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Review Article

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A REVIEW OF DIABETES MELLITUS AND ITS COMPLICATIONS

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ABSTRACT

Diabetes mellitus has quadrupled in global prevalence during the last three decades, which is now the ninth leading cause of mortality. Around 1 in 11 persons globally today has diabetes, with 90% of those suffering from diabetes mellitus (DM). Asia is a significant hot spot for the global DM epidemic, with China and India serving as the top two epicenters. Individual vulnerability to DM is partly determined by genetic predisposition, but a poor diet and sedentary lifestyle are major drivers of the current global epidemic; early developmental variables (such as prenatal exposures) also have a role in susceptibility to DM later in life. Many cases of DM can be avoided by making healthy lifestyle adjustments, including as keeping a healthy body weight and eating a balanced diet. Moderate alcohol consumption, a healthy diet, and regular physical activity. The aim of this paper is to review the information on type 1 and type 2 diabetes with emphasis on its pathophysiology and management via literature review. The global epidemiology of DM, as well as dietary, lifestyle, and other risk factors for DM and its consequences, are all updated in this review.

INTRODUCTION

Diabetes is a chronic condition that happens when the pancreas fails to produce enough insulin or when the body's insulin is ineffectively used. Insulin is a hormone that helps to control blood sugar levels. Uncontrolled diabetes causes hyperglycemia, or high blood sugar, which causes catastrophic damage to many of the body's systems, including the neurons and blood vessels, over time.

Diabetes affected 8.5 percent of persons aged 18 and above in 2014. Diabetes was the direct cause of 1.5 million fatalities in 2019, with 48 percent of all diabetes-related deaths occurring before the age of 70. Diabetes caused a 5% increase in premature mortality rates (death before the age of 70) between 2000 and 2016.

Diabetes-related premature mortality dropped in high-income nations from 2000 to 2010, but then climbed from 2010 to 2016. Diabetes-related premature mortality increased in lower-middle-income nations over both eras.

Between 2000 and 2016, the global risk of dying from any of the four major noncommunicable diseases (cardiovascular diseases, cancer, chronic respiratory diseases, or diabetes) between the ages of 30 and 70 fell by 18%.

Classification of Diabetes Mellitus

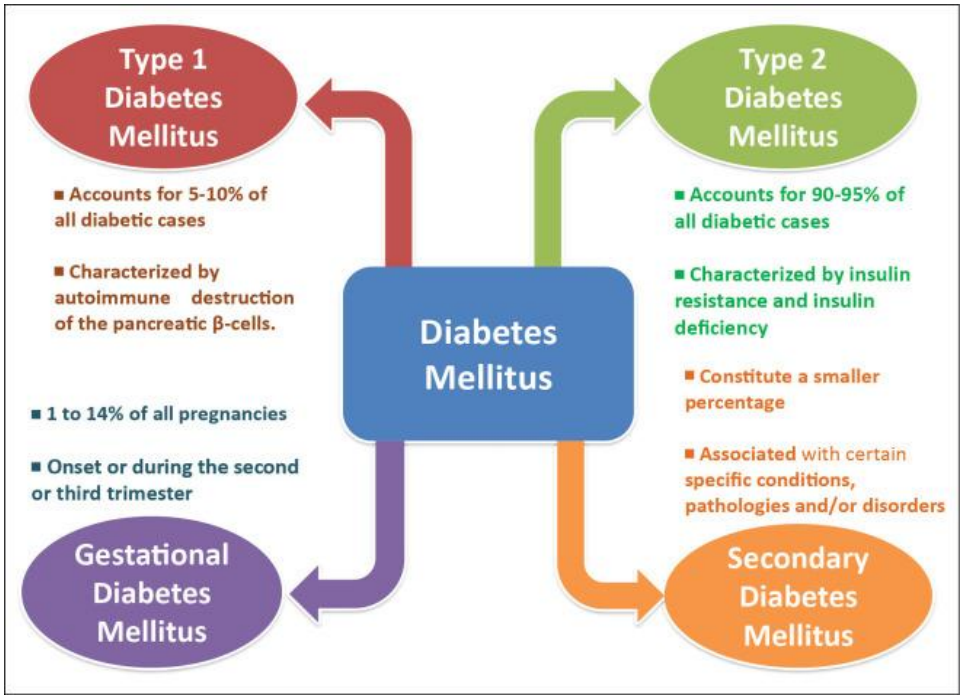
- Type 1 diabetes is defined as diabetes caused predominantly by the death of pancreatic beta cells, resulting in insulin insufficiency and the risk of ketoacidosis. This category includes examples where beta cell loss is caused by an autoimmune disease as well as cases where the cause is unknown.
- Type 2 diabetes can range from insulin resistance with relative insulin shortage to insulin resistance with a major secretory dysfunction. Ketosis is a rare occurrence
- Gestational diabetes mellitus is a type of glucose intolerance that develops or is discovered during pregnancy.

