Review Article

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Understanding Various Oral Complications or Manifestations of Diabetes Mellitus: A Narrative Review

Abstract:
Diabetes mellitus is known as a chronic metabolic disease described by hyperglycemia because of a defect in the secretion of insulin. Patients having uncontrolled diabetes had increased chances of having oral and systemic complications. The present review scrutinize the existing documentation in the literature related to the oral manifestation or oral complication of diabetes mellitus. English language articles were searched in various databases such as Pubmed, Scopus, Science direct and Google scholar. The keyword used for searching are "oral manifestation of diabetes", "oral complication of diabetes", "diabetes and oral health". The present review spotlights on understanding the various oral manifestations or oral diseases which are linked to diabetes mellitus.

Key-words: Oral manifestation, Diabetes, Oral Health, Dental diseases

Introduction:

Diabetes mellitus is known as a chronic metabolic disease described by hyperglycemia because of a defect in the secretion of insulin. Long-standing hyperglycemia results in various complications in different regions of the body including the oral cavity[1,2]. Therefore, the management of blood glucose is very crucial. Various feasible mechanisms that might be linked to the occurrence of oral manifestations of diabetes include increased collagenase activity, microangiopathy, decrease synthesis of collagen, and neuropathy [3,4].

Different soft tissue pathologies and inflammatory diseases of the oral cavity are linked with diabetes mellitus. Attention of these complications is inadequate around the world [5,6]. Initial recognition or care of these oral manifestations may assist in the initial diagnosis of diabetes and aid in good management of glycaemia [7]. Patients having uncontrolled diabetes had increased chances of having oral and systemic complications. The utmost prevalent chronic manifestations of diabetes are vascular diseases. Some microvascular complications are obvious as neuropathy, retinopathy, and nephropathy. Acute complications include hyperosmolar hyperglycemia and diabetic ketoacidosis [8].

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Various Oral Manifestations Of Diabetes Mellitus

1. Dental caries:

Patients with diabetes show a increased prevalence of dental caries compared with non-diabetic patients. Diabetic patients have increased chances of getting recent and intermittent

[1]HIMANSHU SINGH, [2]ANUJ GARG, [3]PANKAJ KUMAR SINGH, [4]VIJAY PRAKASH SHARMA, [5]SAURABH YADAV, [6]MALIK AJAZ AHMAD

[1]Department of Oral and Maxillofacial Pathology and Oral Microbiology, Rohtak, Haryana
[2]Department of Oral and Maxillofacial Pathology and Oral Microbiology, Dental College Azamgarh, Itaura Chandeshwar, Azamgarh
[3]Department of Prosthodontics and Crown & Bridge, Dental College Azamgarh, Itaura Chandeshwar, Azamgarh
[4]Department of Oral and Maxillofacial Pathology and Oral Microbiology, Saraswati Dental College & Hospital, Lucknow
[5]Department of Pediatric and Preventive Dentistry, Dental College Azamgarh, Itaura Chandeshwar, Azamgarh
[6]Department of Oral and Maxillofacial Pathology and Oral Microbiology, Career Post Graduate Institute of Dental Science and Hospital, Lucknow

Address for Correspondence: Dr. Himanshu Singh
MDS
Associate Professor
Dept. Oral and Maxillofacial Pathology and Oral Microbiology, Rohtak, Haryana
Email : himanshustar3g@gmail.com

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tooth decay[9]. Pertinacious hyperglycemia may outcome in necrosis of the pulp. In diabetic patients, there are possibility of establishing apical periodontitis as well as periapical pathology in diabetic patients [10,11].

It is significant to restrain the dietary consume of sugars. Thus, it is very beneficial to educate patients about the role of carbs in the formation of dental caries. The treatment of dental caries is favored by topical utilization of fluorides and appropriate brushing procedure[12].

2. Oral candidiasis:

Oral candidiasis, an opportunistic infection, is produced by candida albicans. It has been observed that patients having type-i diabetes shows increased rate of candida colonization (84%) than type-2 diabetic patient (68%).in the case of non-diabetic persons, the colonization rate seems to be approximately 27%[13,14]. Detriment of level of blood glucose and immune system outcomes in candida infection. Indigent glycemic control results in dry mouth in diabetes patients and boosts the quantity of candida which outcomes in oral candidiasis [15,16].

3. Periodontitis:

Various research proves that the predominance of severe periodontitis was surpassing in diabetic patients [17]. Poor control of diabetes outcomes in the beginning and progression of periodontitis, gingivitis, and loss of alveolar bone. Both type 1 and type 2 diabetic patients show more chances of occurrence of periodontal diseases [18,19].

