

DIABETES AS A RISK FACTOR IN PROSTHETIC ORAL REHABILITATION

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ABSTRACT

Diabetes is a chronic metabolic disease due to an absolute or relative deficiency of effective insulin, which primarily causes disruption of carbohydrate metabolism, followed by disruption of lipid, protein, hydromineral and acid-base metabolism, is often a genetically determined disease and/or acquired, with a chronic stage evolution. The importance of the diabetic field in prosthetic rehabilitation is not only determined by the high frequency of complications and the fact that in these patients any aggression, even limited, can lead to a vicious circle in which the local injury aggravates the diabetic condition, and this, in turn, gets the local evolution of the lesions worse, but also by the particularities that the diabetic disease induces at the level of all the elements of the prosthetic field. Chemical diabetes (prediabetes) represents a stage of diabetes, which is characterized by lack of clinical signs and symptoms in diabetes (asymptomatic diabetes). In diabetes, it is characteristic to disturb other forms of metabolism; in diabetes, the entire apparatus for regulating carbohydrate metabolism is affected, the various links of which are closely linked, being controlled by the central nervous system. Material and method: We studied diabetes risk factor in prosthetic rehabilitation on a group of 86 patients with diabetes and obesity. Results and discussions: The anamnesis, the research of the personal and heredocolateral antecedents are compulsory steps that any dentist must go through in the face of more difficult cases. Conclusions: The prophylaxis of this disease is an urgent social necessity nowadays.

Keywords: chemicals, diabetes, prosthetic rehabilitation, disease prophylaxis.

INTRODUCTION

Diabetes mellitus is a syndrome characterized by impaired metabolism of

carbohydrates, fats and proteins, due to either a deficiency of insulin secretion or a reduction in tissue sensitivity to insulin action. There are: insulin-priv type 1

diabetes or insulin-dependent diabetes, also called juvenile diabetes, and non-insulin-dependent type 2 diabetes. Type 1 includes idiopathic and immune-mediated forms of β -pancreatic cell dysfunction that cause total insulin deficiency. LADA (Latent Autoimmune Diabetes in Adults) is a recently recognized category of diabetes that falls into the type 1 diabetes complex. Diabetes is determined by multiple factors component involving a single genetic more or less important. There is undoubtedly a relationship between HLA and insulin-dependent diabetes. If the association between HLA antigens and insulin-dependent diabetes is certain, the substrate of the interaction is hypothetical. Pancreatic cell lesions can be conditioned by two factors: circulating antibodies and cytotoxic T lymphocytes. Each of them can act in isolation or can act together[1-4].

Diabetes mellitus is a complex and heterogeneous syndrome, induced by genetic or acquired disorder, insulin secretion and/or peripheral cell resistance to insulin action, which induces profound changes in protein, carbohydrate, lipid, ionic and mineral metabolisms; it is a syndrome comprising a heterogeneous group of disorders; it is a chronic condition that affects the nutritional status of the whole body and in the evolution of which the development of the intermediate metabolism process of all food principles is disturbed. The causes of diabetes are partially elucidated. On the one hand, it is known that the occurrence of both types of diabetes is linked to some extent to

hereditary, genetic factors. On the other hand, environmental factors, diet, viral infections, toxins intervene considerably[5-9].

Type 1 diabetes is partially inherited and then triggered by certain infections, such as Coxsackie B4 virus infection; there are certain genetic elements that influence susceptibility such as HLA (Human Leukocyte Antigen) glycoproteins. Type 2 diabetes develops when the body becomes resistant to insulin or when the pancreas no longer produces enough insulin. Risk factors in type 2 diabetes are: weight, fat distribution, sedentary lifestyle, family history, age, prediabetes, gestational diabetes[10-14].

Classical diabetes is presented by the symptomatic triad: polyuria, polydipsia, polyphagia. The diabetic may have various dental conditions during his life, some of which are directly or indirectly related to diabetic disease. Fear of hypoglycemia is a factor that makes doctors reluctant to maintain normal blood sugar levels in anesthetized diabetic patients. Hyperglycemia leads to glucosuria leading to polyuria, which in turn causes dehydration of the patient through osmotic diuresis; decreases the patient's ability to resist infections[15-19].

The most serious complications that can cause death are the acute ones. These occur with a marked decrease or increase in blood sugar (hypoglycemia with hypoglycemic coma, diabetic ketoacidosis in insulin-dependent diabetics and hyperosmolar non-

ketone coma, usually in non-insulin-dependent diabetics).