Pathophysiology

The pathophysiology of diabetes involves plasm concentrations of glucose signaling the central nervous system to mobilize energy reserves. It is based on cerebral blood flow and tissue integrity, arterial plasma glucose, the speed that plasma glucose concentrations fall, and other available metabolic fuels.hyperglycemia is a risk for diabetic patients. Because multiple causes can typically contribute to the condition, the pathophysiology of DM might be obscure. hyperglycemia can affect pancreatic beta-cell activity and lead to insulin secretion problems. As a result, there is a vicious cycle of hyperglycemia that leads to metabolic impairment. In this setting, blood glucose levels exceeding 180 mg/dL are frequently called hyperglycemia, albeit there is no clear cut off point due to the multiplicity of processes. At greater blood glucose levels, the glucose transporters in the nephron become saturated, causing osmotic diuresis. Serum glucose levels exceeding 250 mg/dL are likely to elicit polyuria and polydipsia symptoms, while the effect

is inconsistent. Excess fatty acids and proinflammatory cytokines cause insulin resistance, which impairs glucose transport and increases fat breakdown.

Because the body's response or synthesis of insulin is inadequate, it responds by improperly boosting glucagon, causing to hyperglycemia. While insulin resistance is a part of T2DM, the condition is fully manifested when the patient's insulin production is insufficient to compensate for their insulin resistance. Nonenzymatic glycation of proteins and lipids occurs as a result of chronic hyperglycemia. The glycation haemoglobin (HbA1c) test can be used to determine the amount of this. Damage to small blood vessels in the retina, kidneys, and peripheral nerves is caused by glycation. The process is accelerated by higher glucose levels. The traditional diabetic consequences of diabetic retinopathy, nephropathy, and neuropathy, as well as the avoidable outcomes of blindness, dialysis, and amputation, are all caused by this damage.



Diagnosis and Management

The therapeutic choices for diabetic individuals have grown as our understanding of the pathophysiology of the disease has grown. Individualizing treatment for both intense lifestyle modification and antidiabetic medications in each patient is therefore critical. Each antidiabetic drug targets a different underlying pathophysiology and comes with its own set of contraindications and adverse effects. When making a shared-decision with patients on an antidiabetic drug, it is critical to evaluate the glycaemic goal, risk of hypoglycaemia, life expectancy, resources, social support, and comorbidities. Obesity management is critical since obesity is a major risk factor for diabetes. To reduce cardiovascular events and death, diabetes treatment must also target other cardiovascular risk factors (such as hypertension and dyslipidaemia).

Diabetes tests for type 1 and type 2 diabetes, as well as prediabetes tests

Test for glycated haemoglobin (A1C). This non-fasting blood test determines your average blood sugar level over the previous two to three months. It determines how much blood sugar is bound to haemoglobin, the oxygen-carrying protein in red blood cells.

The more sugar-attached haemoglobin you have, the higher your blood sugar levels are. You have diabetes if your A1C score is 6.5 percent or greater on two independent tests. Prediabetes is defined as an A1C level of 5.7 to 6.4 percent. A score of less than 5.7 is deemed normal.

If the A1C test results are inconsistent, the test isn't accessible, or you have specific factors that can cause the A1C test to be erroneous — such as being pregnant or having diabetes - consult your doctor.

If the A1C test results are inconsistent, the test isn't available, or you have certain conditions that could make the A1C test inaccurate — such as being pregnant or having an uncommon form of haemoglobin (known as a haemoglobin variant) — your doctor may use one of the following tests to diagnose diabetes.

Blood sugar test at random moment, a blood sample will be obtained. A blood sugar level of 200 milligrams per decilitre (mg/dL) — 11.1 millimoles per litre (mmol/L) or greater, regardless of when you last ate, indicates diabetes. Prediabetes is defined as a fasting blood sugar level ranging from 100 to 125 mg/dL (5.6 to 6.9

mmol/L). You have diabetes if your blood sugar level is 126 mg/dL (7 mmol/L) or greater on two separate tests.

Test of oral glucose tolerance. This test requires you to fast overnight and measure your fasting blood sugar level. Then you drink a sweet beverage, and your blood sugar levels are monitored for the next two hours.

Normal blood sugar is less than 140 mg/dL (7.8 mmol/L). After two hours, a result of more than 200 mg/dL (11.1 mmol/L) indicates diabetes. Prediabetes is defined as a blood sugar level of 140 to 199 mg/dL (7.8 mmol/L to 11.0 mmol/L). If you have type 1 diabetes, your urine will be checked for a by-product formed when muscle and fat tissue are used for energy since the body doesn't have enough insulin to use the glucose that is present (ketones). Your doctor will most likely do a test to discover if you have autoantibodies, which are damaging immune system cells linked to type 1 diabetes.

Physical activity is an essential component of your diabetes control strategy. Your muscles use sugar (glucose) for energy when you work out. Regular physical activity also aids in the efficient utilisation of insulin by the body. These elements work synergistically to reduce blood sugar levels.

4 Ways to manage diabetes

1. Even if you are feeling well, take your diabetic and other medical medications.
2. Cuts, blisters, red areas, and swelling should all be checked on a daily basis.
3. To keep your mouth, teeth, and gums healthy, brush and floss every day.
4. Please don't smoke.
5. Monitor your blood sugar levels.

CONCLUSION

Diabetes is a slow-killing disease with no known cure. Its complications, on the other hand, can be reduced with good awareness and prompt treatment. Blindness, kidney damage, and heart attack are three serious consequences. To avoid complications, it is critical to keep patients' blood glucose levels under careful supervision. One of the challenges with strict glucose regulation in the blood is that it might lead to hypoglycaemia, which can cause far more serious complications than a rise in blood glucose. Researchers are currently looking for new ways to treat diabetes. The purpose of this study is to provide an overview of current diabetes research.

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