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Diabetes Mellitus and Its Associated Complications: An introduction

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Abstract

Diabetes is a long-term metabolic condition that affects the kidney, liver, heart, eyes, and other body parts. It causes an imbalance in metabolism. Other factors, such as medications and modern living, also have an impact on it. By treating this illness early, we can prevent it. This summary covers a number of different types of diabetes. The fatality rate from diabetes mellitus is increasing on a global scale. Numerous detrimental behaviors, including alcohol use, a sedentary lifestyle, obesity, and a lack of physical activity, further raised the risk of this disease. Numerous issues related to diabetes mellitus are also covered, such as diabetic neuropathy, diabetic cardiomyopathy, diabetic retinopathy, and diabetic nephropathy.

Keywords: Diabetes, Types & Complication

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Introduction

Diabetes has been recognized since ancient Egypt, where polyuria and weight loss were identified as the main characteristics of the disease (Ahmed et al 2002). According to global reports, diabetes is a chronic health-related problem, and the mortality rate among diabetic patients is higher than that of human immunodeficiency virus (HIV). Studies show that every ten seconds, one death occurs due to diabetes. Diabetes has become a global epidemic, a disorder where blood glucose levels are high, resulting in a hyperglycemic condition. While glucose is necessary for the body's proper functioning, abnormal levels—either too high or too low—can cause significant problems. When discussing diabetes, we refer to high blood sugar levels. It is an endocrine disorder that leads to various complications within the body. Diabetes mellitus encompasses a group of metabolic disorders caused by abnormal insulin production, leading to high blood sugar levels over an extended period (Burcelin et al 1995). This condition arises from malfunctioning of the pancreas, the gland responsible for insulin production. The risk of gestational diabetes increases with weight gain during pregnancy. Diagnosis of gestational diabetes typically occurs around the 20th week of pregnancy. It is linked to the placenta's effect on glucose metabolism, leading to higher glucose levels in the blood.

Risk Factors

Several risk factors contribute to the development of diabetes mellitus. Patients with a history of chronic pancreatitis or cardiovascular problems are at higher risk for developing diabetes. A family history of diabetes also significantly increases the likelihood of developing the condition (Goldfine et al 2006). Additionally, individuals with certain risk factors, such as hyperglycemia, impaired insulin secretion, and obesity, are more prone to developing diabetes mellitus. Other risk factors include age, physical inactivity, ethnicity, polyhydramnios (excess amniotic fluid during pregnancy), macrosomia (large baby), a previous history of gestational diabetes, depression, stroke, an unhealthy diet, and polycystic ovarian syndrome (PCOS). Additionally, high blood pressure and other cardiovascular issues are known to increase the risk of developing diabetes (Mancia et al 2005). Certain ethnic groups, such as African Americans, are also more susceptible to developing diabetes.

Diabetic Complications

Early diagnosis and good metabolic control are essential to managing diabetic retinopathy. Regular eye exams are necessary to detect any changes early and prevent further damage (Rowe et al 2004). The underlying mechanism for diabetic complications, particularly diabetic retinopathy, is the presence of aldose reductase. This enzyme is involved in the polyol pathway, where glucose is converted into sorbitol. The increased flux of glucose through this pathway leads to the accumulation of sorbitol in the cells, causing damage. Additionally, oxidative stress, resulting from high glucose levels, contributes to cell damage by promoting the formation of free radicals and reactive oxygen species (ROS). Various pathological changes occur in the kidneys of diabetic patients, including mesangial nodule formation, microaneurysms, and thickening of the glomerular basement membrane. Symptoms of diabetic nephropathy include fatigue, anemia, and electrolyte imbalances (Tsai et al 2019). Early diagnosis and screening, including blood and urine tests to assess kidney function and protein levels, are essential for managing and preventing further damage.

The American Diabetes Association defines diabetic neuropathy as a condition in which diabetes leads to signs and symptoms of dysfunction in the peripheral nervous system. In autonomic neuropathy, various problems can arise, including exercise intolerance, dysphagia (difficulty swallowing), vomiting, nausea, tachycardia (rapid heart rate), orthostatic hypotension (low blood pressure when standing), diarrhea, constipation, urinary retention, incontinence, and sexual dysfunction (e.g., retrograde ejaculation and erectile dysfunction). Radiculopathy can affect the L4 and L2 nerve roots, leading to lower extremity weakness and atrophy (DeFroda et al 2016). Pinched nerves in the abdomen can involve the T4 nerve roots. Cranial neuropathy can cause ptosis (drooping eyelid), anisocoria (unequal pupils), and diplopia (double vision) when the third cranial nerve is affected, or motor palsies when the fourth and sixth cranial nerves are involved. Mononeuropathy results in numbness and weakness, and patients are at an increased risk of nerve compression, including carpal tunnel syndrome. Early management and prevention strategies are essential to minimize the impact of diabetic neuropathy and improve quality of life for affected patients (Smith et al 2022).

Prevention

Until a proper treatment—whether prallopathy or allopathy—is established, we should take certain precautions. Diabetes is a serious disease that causes many complications and is currently under investigation (Lotfy et al 2017). It is known to be influenced by various risk factors, including environmental causes. In type I diabetes, the body's insulin-producing cells are destroyed. However, through lifestyle modifications and consistent activities, we can reduce the chances of type II diabetes. Interventions like community awareness campaigns, education, and health marketing help promote healthier habits, especially in schools and workplaces. A healthy lifestyle plays a vital role in managing diabetes.

Conclusion

Diabetes mellitus is a chronic metabolic disorder characterized by high blood sugar levels, leading to severe complications affecting the kidneys, eyes, heart, and nervous system. The disease has been recognized since ancient times, and its global prevalence continues to rise due to risk factors such as obesity, sedentary lifestyle, poor diet, genetic predisposition, and ethnicity. Early diagnosis and proper management are crucial in preventing complications like diabetic neuropathy, retinopathy, nephropathy, and cardiovascular issues. Lifestyle modifications, including regular physical activity, a balanced diet, and community awareness programs, play a significant role in reducing the risk of Type 2 diabetes. While there is no cure yet, preventive measures and early intervention can help control the disease and improve patients' quality of life. Further research and public health initiatives are essential to combat this growing epidemic.

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