Diabetic coma comprises three evolutionary phases: *incipient ketoacidosis*, when the compensatory mechanisms are effective, clinical signs: physical asthenia, thirst, low appetite, polyuria, dry lips; biochemistry: hyperglycemia, ketonemia, glycosuria; *diabetic precoma*: Kussmaul-Kein respiration, anorexia, nausea, vomiting, epigastric weight, dehydration, acetonic odor, polyuria, hyperglycemia, ketonemia; *ketoacidosis - clinical coma*: obvious Kussmaul-Kein breathing, pallor, fatigue[20-28].

In less than 10% of cases, patients lose consciousness. Hypotension, swallowing disorders, dehydration, hypothermia sets in. Blood glucose exceeds 4g %.

In most patients, the diabetic disease leads to late complications over time. While some diabetics never get such complications, others develop early. On average, late complications occur 15-20 years after the onset of overt hyperglycemia. Diabetes affects the entire metabolism and, in the absence of proper treatment, leads in time to serious complications due to damage to the blood vessels in the heart, brain or kidneys. Untreated diabetes can lead to blindness, nerve damage, leg/feet ulcers[30-37].

Oral rehabilitation is the oro-dental, multidisciplinary, longitudinal care that takes place within a planned nursing, is the complete treatment plan in relation to the wishes, acceptability and understanding of the patient; represents the maintenance of long-term health status through long-term care; discipline that studies the morphology of dental tissues; acquiring communication skills with the patient in order to obtain informed consent for oral rehabilitation treatment; acquiring the skills of sequential planning of the complete and complex oral rehabilitation treatment. Oral rehabilitation consists in diagnosing oral pathologies and those of the temporo-mandibular joint or muscles, aiming to correct changes following tooth loss or changes in their positions and abrasions.

MATERIAL AND METHOD

Examination of oral changes in patients with type 2 diabetes was performed in patients who presented for dental treatment in dental surgeries. Assessment of the implications of diabetes on oral health in a group of patients who presented for dental treatment in dental surgeries. It is important for the dentist to be aware of the diabetic status of his patients, to be able to make appropriate decisions to prevent and treat oral conditions associated with diabetes.

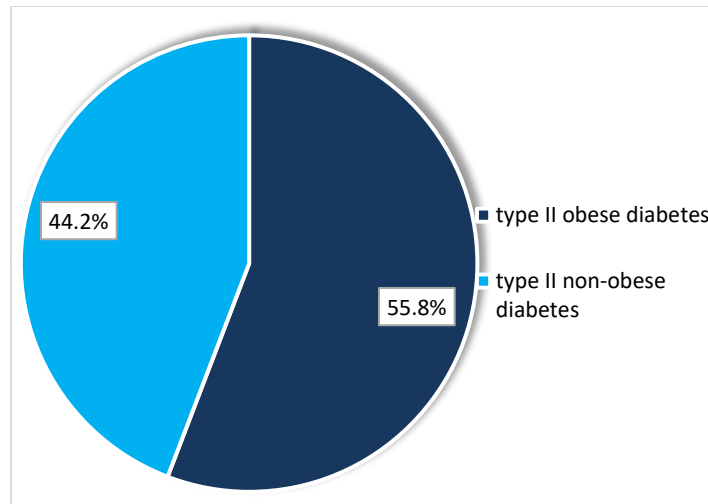


Fig. 1 Distribution of type diabetes

The study group consisted of 86 patients with type 2 diabetes, of whom 48 with obese type 2 diabetes; and 38 with non-obese type 2 diabetes(Fig.1).

Data were collected on the type of diabetes, the age of the disease, the treatments performed, the control of the metabolic balance, if the patient is obese, and smokers. In the study group, patients received treatment for diabetes, oral hypoglycemic medication and diet.

RESULTS AND DISCUSSIONS

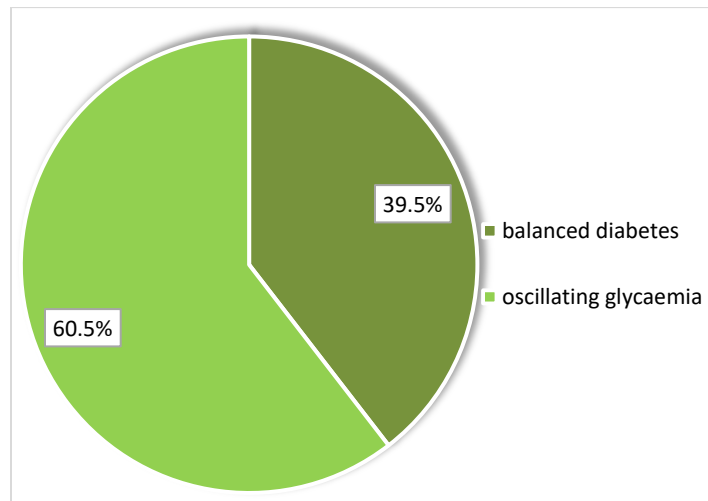


Fig. 2 Distribution of balanced diabetes and oscillating glycaemia

A correlation was made between patients with balanced diabetes mellitus (34 patients) and those whose glycemic values fluctuated (52 patients) and it was found that patients with a metabolic imbalance had a higher CAO index than the balanced ones, especially for those belonging to the age groups 35-65 years and over 65 years(Fig.2).

