

Dental status of patients with cardiovascular diseases and diabetes mellitus

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Abstract

This article discusses some regional features of the structure of dental morbidity in patients with cardiovascular diseases and diabetes mellitus. The relationship between these diseases is shown. It is stated that there is a lack of awareness of the existing dentition diseases in this sort of patients.

Keywords

Cardiovascular diseases, Diabetes mellitus, Dental status

Imprint

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Topicality of the problem

Changes in the oral mucosa (COM) may be the first symptoms of cardiovascular diseases (CVD) and diabetes mellitus (DM) [1, 2, 5]. Diseases of the cardiovascular system (CVS) can manifest as nonspecific changes in the oral mucosa (COM) [2]. The development of pathological processes in the oral cavity is associated with microcirculatory disorders. So, with myocardial infarction, there is a change in the color of the oral mucosa (cyanosis, crimson color), reported is

the appearance of some cracks, erosions, hemorrhages in the papillae of the tongue. Patients suffering from PM cardiosclerosis show a high incidence rate and intensity of dental caries. In patients with chronic heart failure, severe ulcerative-necrotic changes in the oral mucosa are often found and trophic ulcers develop. Human individuals suffering from hypertension and atherosclerosis often have hemorrhagic blisters in the oral cavity [4].

It has been established that the DM patients show an increased prevalence of dental diseases. In the DM patients, the first signs of diabetes are very often found in the oral cavity. Moreover, the DM disease affects the rapid progression of dental diseases: there is a more severe course of the disease, and a significant slowdown in regenerative processes is observed [3,6].

According to the data of numerous studies, changes in the maxillofacial area under the MD conditions depend on the level of glycemic load control and the duration of this pathology. A high level of glycosylated hemoglobin is associated with such changes in dental status as increased susceptibility to caries, an increase in the risk of development of secondary adentia [7, 8].

Among the nonspecific changes and diseases of oral mucosa under DM, there are the following: swelling of the mucous membrane of the cheeks and surfaces of the tongue along the line of closing teeth, atrophy of the papillae of the tongue, cheilitis, recurrent aphthous and ulcerative stomatitis, lichen planus and leukoplakia [9, 10]. Neurological disorders are also observed, which are manifested in the oral cavity in the form of burning sensation in the mouth and tongue, and a perversion of taste.

Structural changes in the salivary glands, impaired salivation and biochemical changes in saliva are noted, which, in its turn, causes xerostomia and the development of complications such as multiple caries, candidiasis and halitosis [1, 4].

A change in the microbial landscape in the oral cavity increases tissue resistance to insulin and contributes to the deterioration of metabolic control of diabetes, and a high concentration of glucose in the gingival fluid is favorable to the reproduction and persistence of the subgingival microflora. Periodontal disease under the DM conditions leads to the development of systemic inflammation, as a result of which the risk of subclinical atherosclerosis and coronary artery disease

is increased, and as a consequence, the risk of heart attack and stroke increases [11,12]. In this regard, an intense cooperation to involve cardiologists, endocrinologists and dentists seems to be highly reasonable.

In modern studies, it has been shown that the DM patients have an insufficient level of awareness of the relationship between their primary, general, disease and their dental health condition. Considering the essence of the issue, it becomes quite obvious that the relevant measures aimed at improving their oral cavity state are of great importance [1].

Thus, the high prevalence of dental diseases among patients suffering from CVD and DM dictates the need for continuous improvement of dental care for this contingent of patients.

The aim of the study was to study some regional features of the prevalence of dental diseases in patients with CVD and DM, depending on the duration of the progression course, the severity of the underlying disease, the state of compensation in carbohydrate metabolism, age- and gender-related specificity.

Material and research methods

To assess the state of the oral cavity in patients with CVD, 202 patients in total were examined: 96 male inpatients and 106 female inpatients in a hospital cardiology department. Their age ranged from 36 years (1 patient) to 81 years (3 patients). All patients underwent clinical and instrumental examination of the oral cavity. The intensity of caries was determined using an assessment index, which represents the sum of carious, filled and extracted teeth in an examined patient (CFE index). The classification of dentition defects was carried out according to E.I. Gavrilov scale (1968). An assessment of the state of the oral mucosa was carried out using visual examination.

Also, we have examined another cohort, covering 45 patients (20 males and 25 females), with type 1-2 diabetes, hospitalized in an endocrinological department of the city clinical hospital in Nalchik in September 2020, due to DM decompensation, at the age of 45-60 years, upon their informed consent on the study. The degree of the diabetes compensation was determined by the level of glycated hemoglobin.

