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FEATURES OF CLINICAL MANIFESTATIONS OF MAJOR DENTAL DISEASES IN PATIENTS WITH TYPE 2 DIABETES MELLITUS (LITERATURE REVIEW)

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Annotation

Subject. The article is a literary review devoted to the peculiarities of clinical manifestations of major dental diseases in patients with impaired carbohydrate metabolism, type 2 diabetes mellitus.

Methodology. The data of Russian and foreign literature were studied using scientific search library databases: PubMed, Elibrary, Cochrane. Literature analysis was carried out on 59 sources over the past 5 years (42 domestic authors and 17 foreign ones). The analysis of the literature data allows us to consider type 2 diabetes mellitus as highly common somatic diseases leading to the development of various symptoms, syndromes and diseases of the hard tissues of the teeth, periodontal and oral mucosa.

Results. Among the wide range of possible complications and symptoms are — impaired taste sensitivity, the presence of xerostomia, burning mouth syndrome, glossalgia, lichen planus, leukoplakia, candidiasis, chronic inflammatory diseases of periodontal tissues, complicated and uncomplicated caries of hard dental tissues. Diagnostic and therapeutic and preventive measures in this case should be aimed at their early diagnosis and prevention.

Conclusions. Against the background of manifestations of DM2, there is a significant prevalence of major dental diseases, which most often depends not only on the duration of the course and severity of DM2, but also on the state of carbohydrate metabolism compensation, age and gender. Undoubtedly, the principle of continuity of interested specialties, including dentists, endocrinologists, gastroenterologists and other specialists, has great prospects both in the diagnosis and prevention of pathology of the oral mucosa.

Keywords: *carbohydrate metabolism disorder, type 2 diabetes mellitus, glycated hemoglobin, periodontal disease, caries, burning, pain, candidiasis, lichen planus, glossalgia, burning mouth syndrome*

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ОСОБЕННОСТИ КЛИНИЧЕСКИХ ПРОЯВЛЕНИЙ ОСНОВНЫХ СТОМАТОЛОГИЧЕСКИХ ЗАБОЛЕВАНИЙ У ПАЦИЕНТОВ С САХАРНЫМ ДИАБЕТОМ 2 ТИПА (ОБЗОР ЛИТЕРАТУРЫ)

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Аннотация

Предмет. Статья представляет собой литературный обзор, посвященный особенностям клинических проявлений основных стоматологических заболеваний у пациентов с нарушением углеводного обмена, сахарным диабетом 2 типа.

Методология. Изучены данные российской и зарубежной литературы с использованием научных поисковых библиотечных баз данных: PubMed, Elibrary, Cochrane. Анализ литературы проводился по 59 источникам за последние 5 лет (42 отечественных автора и 17 зарубежных). Проведенный анализ данных литературы позволяет рассматривать сахарный диабет 2 типа как высоко распространенное соматическое заболевание, приводящее к развитию различных симптомов, синдромов и заболеваний твердых тканей зубов, пародонта и слизистой оболочки рта.

Результаты. В число широкого спектра возможных осложнений и симптомов входят нарушение вкусовой чувствительности, наличие ксеростомии, стомалгии, глоссалгии, плоского лишая, лейкоплакии, кандидоза, хронических воспалительных заболеваний тканей пародонта, осложненного и неосложненного кариеса твердых тканей зубов. Диагностические и лечебно-профилактические мероприятия в данном случае должны быть направлены на их раннюю диагностику и профилактику.

Выводы. На фоне проявлений СД 2 наблюдается значительная распространенность основных стоматологических заболеваний, что чаще всего зависит не только от длительности течения и степени тяжести СД 2, а также от состояния компенсации углеводного обмена, возраста и гендерного признака. Несомненно, большими перспективами как в вопросах диагностики, так и профилактики патологии слизистой оболочки рта обладает принцип преемственности заинтересованных специальностей, среди которых несомненны — стоматологи, эндокринологи, гастроэнтерологи и другие специалисты.