The CAO index recorded in men is slightly higher than that recorded in women, especially in the second and third age groups. Women pay more attention to oral hygiene than men, or perhaps there are mechanisms that belong to the body's defense system or endocrinology.

Diabetes mellitus, when it is not kept under control, is characterized by a decrease of the resistance to infection so that it triggers an increased sensitivity of the organism to infection, vascular deficiencies and an increase of the severity of the inflammatory reaction. As a result, oral tissues are more sensitive to the irritating factors from the oral cavity.

Diabetes is frequently met and raises problems, especially when the patients are not aware of the disease. Together with the diabetic periodontopathy, other signs include a volume enlarged, red and sensitive tongue.

Osteoporoses can also set in, as well as the accelerated atrophy of the alveolar crests, the metabolic diseases generating the resorption and atrophy syndrome of the edentulous crest. It is equally important to treat the general disorders prior to the initiation of the prosthetic treatment.

Other oro-dental manifestations in diabetics which were identified in our study lot: demineralization of the hard dental tissues (rarefying osteitis), delay in the chronology of teeth eruption, retrograde pulp necroses, hypo-function of the salivary glands, cracked lips with bleeding crusts, dry jugal mucosa, red tongue, halitosis and raw apple smell, abundant plaque deposits, chronic superficial or profound marginal periodontitis, periodontolisis, ulceronecrotic and gingival stomatitis, macroglossia, leucodysplasia on the jugal mucosa, atrophy of the oral mucous epithelium, alveolitis and post-extraction hemorrhages, mycotic stomatitis.

At these prosthesis wearing patients, lesions of the mucosa are easily formed under the prosthesis, which are hard to heal(Fig.3).



Fig. 3. Clinical and paraclinical aspects of assessed diabetic patients

Elastic (thermoplastic) prostheses made for patients are dental prostheses made of a semi-elastic, non-rigid material, which withstands, however, the same pressures to

which classical prostheses are subjected, to which the deformation is reversible, various color shades and replace missing tissues(Fig. 4).



Fig.4 Practical aspects with elastic removable prostheses

The excellent mechanical qualities, biocompatibility and aesthetics, as well as the ease of prosthetic works, have produced major changes, gradually giving up some of the works with metal skeletons that require advanced techniques and confer a low degree of biocompatibility, comfort and aesthetics.

Modern dental prosthetics through its arsenal of classic and advanced solutions aims to rehabilitate dental defects representing a valuable tool with a high therapeutic and preventive character.

The importance of the diabetic field in dental practice is determined not only by the high frequency of complications, but also by the fact that in these patients any aggression, even limited, can cause entry into a vicious circle in which the local lesion aggravates the diabetic condition, worsens the local evolution of the lesions.

The impact of diabetes on oral rehabilitation in patients is significant, it affects all components of the stomatognathic system. This system should be seen as an integrated subsystem of the human body,

any local manifestation having the potential to induce general changes, and these, in turn, can affect the homeostasis of the stomatognathic system.

Most authors believe that diabetes itself is not the cause of gum disease and deep periodontitis, but may promote a modified defense response from these structures to bacterial plaque. In diabetes, the evolution of inflammation is more severe due to the accumulation of sugar in the tissues, vascular changes (microangiopathies) that aggravate dystrophic disorders in periodontitis, local and general acidosis leading to osteoporosis and progressive destruction of alveolar bone and due to impaired neutrophil function, resistance, etc. The body's low resistance also causes periodontal complications, such as gums-periodontal abscesses[38-43].

Any disturbance in salivary chemistry, as well as quantitative changes that occur in the context of a general condition such as diabetes, can lead to a decrease in local defense capacity against some aggressive factors represented primarily by the local ecological system.

Salivary changes encountered in diabetes can thus contribute to the induction of unwanted biological effects and to the alteration of existing homeostasis. Decreased salivary flow is more important in untreated diabetics who have a history of multiple hospitalizations[44-48].

Due to the numerous manifestations that appear in the oral cavity in diabetes, a generalist-dentist collaboration is required to detect these lesions in time, which often changes the evolution and prognosis of the disease through the therapeutic attitude adopted[49-53].