Research results

The results of our study show a high prevalence and intensity of caries among the patients with CVD diseases. The intensity of caries according to the above

mentioned assessment index in men was higher than that found in women: it was reported to be 23.2 teeth, while that recorded in women was 20.2. It should be noted that in the structure of this index the main place is occupied by component "extracted teeth", which is recorded to be 14.8 in men against 13.5 in women. Significantly lower is the contribution made by component "teeth treated for caries and its complications" that is reported to reach 5.22, which is found in men and women almost the same level: 4.92 against 5.52, respectively. As to the contribution of component "caries", we have identified its level of 4.0 in male patients in contrast to the significantly lower level of 1.1 in female patients.

Caries was detected in 20.5% of the examined patients who needed dental treatment. The caries associated complications in the CFE index structure were reported to reach 3,6 with 3,0 in male patients and 4,2 in female patients, respectively. It should be mentioned that the teeth in question were subjected to endodontic treatment and were included into assessment component F.

Our analysis of the study results demonstrated that dental treatment was required for 24.8% of the patients. All examined patients had defects in dentition and needed prosthetics of various orthopedic design versions. One- and two-sided end defects were observed in 20.5% of the patients; 17.6% of the patients had included lateral defects on one or both sides; in 8.8% of the cases found was the complete loss of teeth only in the upper jaw, and single teeth on one or both jaws were recorded in 17.6% of the patients.

Full removable plate prostheses for one or two jaws were used by 44.1% of the examinees, partial removable plate prostheses were found in 38.2% of the cases, and various fixed structures (artificial crowns, bridges) in combination with partial removable plate prostheses were reported to be in 27.7% of the patients in the cohort. New prosthetics upon primarily used prostheses of various designs were required for 13.3% of the examined individuals.

In 53.2% of the patients, poorly manufactured or worn out orthopedic structures were identified, which required repeated prosthetics. Thus, 66.5% of the surveyed individuals needed prosthetics.

Our examination of the DM patients revealed a complex of oral symptoms: coated tongue (33.1%), gum edema and hyperemia (86.3%) and fissured tongue (43.2%).

When examining patients with diabetes, the following structure of inflammatory and destructive periodontal diseases was established:

- generalized gingivitis –in 25.9% of the cases;
- mild chronic generalized periodontitis – in 31.6% of the cases;
- chronic generalized periodontitis of moderate degree - 17.4% of the cases;
- chronic generalized periodontitis of severe degree -15.8% of the cases.

At the same time, with age and an increase in the experience in the diabetes patients, a rise in the prevalence of periodontitis was noted.

Upon our visual assessment of the level of oral hygiene, we identified in 83.3% of the subjects abundant pigmented soft dental plaque, covering the crowns of all teeth completely or half. Dry mouth was found in 80% of the examined subjects.

Dental caries was revealed in 87% of the DM patients. In general, the caries incidence rate, both in terms of its prevalence and intensity, tends to increase with age. Moreover, in patients with decompensated diabetes, the indicators of the intensity of caries were higher. The indicators achieved their highest level in individuals aged 50-59 years (95.1%), the smallest value was reported for the group of patients 60 years of age or older.

At the same time, the degree of tooth decay in the DM patients was distributed as follows: a high and very high degree of tooth decay was noted in 96.3% of the cases, and the average degree of damage was only 3.7%.

All patients were diagnosed with chronic generalized periodontitis: the initial stage- grade I periodontitis was noted in 56.4% of the cases; in 32.8% of the cases we found periodontitis grade I-II, and in 10.8% of the cases we reported periodontitis grade II-III.

Attention should be drawn to the high need for treatment of the dentition, prosthetics and restoration of teeth. The need for prosthetics was recorded in 79.1% of the cases.

Our analysis of the awareness of the presence of dental problems in the DM patients shows a low level of their awareness thereof. Thus, according to a lot of evidence data from the relevant reference sources, considering the results obtained from our own pilot study at the regional level, under the diabetes mellitus conditions, there is a high prevalence of dental morbidity as well as a poor level of oral hygiene available.

Conclusions

Upon completion of our study, we arrive at the following conclusions:

1. The prevalence of dental diseases in patients with CVD and DM depends on the duration and severity of the disease course.
2. Patients with CVD and DM need not only follow-up care for their disease, but they also require treatment and prevention of dental diseases.
3. Management and implementation of scheduled oral cavity sanitation in patients with CVD and diabetes mellitus is an extremely necessary measure to be widely applied in practice.
4. Education of patients with CVD and DM covering oral hygiene, prevention of gum and dental diseases can improve the level of dental care in general.

Statement on ethical issues

Research involving people and/or animals is in full compliance with current national and international ethical standards.

Conflict of interest

None declared.

Author contributions

The authors read the ICMJE criteria for authorship and approved the final manuscript.

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