Ключевые слова: *нарушение углеводного обмена, сахарный диабет 2 типа, гликированный гемоглобин, пародонт, кариес, жжение, боль, кандидоз, плоский лишай, глоссалгия, стомалгия*

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Introduction

In the modern aspect of the increase in the number of patients with somatic pathology, the presence of comorbidity, as well as the high prevalence of type 2 diabetes in the world and in Russia as a whole, indicates a significant frequency of occurrence of major dental diseases, including mucosal pathology. It is known that diseases of the oral mucosa are one of the most difficult problems, since they differ not only in their chronic recurrent course and diagnostic difficulties, tolerance to treatment, which together significantly affects the quality of life [1, 26].

In type 2 diabetes mellitus, manifestations of various pathological conditions on a slippery sick cape thicket, bearing the following nonspecific confessions and symptoms in the form of edema of the mucosal lining of the oral cavity (31.7%), atrophy of the filamentous papillae of the tongue (2.6%), leprosy – cheilitis, recurrent consequences of the completeness of the oral cavity, lingual, prosthetic stomatitis (17%), lichen planus or lichenoid defeated mucosa (3.21%), leukoplakia (3.2%), from autonomous pagan patients – rhomboid and desquamative glossitis (11.65%), the medial labial fissure (6.06%), as well as failed candidiasis and burning mouth syndrome [2, 6, 7, 12, 13, 18–22, 24, 27, 29, 30, 34–37, 39].

According to the numerous studies frecuency defeat of the tissue of parodentium in patients with a DM2 of ranging from 2% to 80%, intact parodentium (7.7%), 100% of the cases high prevalence of carries of hard tissues of teeth and unsatisfactory hygiene of the oral cavity is observed [2, 6, 11, 12, 13, 20, 22, 24, 27–37, 41, 46, 58].

Despite the comorbidity of dental pathology, the high prevalence of type 2 diabetes mellitus and metabolic syndrome, the study of the features of clinical manifestations of major dental diseases in patients living in the Republic of Bashkortostan is important and relevant today.

The purpose of this study is to conduct a systematic analysis of modern native and foreign literature sources to determine some features of clinical manifestations of major dental diseases against the background of DM2 and metabolic symptoms.

Material and methods of research

We have conducted a search for various systematic reviews on the features of clinical manifestations of major dental diseases in people with DM2. The following databases are involved in the search: PubMed, Web of Science, Medline, elibrary.ru, Scopus in the period from 2016 to 2021. The literature search strategy also included combinations of keywords and terms: DM2, caries, gingivitis, periodontitis, leukoplakia, lichen planus, candidiasis, burning, dryness, stomatalgia, glossodynia, cheilitis, glossitis, microbiome. Particular attention was paid to articles published in peer-reviewed scientific publications over the past 5 years.

The results of the study

Manifestations and changes in the oral cavity against the background of the presence of type 2 diabetes mellitus and metabolic syndrome are different – changes in the salivary glands that occurred by the type of dystrophic in the form of sialadenosis, decreased salivation, which often contributes to the patient's feeling of dryness in the oral cavity and the development of xerostomia, impaired taste sensitivity. A decrease in the secretory reflex leads to a significant violation of the composition of the oral microbiota in the form of the prevalence of acid-resistant microorganisms – Streptococcus mutans, as well as yeast-like fungi of the genus Candida spp. what is of no small importance in the development of candidiasis, the increased formation of soft and hard dental debris and the development of inflammatory diseases of periodontal tissues, as well as the high prevalence and intensity of caries of hard dental tissues, which together leads to a decrease in the quality of therapeutic and preventive measures [2, 6, 8, 10, 11, 12, 14–16, 18, 21, 23, 31–33, 35, 46, 49].

Based on modern studies provided by Russian researchers, against the background of manifestations of type 2 diabetes mellitus, thinning of the epithelial layer of the oral mucosa occurs, a decrease in the size of cellular elements, as well as thickening of elastic fibers and loosening of collagen bundles, the development of various forms of lichen planus, stomatitis of microbial and viral etiology, opportunistic infections, exacerbations of chronic periodontitis in the form of abscess formation is observed. In patients with DM2 and metabolic symptoms after surgical interventions on the oral mucosa, the period of the reparative process is significantly reduced [2, 4, 6, 12, 18, 23, 32, 33].

In patients with DM2, during an objective examination of the oral mucosa, edema, loci of atrophy and desquamation, keratosis and hyperkeratosis and the development of symptomatic cheilitis are most often observed [2, 6, 7, 12, 13, 18, 20, 22, 24, 27, 30, 34–37, 39].

