Review Article

Oral Manifestations of Diabetes

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ABSTRACT

Diabetes mellitus is a disease of adults as well as children which could result either due to insulin deficiency or resistance to insulin, or both. Symptoms include polyuria, polydypsia, polyphagia, unexplained weight loss, neurosensory disorders, recurrent infections and slow wound healing. Diabetes mellitus is classified as Type I diabetes mellitus (insulin dependent), Type II diabetes mellitus (non-insulin dependent), gestational diabetes and other specific types. Most frequent oral manifestations include gingivitis, periodontitis, recurrent periodontal abscess, delayed healing after extraction, dry socket, oral infections like candidiasis, xerostomia, neurosensory disorders which result in glossodynia, stomatopyrosis or 'burning mouth syndrome', hypogeusia and other oral dysesthesias.
Most diabetic patients can easily be managed on an outpatient basis in dental office. Preferred appointment timing is in the morning. Prophylactic antibiotic coverage is usually necessary in order to prevent infections. It is also advisable to have dextrose solution at hand during treatment procedures.

Key words: Oral Manifestations, Diabetes, Dental

INTRODUCTION

Diabetes mellitus is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or a combination of both, with concomitant oral manifestations that impact dental care. Patients suffering from this disease show symptoms such as polyuria which is caused by excretion of glucose into urine, polyphagia (increased appetite and eating), polydypsia (increased thirst) caused by dehydration, unexplained weight loss, sweet or acetone breath, retinopathies resulting in sudden vision changes, tingling or numbness in hands or feet, excessive tiredness, very dry skin and recurrent infections.

It is a fast growing global problem with huge social, health and economic implications. It is estimated that in 2010 there were globally 285 million [1] people (approximately 6.4% of adult population) suffering from this disease. This number is estimated to increase to 430 million in the absence of better control or cure. Increased life span and obesity are supposed to be responsible for this increase. Furthermore, it has been shown that almost 50% of the putative diabetics are not diagnosed until 10 years after onset of the disease; hence the real prevalence of global diabetes must be astronomically high [1].

Classification

Diabetes mellitus is classified as follows:

- Type I Diabetes Mellitus (insulin dependent)
- Immune-mediated
- Idiopathic
- Type II Diabetes Mellitus (non-insulin dependent)
- Gestational diabetes
- Other specific types

Etiology

Type I diabetes mellitus affects people at a very young age, hence is also known as juvenile diabetes. The defect lies in the insulin producing beta cells of the islets of Langerhans in the pancreas, as they undergo autoimmune destruction. This results in lack of insulin secretion, leading to the disease.

Type II diabetes mellitus affects adults. It is primarily caused due to lifestyle factors and genetics. It results from insulin resistance. Insulin secretion may also reduce with age, thus leading to the onset of diabetes. Gestational diabetes mellitus is similar to type II diabetes mellitus in that, there's a combination of relatively insufficient insulin secretion and responsiveness. It occurs in about 2-10% of pregnancies and may improve or disappear after delivery [2].

Oral Manifestations

Gingivitis and Periodontitis

Patients with uncontrolled diabetes show exaggerated response to local factors leading to the sequelae of gingivitis, periodontitis and alveolar bone loss. This is characterized by greater loss of attachment, increased bleeding on probing, increased tooth mobility, increased bone loss and delay of post surgical healing of periodontal tissues and recurrent periodontal abscesses. Patients having type I diabetes mellitus tend to have more periodontal destruction around first molars and incisors and anaerobic organisms make up the majority of their subgingival flora.

There are various factors involved in increasing the susceptibility of patients suffering from diabetes to periodontal diseases. These are alterations in host response; increase in number of anaerobes in subgingival microflora; changes in vascularity, collagen metabolism, gingival crevicular fluid and hereditary patterns. Increased alveolar bone loss could also be attributed to compromised neutrophil function, decreased phagocytosis and leukotaxis [3].

Recurrent infections of oral cavity

Diabetic patients are more prone to suffer from multiple and recurrent infections because of increased blood glucose level and compromised host immune response. Recurrent periodontal abscess is typically seen in patients with uncontrolled diabetes. They form owing to the predominance of gram negative anaerobic rods and the presence of fungi such as Candida species which are secondary invaders in the area of pre-existing infection, resulting in candidiasis.

Poor wound healing

Complications faced in oral surgery in diabetics are poor soft tissue regeneration and delayed osseous healing. Reasons for delayed wound healing are delayed vascularisation, reduced blood flow, a decline in innate immunity, decreased growth factor production and psychological stress.