The causes of diabetes are partially elucidated. On the one hand, it is known that the occurrence of both types of diabetes is linked to some extent to hereditary, genetic factors. On the other hand, environmental factors, diet, viral infections, toxins intervene considerably.

The presence of diabetes predisposes to the formation of oral infections and once developed the oral infection favors the progression of systemic disease, so we can discuss an interrelationship between diabetes and oro-dental infections[54-59].

Recent studies have shown that the difference between periodontics from a diabetic to a non-diabetic is not the quality and quantity of bacteria, but the exacerbated inflammatory response in diabetics.

Epidemiological research shows an increase in the prevalence and severity of loss of gingival and periodontal bone loss in adults with diabetes. Patients with type 2 diabetes are three times more likely to develop periodontitis than those without diabetes. Other manifestations of diabetes are: hyposalivation / xerostomia, increased volume of the taste glands, decreased taste perception, oral candidiasis, dental caries. Within the multifactorial etiology of inflammatory lesions of the oral

mucosa and odonto-periodontal lesions, the microbial factor intervenes quantitatively and qualitatively even in the conditions of a modified terrain. Oral fluid rich in glucose and with a low leakage rate provides ideal conditions for multiplication for aggressive microbial species, the increased bacterial activity being considered by most specialists as the main cause of dento-periodontal pathology. Poor oral conditions favor microbial imbalances, and these, in turn, influence changes in salivary pH that occur especially in uncontrolled diabetes[60-62].

Considering the levels of cholesterol and other lipids in the circulation, diabetic patients develop arteriosclerosis, coronary artery disease and multiple severe vascular damage in the microcirculation, than in healthy people. The current trend is to allow the patient to consume an almost normal amount of carbohydrates and to administer a sufficient amount of insulin to metabolize these carbohydrates. This method reduces the rate of lipid metabolism and has the effect of lowering high blood cholesterol levels[63-65].

Today, modern science has allowed the creation of materials, devices and methods, which offer the possibility of performing mobile prosthetic works, which can fully satisfy from the physiognomic, phonetic and to a large extent masticatory on any edentulous. And although great progress has been made in prosthesis replacement treatments for lost teeth, there are still many situations in which prostheses cannot

achieve a restoration close to the normal state of the dental system.

Dental prosthetics is one of the fundamental pillars of dentistry being highly specialized in addressing dental abscesses and adjacent tissue defects; it is the last act in completing the oral rehabilitation of the entire maxillofacial system.

A particularly important factor in the realization of a prosthetic work is the anatomical field, individual, local, i.e. the prosthetic field, which can sometimes be unfavorable; we must obtain a prosthesis that allows superior biological adaptation. A closer examination of all factors influencing the results of prosthetic treatments. The stability of a prosthesis contributes to a great extent in the appreciation of its functionality[66].

The removable partial denture is a prosthetic solution that can be applied in edentations of very wide stretches - from the absence of a single tooth to the presence of a tooth on the arch - being called, for this reason, universal treatment solution, unlike joint prosthesis, which claims the existence of a sufficient number of teeth in a favorable topographic distribution, with a periodontal status, which does not exceed a certain limit of atrophy.

Partial removable prostheses, taking over the function and location of lost organs, must be functionally, mechanically and bioprophyllactically effective. The latter goal is a basic principle of dental prosthetics, which must be applied both in the therapy of coronary lesions and in that of reduced,

extensive or total partial edentations. Modern dental prosthetics through its arsenal of classic and advanced solutions aims to rehabilitate dental defects representing a valuable tool with a high therapeutic and preventive character. The prosthetic works can be classified into the following categories: prostheses chewing on bones that transmit pressure through the remaining teeth and their periodontal – called with periodontal support; prostheses that transmit the masticatory pressures of the bone substrate, through the alveolar ridge mucosa - called with mucoperiosteal support; prostheses that transmit masticatory pressures to the bone substrate, both through the teeth and periodontium, and mucoperiosteal, with mixed support [67,68].

Whatever the support of the movable adjunct prosthetic works, what characterizes them, in general, is their relative

independence from the teeth left on the arch, the prosthetic parts being able to be removed and put back in the oral cavity by the patient himself.

A removable prosthesis of a high quality requires complicated individual planning to manufacture and design, which can contribute to an improved quality of life-elastic brace.

CONCLUSIONS

The hygiene of the oral cavity is a decisive factor in performing any prosthetic treatment, especially in the case of patients with diabetes who have a low resistance of the body.

Diabetes induces a number of risk factors in performing dental treatments. Specific patient training and collaboration with a diabetologist is required.

All authors contributed equally to this work.

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