Among patients with the presence of metabolic syndrome or DM2, the typical, atypical and erosive-ulcerative forms of lichen planus prevail most often on the oral mucosa in 50%, 25% and 67.7% of cases [27, 31–33].

Among the main complaints of patients with diagnosed DM2 who applied for rational prosthetics, complaints of dryness, burning and soreness of the oral mucosa most often prevail in 26.3% of cases of clinical observations. These symptoms tend to become more severe when there is a critical increase in blood sugar levels. Also, this category of persons has significant changes in reversible and irreversible indices, which objectively proves to the patient the manifestations of bleeding and soreness during individual oral hygiene and eating hard food, discomfort and breath odour [18, 22, 36, 37].

In the presence of the pathology under study, patients most often complain about the presence of a burning symptom in the mucous membrane of the mouth, most often in the tongue, as well as a perversion of taste sensitivity – a violation of the perception of sweet 7.2%, 5.9 times more often there is a perception of salty and lack of perception of sour stimulus. Only 12.5% of people with DM2 note an increase in taste mobility in the form of perception of sweet and 9.1% of salty [1, 18, 22, 36, 37].

In persons with impaired glycemic control, as well as against the background of DM2, a decrease in the secretory reflex contributes to biochemical shifts and a violation of the composition of the oral fluid. Against the background of these changes, xerostomia develops, resulting in multiple caries, candidiasis, halitosis [6, 9, 20, 23].

Against the background of clinical manifestations of type 2 diabetes mellitus, numerous researchers have described neurological disorders that most often manifest in these patients in the form of stomalgia, glossalgia. The presence of pain symptoms, paresthesia contributes to a decrease in the quality of individual oral hygiene, and the perversion of taste sensitivity leads to the development of hyperphagia and deterioration of glycemic control [1, 4, 6, 9, 18, 20].

When conducting a comprehensive dental examination of patients with DM2 in the oral cavity, the following mucosal changes are most often observed – edema, tooth prints on the lateral areas of the tongue and on the cheeks along the line of teeth closure. When collecting complaints and anamnesis, 75.8% of patients report intermittent dryness of the mucous membrane, a small amount of viscous oral fluid is noted during sialometry. Microbiological methods confirm clinical manifestations of oral candidiasis in 35.2% of cases of studies. These symptoms and manifestations in the studied category of persons are directly related to DM2 or the presence of comorbidity [1, 7, 13, 20, 24, 34–37, 39].

In experimentally induced diabetes mellitus, superficial erosions, atrophic changes, keratinization pathology, circulatory disorders and processes of repair and differentiation of epithelial cells were detected in the cheek mucosa. In the small salivary glands – discomplexation of lobules, dystrophic changes of myxocytes, serocytes. The clinical condition of the gum tissues in remission depends on the severity of hyperglycemia and the duration of the manifestation of DM2 [20, 41].

Intact periodontitis in patients with the presence of DM2 occurs in a small number of cases (7.7%), in 10% of patients with identified periodontitis, the presence of a risk factor in the form of DM2 is most often detected. The latent course of inflammation complicates the timely diagnosis of inflammatory diseases of parodentium, pushes back the implementation of high-quality therapeutic and preventive measures and supportive therapy. There is a high prevalence and intensity of uncomplicated and complicated caries of hard tissues of teeth in 62,6% [11–13, 20, 24, 28, 34–37, 58].

Numerous Russian and foreign researchers have proved that among the main dental diseases in the presence of DM2, the most prevalent are chronic inflammatory periodontal diseases from 92.3% to 100% of cases, in 33%, 61.5% and 5.5% of cases, respectively, localized and generalized initial and moderate periodontitis, as well as severe periodontitis with tooth loss. Early signs of an asymptomatic chronic inflammatory process in periodontal tissues can manifest against the background of DM2 in the form of inflammation of the papillary and marginal gums, against the background of manifestations of metabolic syndrome, inflammation of the gingival papillae is characteristic [15, 31–33].

When identifying periodontal pathology associated with systemic inflammation, its clinical manifestations directly correlate with gender and age of patients. Periodontal pathology is most often considered by many researchers as manifestations of metabolic syndrome or type 2 diabetes mellitus, since they are characterized by all phases of chronic inflammation [11].

