стран по количеству людей с диагнозом находятся:

1. Индия — 50,8 миллионов;	6. Германия – 7,6 миллионов;
2. Китай — 43,2 миллионов;	7. Пакистан – 7,1 миллионов;
3. США – 26,8 миллионов;	8. Япония – 7,1 миллионов;
4. Россия – 9,6 миллионов;	9. Индонезия – 7 миллионов;
5. Бразилия – 7,6 миллионов;	10. Узбекистан – 245 тысяч.

Максимальный процент уровня заболеваемости выявлен среди жителей Индия, Китай и США, где от сахарного диабета страдают около 20 процентов всего населения страны. В России этот показатель равняется около 6 процентов. Министерство здравоохранения: В Узбекистане количество больных сахарным диабетом — более 245 тысяч, из них более 2,3 тысяч детей, 879 подростков. Несмотря на то, что в нашей стране уровень заболевания не такой высокий, как на территории США, ученые утверждают, что жители России вплотную приблизились к эпидемиологическому порогу.

Экспертами отмечается, что в развитых странах каждые 15 лет количество диабетиков растет удваивается, остановить этот прирост пока не удастся. Согласно прогнозам, к 2040 году количество диабетиков достигнет 642 миллиона и 540 тысяч из них будут дети до 14 лет. Из-за серьезности данной проблемы ВОЗ объявил сахарный диабет эпидемией XXI века.

Ключевой слова. Сахарный диабет, СД-1, СД-2, Инсулин, гипергликемия, поджелудочной железа, глюкозурии, глюкоза.

Purpose of the study. Study of changes in the oral cavity of patients with diabetes.

Materials and methods. One dissertation, six scientific articles and eight textbooks were analyzed.

Results and discussion. Diabetes mellitus is characterized by chronic hyperglycemia, which develops as a result of insulin deficiency (type 1 diabetes mellitus) as a result of

the cessation of its production, or as a result of a decrease in body tissue resistance to insulin in combination with secretory dysfunction of pancreatic β -cells (type 2 diabetes mellitus).

CD-1 occurs in people under the age of 30 and leads to the development of persistent hyperglycemia. Sometimes the first type can develop after a severe attack of pancreatitis, resulting in loss of pancreatic function. There is no insulin in the body, so it is administered artificially.

CD-2 disrupts the interaction of insulin with body tissue cells, cells lose sensitivity to insulin, hyperglycemia occurs with a lack of glucose in tissues, and the amount of the hormone can be even higher than in healthy people. This form occurs in 80-90% of cases. It develops in people who lead an unhealthy lifestyle, as well as in elderly patients, which is explained by impaired functioning of the body due to age-related characteristics. DM-2 is corrected with the help of specific therapy and diet [8, 14].

Thus, a paradoxical situation arises: the body, on the one hand, experiences hunger due to the fact that incoming sugars are not processed into nutrients, and on the other hand, the glucose content in the blood increases, which has a destructive effect on the state of the cells.

Insulin is actively involved in carbohydrate metabolism, in the processes of glycolysis, lipolysis, proteolysis, promotes the reabsorption of Na and water due to the activation of Na-, K-ATPase. Due to the lack of insulin, the level of glucose in the blood rises, which leads to glucosuria, polyuria, and dehydration [15].

As a consequence of the latter, the function of the salivary glands decreases, dryness of the mucous membranes of the oral cavity develops, despite increased thirst.

Along with xerostomia, mucosal paresthesia occurs. Patients complain of burning sensation in the mouth. Taste sensitivity also decreases, which is due to disorders of the nervous system as a result of carbohydrate metabolism disorders [12, 17].

Along with a decrease in the amount of saliva secreted, its chemical composition changes - an increased level of glucose in the blood leads to an increase in the concentration of glucose in saliva [6, 14], an increase in the level of calcium and a decrease in the phosphorus content, which affects the main functions of the oral fluid - mineralizing, cleansing and protective. Much the balance of demineralization and remineralization processes worsens [7, 11].

At the initial stages, a compensatory mechanism manifests itself - acidosis with a shift in the pH of the mixed saliva to the acid side up to 6.17 ± 0.04 , with further progressive development of the disease, a persistent violation of the acid-base balance in the oral cavity occurs. In severe forms of diabetes, the amount of glucose in saliva increases in parallel with the increase in blood plasma and exceeds 0.06-0.17 mmol / l. With a decrease in pH already to 6.2, saliva becomes undersaturated with calcium and

inorganic phosphate and turns into demineralizing saliva [13, 15]. All monosaccharides are quickly utilized by oral microbes and converted into organic acids, which further acidifies the environment in the oral cavity.

