Edisi Cetak Dentika Dental Journal, Juli 2012 (ISSN: 1693-671X)

DIABETES MELLITUS MANAGEMENT IN DENTAL PRACTICE

(PENATALAKSANAAN DIABETES MELLITUS DI PRAKTEK DOKTER GIGI)

Sukminingrum, Ninin,

School of Dental Sciences, Universiti Sains Malaysia, USM Health Campus, 16150
Kubang Kerian, Kelantan, Malaysia
E-mail: drninin@kb.usm.my

Abstract

A number of oral disorders have been associated with Diabetes mellitus (DM) such as: periodontal diseases, dental caries, salivary dysfunctions, oral mucosal diseases, oral infections such as candidiasis, taste and other neurosensory disorders. This article would discuss about the advances in understanding the relationship between oral diseases and systemic conditions need to be translated into clinical practice. Dentist should be active in the involvement in office management of patient with type 1 or type 2 DM. Patients with long-standing, poorly controlled DM are at risk of developing oral candidiasis, and the evidence indicates that periodontitis is a risk factor for poor glycemic control and the development of other clinical complications of DM. DM is a disease of which the general public and practicing dentists should be aware. On the basis of the available data, we can conclude that practicing dentists can have a significant, positive effect on the oral and general health of patients with DM. Since higher population is thought to have DM, a greater role for the oral health care team in the management of the care of patients with DM is both warranted and appropriate. In conclusion, dentists need to be involved in the prevention and management of DM to improve the treatment of oral disease. By active

health.

Key words: Diabetes mellitus, dental practice, clinical management

Abstrak

Sejumlah kelainan didalam mulut berhubungan dengan Diabetes Mellitus (DM) seperti: penyakit periodontal, karies, disfungsi air liur, muklosa mulut, kandidiasis, rasa dan gangguan sensor syaraf. Tulisan ini akan membahas tentang kemajuan dalam pemahaman hubungan antara penyakit gigi dan kondisi sistematik yang perlu diperhatikan dalam praktek di klinik. Dokter gigi harus aktif terlibat dalam penatalaksanaan pasien DM tipe 1 atau 2. Pasien dengan kontrol DM yang buruk mempunyai resiko untuk mengalami kandidiasis dan bukti menunjukkan penyakit periodontitis diakibatkan kontrol kadar gula yang buruk dan menyebabkan komplikasi klinik lainnya. DM merupakan penyakit yang mana Masyarakat umum dan Dokter gigi harus menyadari. Berdasarkan data yang ada, dapat disimpulkan bahwa Dokter gigi yang praktek mempunyai pengaruh yang positif dan bermakna pada kesehatan mulut dan umum pasien DM, karena jumlah masyarakat meningkat, peranan tim kesehatan mulut perlu menangani pasien DM dengan tepat, walaupunbanyak aspek dari komponen baru ini dari praktek gigi perlu dikembangkan, suatu kesempatan pada profesi gigi untuk bersatu. Kesimpulannya, dokter gigi perlu terlibat dalam pencegahan dan penatalaksanaan DM untuk meningkatkan perawatan penyakit gigi dan mulut, dengan menginterpensi secara aktif dalam mengidentifikasi dan memotivasi pasien DM, dokter gigi mempunyai kesempatan untuk meningkatkan kesehatan gigi dan mulut pasien.

Kata kunci: Diabetes mellitus, praktek gigi, penatalaksanaan klinik

INTRODUCTION

The number of people with diabetes will be double worldwide by 2030, according to new estimates from researchers at the World Health Organization (WHO) and several European universities. In a survey conducted by WHO, Indonesia was ranked the 4th largest in the world.[1] International Diabetes Federation (IDF), which is sponsored by the World Diabetes Foundation, also conducts surveys about the number of diabetics in a country. In the book Diabetes Atlas Executive Summary, the 2nd edition,

Indonesia was ranked the 3rd largest in the world.

Furthermore, approximately 30 percent of people with diabetes mellitus have undiagnosed diabetes mellitus. Therefore, the dental office is a health care site that can help identify undiagnosed diabetes mellitus, which can lead to better management of the care of patients with diabetes.