Insulin resistance in patients with periodontitis can be caused by a complex interaction between the components of the inflammatory response of the body, an increase in the level of circulating anti-inflammatory inflammatory mediators, interleukins, oxygen radicals, changes in the level of lipids, biomarkers of oral fluid, disorders in the composition of the supra and subgingival biofilm [11, 46, 59].

In patients with compensated type II diabetes mellitus, manifestations of hyperglycemia lead to an increase in oxidative stress, hypercoagulation, and intravascular platelet aggregation leads to the phenomenon of ischemia, the development of endothelial dysfunction, hypercoagulation and severe microcirculation disorders in initial and moderate periodontitis [3–5, 10–12, 16, 17, 20, 22, 25, 28–30, 34, 36–38, 40–45, 47–56].

E.A. Khromova, and co-authors (2018) during an objective examination of patients with DM2 in periodontal tissues, the presence of congestive hyperemia or cyanotic, swelling of the gingival mucosa and interdental papillae, the presence of an average depth of periodontal pockets from 4 to 5 mm, the mobility of teeth of 1–2 degrees was observed most often, the values of the indices of bleeding and oral hygiene most often correspond to the clinical condition of periodontal tissues corresponding to severe periodontitis. When studying the resistance of the capillaries of the gum, rapid hematoma formation is observed on average up to 13 seconds, which is significantly lower than normal and confirms significant violations of the resistance of the capillaries of the gum. The presence of periodontitis is confirmed by radiological data [36].

Prisyazhnyuk O.V. (2020) revealed the presence of chronic gingivitis in 4.55% and 5.83% of cases of clin-

ical observations in sanitized persons under dispensary supervision at the dentist and persons seeking medical and preventive care, while the indicators of the PMA index averaged 28.13% and 67.18%, the indicators of the gingival papilla bleeding index were 0.87 and 2.44 at the same time, chronic periodontitis was diagnosed in 14.39% of cases, localized in 8.33% and 17.48% of cases, generalized periodontitis in 6.06% and 94.17% of cases, remission is 100% and 17.42%.

According to various authors, the glucose content in the oral fluid in the presence of chronic inflammation in periodontal tissues against the background of DM2 is the limit from 0.15 to 0.23 mmol/L, the xerostomia observed in this case contributes to the development of dysbiosis in the oral cavity, in the microbiota there is an increased number of representatives of periodontopathogenic microflora, yeast-like fungi of the genus Candida, urease-positive microflora in the dental plaque and plaque from the dorsal surface of the tongue. Against the background of increased resistance of the oral mucosa to insulin, the metabolic control of diabetes worsens, and a high concentration of glucose in the gingival fluid contributes to an increase in the persistence of these microorganisms in the composition of the supra and subgingival biofilm [4, 6, 8, 9, 20, 38, 40, 41, 46].

In the pathogenesis of dental manifestations in the presence of diabetes mellitus, a pronounced violation of blood circulation and sensitivity of nerve endings prevails, a decrease in local immunity and regeneration of the oral mucosa, as well as an increase in bacterial invasion [20].

Conclusion

According to the results of numerous studies conducted by Russian and foreign authors over the past 5 years, various data on the dental status of patients with DM2 and metabolic symptoms are presented. Changes in dental status most often depend on the level of glycemic control and the duration of the manifestation of DM2 and the presence of metabolic syndrome.

In connection with the listed dental manifestations, DM2 is a very relevant area of dentistry and includes not only examination and diagnosis in close relationship with both an endocrinologist and a dentist-therapist, since the effectiveness of treatment of DM2 and its complications directly depend. The presence of DM2 or metabolic syndrome in a patient increases the need for this category of persons to receive a high-quality complex of therapeutic and preventive measures, the development of a special scheme of supportive therapy in the case of surgical interventions that are selected together with an endocrinologist. It should be borne in mind that against the background of the use of a large number of drugs affecting various links of the pathological process, polypragmasia most often develops, often accompanied by complications and side reactions [24, 36, 37, 50, 52, 56, 58].

Thus, the features of the relationship between the clinical manifestations of major dental diseases against the background of DM2 and metabolic symptoms can pave the way for the development of new diagnostic and therapeutic and preventive algorithms.

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