Violation of the acid-base balance with a shift in pH to the acid side due to a decrease in salivation against the background of hyperglycemia leads to tension in compensatory mechanisms and destabilization of systems for maintaining local homeostasis. Against the background of a decrease in the resistance of periodontal tissues to the action of local factors, favorable conditions are created for the development of dysbiosis with the activation of periodontopathogen and fungal microflora [9, 18].

In DM, hyperglycemia is compensatory in nature, because with a high level of glucose in the blood, its consumption by tissues improves, but it also has a negative value, being a pathogenetic factor in diabetic angiopathy, manifested in the form of sclerosis, obliteration and other damage to blood vessels. Pathological changes in the vessels of the microvasculature (microangiopathy) develop as follows:

under conditions of high blood glucose, glycosylation of capillary basement membrane proteins occurs, due to which the vascular wall thickens and thickens under the influence of excess sorbitol (the conversion of glucose into sorbitol in diabetes mellitus increases 8 - 10 times from 1-2%). The consequence of this is swelling, thickening and degeneration of the vascular endothelium, tissue ischemia due to a decrease in the lumen of the vessel, which leads to disruption of transcapillary exchange and the formation of microthrombi [8, 19, 21].

Vascular complications and hyperglycemia lead to a decrease in the reparative functions of the periodontium. The mucous membrane of the oral cavity is thinned, inflamed and highly vulnerable. Patients feel pain when eating, especially hot and hard food, catarrhal gingivitis develops, gums bleed when brushing teeth [10, 18]. It is a mistake to use unnecessarily gentle methods of brushing your teeth, because. Decreased oral hygiene in patients with DM leads to the further development of various forms of gingivitis. According to researchers, 30% have simple marginal, 53% hyperplastic, and 16% atrophic gingivitis. In places of minor mechanical injuries, damage is observed in the form of hemorrhages, sometimes erosions; in patients with decompensated DM, trophic ulcers with slow regeneration may develop on the mucosa. Fungal lesions are characteristic (pseudomembranous, acute and chronic atrophic candidiasis of various departments) due to a decrease in bactericidal capabilities of saliva [17, 21].

The most common complication of DM is periodontitis (52-90%). Its development is due to hyperglycemia, insufficiency of the functions of the salivary glands and a decrease in the bactericidal properties of saliva. The relationship between the state of periodontal tissues and the course of diabetes mellitus has been established.

Patients with latent or mild diabetes are more likely to develop periodontitis 1 and 2 degrees, and in moderate and severe forms - 2 and 3 degrees. When the duration of the disease is up to 1 year, there are changes in the periodontium in 28% of patients [2]. With the development of microbial flora, halitosis develops.

Among the nonspecific changes and diseases of the oral mucosa in diabetes mellitus, there are: swelling of the mucous membrane of the cheeks and surfaces of the tongue along the line of closure of the teeth (31.7%); atrophy of the filiform papillae of the tongue (2.6%); cheilitis, various clinical forms of chronic recurrent aphthous stomatitis (17%); lichen planus (Grins pan's syndrome) and leukoplakia (3.2%) [7].

When examining the oral cavity, a dentist may note a slightly moist or dry mucous membrane. It has a luster and is slightly hyperemic. With a longer course of the underlying disease, erosion, hemorrhage, and the appearance of trophic ulcers are possible. When examining the salivary glands, no organic changes are noted, tk. xerostomia in DM is not associated with damage to the parenchyma of the salivary glands, but with tissue dehydration.

Their palpation is painless. The excretory ducts are without pathological changes, the secret is clean, but its deficiency is noted.

In general, the hygienic condition is unsatisfactory - patients spare the gums, brush their teeth poorly. Increased plaque formation. Periodontal tissues are inflamed due to the above reasons, as well as disorders of carbohydrate metabolism and bone lysis. As additional research methods, bacteriological examination of the contents of periodontal pockets is used. With a titer of 10^3 *Candida alb.* confirmed the diagnosis of candidiasis-associated periodontitis. Due to the processes of osteolysis of the alveolar processes, the pathology of periodontal bone tissue of varying degrees will be confirmed on the radiograph [12].

Conclusions.

1. The very first manifestation of DM in the oral cavity may be xerostomia due to developing tissue dehydration.
2. Hyperglycemia leads to an increase in glucose levels in mixed saliva, which negatively affects its basic functions. Acidosis as a compensatory mechanism increases the risk of oral dysbiosis.
3. Pathological changes in the vessels of the microvasculature predispose to a decrease in the reparative and barrier functions of periodontal tissues - bleeding of the gums appears, trophic ulcers may develop, pain when eating.
4. Together, persistent hyperglycemia, insufficiency of the salivary glands, a decrease in the bactericidal properties of the oral fluid and the protective functions of periodontal tissues, as well as a deterioration in personal hygiene lead to the development of inflammation in the form of gingivitis, stomatitis. Developing osteolysis leads to moderate and severe degrees of periodontitis.

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