4. Taste disturbance or dysfunction:

Neuropathies can encounter the taste perception. Commencement of diabetes and obesity have been associated to change in taste. In a research conducted by sujimoto et al, 8.6 % of pre-diabetic and diabetic patients had a detriment of salt taste and 5.7 % showed alteration in sweet taste [20,21]. Because of the salivary malfunction, alteration in the taste perception occurred [22,23].

5. Localized osteitis:

Diabetes may outcomes in the development and progression of dry sockets. It results in delayed healing and weak immune system. One of the main reasons for the occurrence of localized osteitis is the elevated synthesis of matrix metalloproteinases [24,25].

6. Poor oral wound healing:

In diabetic patients, gradual or poor healing of tissues occur. Various reasons for delay in the repair of tissues include lower innate immunity, reduced blood flow and hypoxia, hindrance in vascularization, stress, and conquest in synthesis of growth factors [26-28].

7. Oral infections

In diabetes patients, various oral infections occur in the oral cavity. Various determinants like a decrease in the flow of saliva, decreased defense mechanisms, deficient antimicrobial properties, and decrease in metabolic management are accountable for the progression of infection [29-31]

8. Salivary dysfunction:

Saliva plays a key role in maintaining a healthy oral cavity. Saliva is mainly produced by salivary glands. It has been observed that patients having diabetes show salivary dysfunction. A cross-sectional research was conducted in 2001 to observe the predominance of dry mouth and hyposalivation and to conclude the conjunction between complications of diabetes and salivary dysfunction. In this research, they observed that diabetic patients show xmerostomia and decrased salivary flow rate, exclusively in patients who developed diabetic neuropathy [32-34]

It is also observed that there is a decrease in parotid gland flow in poorly managed diabetic patients in comparison to patients with good control. It is noted that salivary pathogens also increased [35,36]. An increased representation of stomatopyrosis or glossodynia is seen in diabetic patients. Burning mouth syndrome shows association with diabetes mellitus. The utility of oral hygiene devices was undermined by peripheral neuropathy. Diabetic retinopathy results in visual disorder may lead to blindness [37-39].

9. Bone resorption in diabetic patients and implant therapy:

In diabetic patients, an increased resorption of bone is seen coparing to healthy people. In diabetic patients, increased residual ridge resorption is seen coparing to non-diabetic people. Decreased density of mandibular aveolar bone is substantially seen in diabetic patients [40,41].

10. Bacterial infections:

Patients suffering from diabetes often show bacterial infections in the oral cavity. In the case of poorly controlled diabetes, bacterial infection can transmit to other parts of the body. In various research, it is observed that diabetic patients are more vulnerable to deep neck bacterial infections [42-44]

According to the research, submandibular space followed by buccal space is the most common site for the bacterial infection in the oral cavity. Important bacterial species involved is streptococcus. These bacteria are involved in the formation of plaque and may convolute oral infection resulting in mouth sores [45-47]. The most common bacteria involved in oral infections in diabetic patients include Fusobacterium nucleatum, Prevotella intermedia, Streptococcus sanguis, Actinomyces israelii, P. Gingivalis, Saccharomyces cerevisiae, Propionibacterium acnes [48]

11. Halitosis:

Halitosis is also known as oral malodor, fetor oris, and bad breath. Halitosis with characteristic ketonic odor is the initial symptom of diabetes. Another important feature is the smell of unstable sulfide compounds that manifest the presence of periodontal diseases[49].

12. Tongue abnormalities

The tongue mucosa is the most frequently involved area of the oral cavity after periodontal tissues. In the oral cavity, fissured tongue is consequence of type 1 diabetes mellitus[49].

A bald tongue is most commonly seen in diabetic patients. In this, an atrophied papilla of the tongue is seen. The main area of atrophy may indicate the presence of candida infection [50].

13. Dry socket:

Dry socket mostly occurs after mandibular teeth extraction due to affected blood supply. The main cause of decreased blood supply is atherosclerosis which is seen in diabetes patients [51].

Conclusion:

The population are less knowledgeable about the possibility of oral diseases in contrast to systemic diseases in diabetes mellitus. Therefore, dentists need to develop information on the link between oral health and diabetes mellitus so that complications can be avoided. As a first step in the prevention of diseases, educational camps, and programs must be organized.

Oral complications in diabetes are irresistible, but their chances of occurrence and harshness can be reduced by routine visit to the dentist. Dentist plays a crucial role in the management of oral diseases linked with diabetes mellitus.

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