**Lecture 3 Dr.Mohammed Alaraji**

**Diabetes mellitus**

Diabetes mellitus is a chronic disease complex with metabolic and vascular components. The metabolic disorder of carbohydrate metabolism due to disturbance of the normal insulin mechanism (characterized by hyperglycemia). The vascular component affect both macro vascular & micro vascular causing serious diseases involved heart, kidney, eyes, lower limbs & neuropathies.

***Insulin*** is a hormone secreted by the β-cells of the pancreatic islets of langerhans, it promotes the entry of glucose into the body's cells.

***The pancreas ;*** is a gland in the digestive system and endocrine system . It is both an endocrine gland producing several important hormones, including insulin, glucagon, somatostatin, and pancreatic polypeptide, a digestive organ, secreting pancreatic juice containing digestive enzymes that assist the absorption of nutrients and the digestion in the small intestine.

Maintenance of good glycemic control can prevent or retard the development of microvascular complications of diabetes. The vascular component includes an accelerated onset of nonspecific atherosclerosis and a more specific microangiopathy that particularly affects the eyes and kidneys. Retinopathy and nephropathy are eventual complications. These complications result in serious morbidity.

**Etiology :**

Diabetes mellitus may be the result of any of the following:

• Genetic disorder

• Primary destruction of islet cells through inflammation, cancer, or surgery

• An endocrine condition such as hyper pituitarism or Hyperthyroidism .

An iatrogenic disease that occurs after steroids have been administered.

**Types of diabetes mellitus**

There are three main types of diabetes mellitus (DM).

* Type 1 DM results from the body's failure to produce insulin, and presently requires the person to inject insulin or wear an insulin pump. This form was previously referred to as "insulin-dependent diabetes mellitus" (IDDM) or "juvenile diabetes".
* Type 2 DM results from insulin resistance, a condition in which cells fail to use insulin properly, sometimes combined with an absolute insulin deficiency. This form was previously referred to as non insulin-dependent diabetes mellitus (NIDDM) or "adult-onset diabetes".
* The third main form, gestational diabetes occurs when pregnant women without a previous diagnosis of diabetes develop a high blood glucose level. It may precede development of type 2 DM.

**Complications of Diabetes Mellitus**

- Ketoacidosis (type 2 diabetes)

- Diabetic retinopathy/blindness and Cataracts

- Diabetic nephropathy/renal failure.

- Accelerated atherosclerosis (coronary heart disease)

- Ulceration and gangrene of feet .

• Diabetic neuropathy (dysphagia, gastric distention, diarrhea , muscle

weakness/cramps, numbness, tingling, deep burning pain).

• Early death.

Complications of diabetes are related to the level of hyperglycemia and

pathologic changes that occur within the vascular system and the peripheral nervous system . Vascular complications result from microangiopathy and atherosclerosis. Diabetic gangrene of the feet.

**Clinical presentation**

**Signs and Symptoms;**

In patients with type 1 diabetes, the onset of symptoms is sudden and more acute, symptoms include, polydipsia , polyuria, polyphagia, loss of weight, loss of strength, marked irritability, drowsiness, and malaise.

Other signs and symptoms related to the complications of diabetes include skin lesions, cataracts, blindness, hypertension, chest pain, and anemia. The rapid onset of myopia in an adult is highly suggestive of diabetes mellitus.

**Blood Glucose Determination**

**1-Fasting venous blood glucose**.

Fasting blood glucose (no caloric intake for at least 8 hr) level at or above 126 mg/100 mL

**2-Two-hour postprandial glucose** :

For the 2-hour postprandial glucose test, the patient is given a 75- or 100-g glucose load after a night of fasting. Blood glucose levels taken at 2 hours that are 200 mg/100 mL or higher on two or more occasions are diagnostic of diabetes mellitus .

**3-Glycohemoglobin.(HbA1c)**

The A1c test is a common test that measures how much sugar has been in your blood over the previous few months. It’s used to diagnose diabetes or determine how well a person with the disease has been managing their blood sugar. An A1c test result gets reported as a percentage. The number represents the portion of hemoglobin proteins that are glycosylated, or holding glucose. The higher the percentage, the higher your blood sugar levels have been over the last few months.

* Less than 5.7% means you don’t have diabetes.
* 5.7% to 6.4% signals pre-diabetes.
* 6.5% or higher means a diabetes diagnosis.
* 7% or lower is the goal for someone trying to manage their diabetes

**Medical management**

Treatment of Patients with Diabetes Mellitus

TYPE 1 DIABETES

• Diet and physical activity

• Insulin

• Conventional

• Multiple injections

• Continuous infusion

• Pancreatic transplantation

TYPE 2 DIABETES

• Diet and physical activity

• Oral hypoglycemic agents

• Insulin plus oral hypoglycemic agents

• Insulin

**Pharmacologic Treatment of Type 1 Diabetes** Patients with Type l diabetes are treated with insulin, available human insulin & analogues include rapid-acting, short-acting, intermediate-acting, and long-acting preparations.

**Intensive insulin therapy**; Intensive insulin therapy is recommended for all patients with Type 1 diabetes two regimens are available: multiple daily injections (MDI) of insulin and continuous subcutaneous infusion of insulin (CSII). Both regimens attempt to mimic physiologic insulin secretion through appropriate meal and basal insulin replacement. **Treatment of Type 2 Diabetes**

Oral agents - Insulin sensitizers acting in liver-biguanide**;** metformin (Glucophage), Its major action is to reduce hepatic insulin resistance, gluconeogenesis, and glucose release.

**- Insulin sensitizers acting in peripheral tissues—thiazolidinediones.**

These drugs appear to cause a slow improvement in glycemic control over time (weeks to months) along with improvement in insulin sensitivity and reduction of free fatty acid levels.

**Insulin Shock**

Patients who are treated with insulin must closely adhere to their diet. If they fail to eat in a normal manner but continue to take their regular insulin injections, they may experience a hypoglycemic reaction caused by an excess of insulin (insulin shock). A hypoglycemic reaction also may be due to an overdose of insulin or an oral hypoglycemic agent. Reaction or shock caused by excessive insulin usually occurs in three well-defined stages, each more severe and dangerous than the one preceding it.

**Signs and Symptoms of Insulin Reaction**

*MILD STAGE*

• Hunger

• Weakness

• Tachycardia

• Pallor

• Sweating

• Paresthesias

*MODERATE STAGE*

• Incoherence

• Uncooperativeness

• Belligerence

• Lack of judgment

• Poor orientation

*SEVERE STAGE*

• Unconsciousness

• Tonic or clonic movements

• Hypotension

• Hypothermia

• Rapid thready pulse

**Dental Management of the Patient with Diabetes**

1. Non–insulin-dependent patient:

If diabetes is well-controlled, all dental procedures can be performed without special precautions.

2. Insulin-controlled patient:

• If diabetes is well-controlled, all dental procedures can be performed without special precautions.

• Morning appointments are usually best.

• Patient advised to take usual insulin dosage and normal meals on day of dental appointment; information confirmed when patient comes for appointment.

• Advise patient to inform dentist or staff if symptoms of insulin reaction occur during dental visit.

• Glucose source (orange juice, soda) should be available and given to the patient if symptoms of insulin reaction occur.

3. If extensive surgery is needed:

• Consult with patient’s physician concerning dietary needs during postoperative period & for medical evaluation, management, and risk factor modification

• Antibiotic prophylaxis can be considered for patients with brittle diabetes and those taking high doses of insulin who also have chronic states of oral infection.