Table 1. List of countries with the highest numbers of estimated cases of diabetes for year 2000 and 2030 (1)

	Year of 2000		Year of 2030	
Rank	Country	People with diabetes (millions)	Country	People with diabetes (millions)
1	India	31.7	India	79.4
2	China	20.8	China	42.3
3	U.S.	17.7	U.S.	30.3
4	Indonesia	8.4	Indonesia	21.3
5	Japan	6.8	Pakistan	13.9
6	Pakistan	5.2	Brazil	11.3
7	Russian Federation	4.6	Bangladesh	11.1
8	Brazil	4.6	Japan	8.9
9	Italy	4.3	Philippines	7.8
10	Bangladesh	3.2	Egypt	6.7

The term "Diabetes mellitus" (DM) is used to identify a group of disorders characterized by elevated level of glucose in blood. This elevation is the result of a deficiency in insulin secretion or an increased cellular resistance to the actions of insulin, leading to a variety of metabolic abnormalities involving carbohydrates, fats and proteins. In healthy people, blood glucose levels usually are maintained within a range of 60 to 150 mg/dL, throughout the day. Insulin serves a critical role in the regulation of blood glucose.[2] It is synthesized in the beta cells of

Edisi Cetak Dentika Dental Journal, Juli 2012 (ISSN: 1693-671X)

excessive urination (polyuria) occurs because of osmotic diuresis. Increased fluid loss leads to dehydration and excessive thirst (polydipsia). Since cells are starved of glucose, the patient experiences increased hunger (polyphagia). Paradoxically, the diabetic patient often loses weight, since the cells are unable to take up glucose.[2]

A number of pathological mechanisms related to elevated levels of glucose in the blood have been defined, including the activation of the sorbitol pathway, the formation of advanced glycation end-products (AGEs), the damaging effect of oxidative stress and altered lipid metabolism. These mechanisms have been associated with classical clinical complications of DM such as an increased incidence of both microvascular and macrovascular complications.[2,4] Long-term sequelae of DM may include retinopathy, with potential loss of vision, and nephropathy leading to renal failure. Hypertension, hyperlipidemia, atherosclerotic cardiovascular disease, peripheral vascular disease and cerebrovascular disease also are common. Some patients experience peripheral and autonomic neuropathies such as numbness and tingling of extremities, oral paresthesia and burning. People with poorly controlled DM also may have impaired wound healing and increased susceptibility to infections. Among the mechanisms thought to produce the tissue damage associated with chronic hyperglycemia are glycation of tissue proteins and excess production of polyol compounds from glucose.[3]

DIAGNOSIS

Several glucose tests could be used to diagnose DM such as:

1. Casual plasma glucose level (taken at any time of day) of 200 mg/dL (11.1 millimolar) or greater when the classical symptoms of diabetes are present (polydipsia, polyuria and unex-plained weight loss).
2. Fasting plasma glucose level of 126 mg/dL (7.0 mmol/L) or greater.
3. Oral glucose tolerance test value in blood of 200 mg/dL or greater when measured at the two-hour interval.

These criteria are expected to lead to a further increase in the number of patients diagnosed who had DM. The normal fasting plasma glucose level is now defined as less than 110 mg/dL. Included in the between the stages of normal glucose homeostasis and DM. This stage includes people with fasting plasma glucose levels of 110 mg/dL or greater but less than 126 mg/dL.

Because early detection and prompt treatment may reduce the burden and complications of type 2 DM, the American Diabetes Association recommends that all people older than age 45 years are screened every three years, and that screening should be earlier and more frequent in high-risk people, including those with previously identified IGT or IFG.[7]

Table 3. Diagnostic Criteria for Diabetes Mellitus and Impaired Glucose Regulation

Test	Normal	Impaired Glucose Regulation	Diabetes
FPG	< 100 (< 5.6)	100 125 (5.6 6.9)	
OGTT	< 140 (< 7.7)	140 199 (7.7 11.0)	

FPG = fasting plasma glucose; OGTT = oral glucose tolerance test, 2 h glucose level.
Note: All values refer to glucose levels in mg/dL [mmol/L].

MEDICAL MANAGEMENT

The objective of medical management in all patients with DM is to maintain blood glucose levels as close to normal as possible. It is proven that good glycemic control inhibits the onset and delays the progression of complications of type 1 DM and evidence indicates a similar relationship for type 2 DM.[3,4]

The glycated hemoglobin assay (HbA1c) reflects mean glycemia levels over the preceding two to three months, and currently is used to assess within the target range (normal value <7 percent). The glycated hemoglobin value also has been shown to be a predictor for the development of chronic complications in patients with DM. Intensive treatment programs and comprehensive education in self-management, including diet control, exercise and frequent self-monitoring of blood glucose levels are essential components of disease management.[8]

1. Insulin

   Insulin is used in the medical management of all patients with type 1 DM and in some patients with type 2 DM. It is available in rapid-, short-, inter-mediate and longacting forms that usually are administered by patient via subcutaneous injecttion. Alternatively, continuous subcutaneous insulin infusion by means of a computeri-