Dry socket

Dry socket is a complication of extraction which occurs due to dislodgement of blood clot formed postoperatively. It is most common after mandibular teeth extractions because of reduced blood supply to the mandible caused by atherosclerosis caused by long standing diabetes. Use of epinephrine in local anaesthetics further reduces blood supply to the area, thereby increasing the likelihood of dry socket.

Salivary dysfunction

People with diabetes usually complain of xerostomia, i.e. dry mouth and experience salivary gland dysfunction. A recent study detected impaired salivary uptake and excretion by salivary scintigraphy in adults with type II diabetes [4]. This may be resulting due to either excessive loss of water via urination or from alterations in basement membranes of salivary glands, or from medications.

Grinspan syndrome

When diabetes mellitus is associated with lichen planus and hypertension, it is known as grinspan syndrome. It usually occurs as a result of medications for diabetes and hypertension. Patients taking sulphonylureas are more prone to suffer from this syndrome.

Taste disturbances

Taste is an essential component of oral health. It is adversely affected in patients with diabetes. According to a report, more than one-third of all adults suffering from diabetes had hypogeusia [5], i.e. diminished taste perception. Because of this, patients tend to eat more, leading to obesity. This symptom, known as hyperphagia, would prevent the patient from maintaining a proper diet and this would subsequently result in poor glycemic regulation.

Neurosensory disorders

Patients with diabetes have reported increased complaints of glossodynia and/or stomatopyrosis [6]. A common, yet poorly understood orofacial neurosensory disorder, burning mouth syndrome, has been associated with diabetes mellitus. They may experience long-lasting oral dysesthesias which would adversely affect oral hygiene maintenance. Peripheral neuropathies have oral implications as well. It may impair the patient in using devices for oral hygiene maintenance. Neuropathies like retinopathy could cause blindness in diabetics which in turn would affect daily oral and prosthesis hygiene. Dysphagia may also result due to altered strength, speed and/or coordination of the cranial nerve musculature [7].

Dental caries

It could be said that dental caries occurs as a sequelae to other oral manifestations in diabetics. Patients having complaints of xerostomia are more susceptible to caries because of reduced salivary flow. Patients with periodontal problems also are more prone to develop caries. Other factors responsible are increased levels of streptococcus mutans and poor metabolic control of diabetes.

Dental considerations

Usually most of the diabetic patients are given dental treatments on an out-patient basis. More controlled medical environments are considered for giving treatments to patients with very poor glycemic control, severe head and neck infections, other systemic diseases or complications and to those who require long-term alteration of medication regimens or diet.

It is preferable to give antibiotic coverage to diabetics prior to surgical treatments. Prophylactic antibiotic coverage is mandatory in emergency situations, especially in patients with poor glycemic control, but elective procedures are generally deferred until glycemic control improves.

In those patients who have undergone extraction, it is advisable to place sutures over the empty socket in order to prevent the occurrence of the most common complication – dry socket. Patients should be kept on regular follow-ups to monitor the appearance and progress of new and already present dental decay, periodontal disease and for maintenance of oral hygiene and health.

Most commonly preferred appointment timing is in the morning, but it is often determined by the patient's medication regimen. Therefore, appointments should be so scheduled such that they are either before or after periods of peak insulin inactivity. This would reduce the risk of perioperative hypoglycaemic reactions which occur during peak insulin activity. Hypoglycaemia has more serious implications than does hyperglycemia. Therefore, easily absorbable carbohydrates (glucose, sugar, candies, chocolates, and fruit juices) should be available for emergency use [8]. For those who take insulin, the greatest risk of hypoglycaemia will thus occur about 30 to 90 minutes after injecting lispro insulin, 2 to 3 hours after regular insulin, and 4 to 10 hours after NPH or lente insulin. Metformin and thiazolinediones rarely cause hypoglycaemia.

CONCLUSION

Diabetes mellitus affects all age groups and its prevalence has been increasing because of lifestyle changes, increased life span, etc. In order to provide safe and effective oral medical care for patients with diabetes, proper understanding of the disease is necessary, along with familiarity of the oral manifestations. The goal of therapy is to promote oral health in patients with diabetes, to diagnose diabetes in dental patients receiving routine stomatological care and to enhance the quality of life for patients with this disease. Most oral complications occur in patients with uncontrolled diabetes, involving the periodontium, calcified tissue and the oral mucosa. Therefore, poor metabolic control, periodontal disease, dental caries, xerostomia and fungal infections go hand in hand. Hence, there is a need for appropriate health education as good oral health is important for diabetic individuals.

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