Edisi Cetak Dentika Dental Journal, Juli 2012 (ISSN: 1693-671X)

Edisi Cetak Dentika Dental Journal, Juli 2012 (ISSN: 1693-671X)

dental treatment and immediately administer 15 grams of a fast-acting oral carbohydrate such as glucose tablets or gel, sugar, candy, soft drinks or -glucosidase inhibitors prevent the hydrolysis of sucrose into fructose and glucose. Therefore, a hypoglycemic episode in a patient taking these drugs should be treated with a direct source of glucose. After immediate treatment, dentists should measure blood glucose levels to confirm the diagnosis and determine if repeated carbohydrate dosing is needed. If patient is unable to swallow or lose consciousness, the dentist should seek medical assistance; 25 to 30 mL of a 50 percent dextrose solution or 1 mg of glucagon should be administered intravenously. Glucagon also can be injected subcutaneously or intramuscularly.[3]

Severe hyperglycemia associated with type 1 ketoacidosis or type 2 hyperosmolar nonketotic states usually has a prolonged onset. Therefore, the risk of a hyperglycemic crisis is much lower than that of a hypoglycemic crisis in a dental practice setting. Ketoacidosis may develop, with nausea, vomiting, abdominal pain and an acetone odor. Definitive management of hyperglycemia requires medical intervention and insulin administration. However, it may be difficult to differentiate between hypoglycemia and hyperglycemia based on symptoms alone. Therefore, the dentist should administer a carbohydrate source to a patient in whom a presumptive diagnosis of hypoglycemia is made. Even if patient undergoes a hyperglycemic episode, the small amount of additional sugar is unlikely to cause significant harm.[2] The clinician should measure blood glucose levels after immediate treatment.

8. Post treatment

   Clinicians should keep in mind these post-operative considerations. Patients with poorly controlled DM are at greater risk of developing infections and may demonstrate delayed wound healing[3]. Acute infection can be adversely affect insulin resistance and glycemic control, which,

   for healing.

Therefore, antibiotic coverage may be necessary for patients with overt oral infections or for those underwent extensive surgical procedures[4]. If the dentist anticipates that normal dietary intake will be affect-ted after treatment, insulin or oral anti-diabetic medication dosages may need to be appropriately adjust

physician. Salicylates increase insulin secretion and sensitivity and can potentiate the effects of sulfonylureas, resulting in hypoglycemia. Therefore, aspirin and aspirin-containing compounds generally should be avoided for patients with DM.[9]

A number of oral disorders have been associated with diabetes mellitus.[11] The association of diabetes mellitus and periodontal diseases (such as gingivitis and periodontitis) has received the greatest attention and is the focus of this article.[12,13] In addition to gingivitis and periodontitis, Fortune listed dental caries, salivary dysfunction, oral mucosal diseases, oral infections such as candidiasis, taste and other neurosensory disorders.[4]

DISCUSSION

The results of study indicated that most GPDs reported a lack of confidence in their ability to screen patients for Diabetes mellitus, viewed active management of care of patients with Diabetes mellitus as peripheral to their role as health care professionals and thought that their colleagues and patients did not expect them to perform such activities[10]. When the types of activities GPDs actually perform was explored, the practitioners reported performing more assessment and advising activities than active management activities.

In a subsequent study, the researchers compared the attitudes and behaviors of GPDs and periodontists in diabetes patients[10]. Periodontists were chosen as the comparative group because diabetes is the most important risk factors for periodontitis.
Although periodontists tended to identify risk and management behaviors for patients who have Diabetes mellitus more frequently than did GPDs, both groups of dentists tended more to engage in activities that could be classified as inquiring and discussing, as opposed to actively managing these risk factors. Researchers found that proactive management of the care of patients was not performed routinely.[12]

In case of undiagnosed diabetic person, history of signs or symptoms of diabetes or its complication should be taken. High risk factors for developing diabetes are parents who are diabetic, gave birth to one or more large babies, history of spontaneous abortions or stillbirth, obese and over 40 years of age. If dentist found history of signs or symptoms of diabetes and high risk factors detected, referral or screening test for diabetes should be made[3]. Diabetes mellitus is a disease of which the general public and practicing dentists should be aware.

We can conclude that practicing dentists and dental hygienists can have a significant, positive effect on the oral and general health of patients with DM. Since approximately eight percent of the Indonesian population is thought to have DM, prevalence increases with age, and our population is

Edisi Cetak Dentika Dental Journal, Juli 2012 (ISSN: 1693-671X)