

DIABETES MELLITUS IN CHILDREN

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Abstract: This article analyzes the relevance of diabetes mellitus among children and its impact on the functioning of the body. In children, this disease mainly occurs due to insufficient production of the hormone insulin by the pancreas or due to impaired insulin action in the body. As a result, the level of glucose in the blood increases and various changes occur in metabolic processes. The article provides information about the causes of the disease, including genetic predisposition, immune system disorders, viral infections, and lifestyle-related factors. In addition, the main clinical symptoms of diabetes in children, such as excessive thirst, frequent urination, increased appetite, weight loss, and rapid fatigue, are discussed. The study also highlights the importance of laboratory diagnostic methods in identifying the disease. Furthermore, the significance of insulin therapy, proper nutrition, and physical activity in the treatment process is emphasized. The article concludes that early diagnosis and continuous monitoring of diabetes in children play an important role in reducing complications of the disease.

Keywords: Diabetes mellitus, childhood diabetes, type 1 diabetes, type 2 diabetes, insulin therapy, diet, physical activity, blood glucose, laboratory diagnostics, clinical symptoms, stress, healthy nutrition, prevention, early diagnosis.

Relevance of the Topic: Diabetes mellitus in children is one of the chronic endocrine diseases that has been increasingly observed among children and adolescents in recent years. This disease disrupts carbohydrate metabolism in the body and leads to an increase in blood glucose levels, which results in metabolic disorders and various health problems. In children, diabetes mainly develops due to insufficient production of insulin by the pancreas or due to impaired insulin action in the body. Type 1 diabetes is the most common among children and occurs as a result of autoimmune processes that destroy insulin-producing cells. At the same time, the occurrence of type 2 diabetes among children associated with overweight, poor nutrition, and a sedentary lifestyle is also being observed.

The relevance of the topic is increasing due to several factors. First, the incidence of diabetes among children has significantly increased in recent years, highlighting the importance of early diagnosis and prevention. Second, uncontrolled diabetes can lead to serious complications such as cardiovascular diseases, kidney failure, and disorders of the eyes and nervous system. Third, ensuring the health and normal growth and development of children is essential for the future of society. Therefore, studying diabetes mellitus in children, analyzing its causes, clinical manifestations, diagnostic methods, and treatment approaches is of great scientific and practical importance.

This topic is important not only for healthcare professionals but also for parents and educators, as early detection and effective treatment of the disease contribute to raising a healthy generation.

Purpose of the Study: The main purpose of this article is to systematically and comprehensively study the causes, clinical symptoms, diagnostic methods, treatment principles, and preventive measures of diabetes mellitus in children. The increasing prevalence

of diabetes among children, its chronic nature, and its potential to cause serious complications, as well as its negative impact on a child's growth and development, increase the scientific and practical significance of this study.

To achieve the purpose of the article, the following tasks are considered:

- To identify the causes and mechanisms of diabetes development in children, including genetic predisposition, autoimmune processes, psycho-emotional conditions, poor nutrition, viral infections, and lifestyle factors.
- To analyze the main clinical symptoms of the disease, including excessive thirst, frequent urination, weight loss, increased appetite, and rapid fatigue, and to demonstrate the possibilities for early diagnosis.
- To explain the importance of laboratory diagnostic methods, including determining blood glucose levels, the glucose tolerance test, and hormonal examinations.
- To highlight the importance of insulin therapy, dietary management, physical activity, and blood glucose monitoring in the treatment process.
- To present preventive measures for diabetes in children, including healthy nutrition, regular physical activity, and periodic medical examinations.

Additionally, the article aims to systematically present modern medical approaches aimed at reducing metabolic disorders associated with diabetes in children, preventing chronic complications, and supporting a healthy and active lifestyle among children. This information may serve as an important scientific source for researchers, medical professionals, parents, and educators.

Main Part: Several factors may contribute to the development of diabetes mellitus in children. One of the most important factors is genetic predisposition. If one of the parents has diabetes, the child may also have a tendency toward the disease. However, hereditary factors do not always lead to the development of diabetes but rather increase the risk.

Autoimmune processes also play an important role in the development of diabetes. In such cases, the immune system mistakenly recognizes the insulin-producing beta cells of the pancreas as foreign and attacks them. As a result, these cells gradually become damaged, and insulin production decreases. This process often leads to the development of type 1 diabetes.

In addition, certain viral infections may trigger the development of the disease. For example, rubella, measles, or other viral diseases may affect the immune system and disrupt the function of the pancreas. In recent years, overweight and a sedentary lifestyle among children have also been considered significant risk factors for diabetes development. This condition is more commonly associated with type 2 diabetes.

Improper nutrition is another factor contributing to diabetes in children. Recently, there has been an increase in the consumption of foods high in sugar, carbonated beverages, fast food, and fatty meals among children. Such dietary habits can disrupt metabolic processes in the body. As a result, excess weight develops, and the body's sensitivity to insulin decreases. This condition significantly increases the risk of developing type 2 diabetes.

Another factor influencing diabetes development in children is psycho-emotional stress. Severe emotional stress, fear, or prolonged psychological pressure during childhood can significantly affect the hormonal system of the body. During stress, the secretion of hormones such as adrenaline and cortisol increases. These hormones raise blood glucose levels and alter metabolic processes.

If stress persists for a long time, it may reduce the body's sensitivity to insulin. As a result, glucose uptake by cells becomes more difficult, and blood sugar levels increase. Such processes are considered risk factors for the development of type 2 diabetes.

Diabetes mellitus in children manifests through various clinical symptoms. Early detection of these symptoms plays an important role in early diagnosis and prevention of complications. At the initial stages of the disease, disturbances in glucose metabolism cause several physiological changes.

One of the most common symptoms in children is excessive thirst. Increased blood glucose levels disturb the fluid balance in the body, causing the child to feel a strong need to drink water. Frequent urination is also observed. This occurs because excess glucose in the blood is excreted through urine, often leading to increased urination during the night.

Another important symptom is weight loss. Due to insulin deficiency, the body cannot fully utilize glucose as an energy source. As a result, the body begins to use fat and protein reserves for energy, which leads to weight loss. At the same time, some children may experience increased appetite as the body attempts to compensate for the energy deficiency.

In addition, symptoms such as fatigue, weakness, and decreased concentration may occur. High blood glucose levels affect the general condition of the body and reduce both physical and mental performance. In some cases, dry skin, temporary blurred vision, or slow wound healing may also be observed.

Laboratory diagnostic methods play an essential role in detecting diabetes and assessing its progression. These examinations help identify the disease at an early stage, establish an accurate diagnosis, and select appropriate treatment strategies.

One of the most important laboratory indicators is the measurement of blood glucose levels. In healthy individuals, fasting blood glucose remains within normal limits, whereas in patients with diabetes, this level may be significantly elevated. Therefore, measuring fasting blood glucose is one of the primary methods for diagnosing diabetes.

The glucose tolerance test is another important diagnostic method. This test evaluates how efficiently the body processes glucose. During the test, the patient drinks a glucose solution, and blood glucose levels are measured at specific intervals. If glucose levels remain elevated for a prolonged period, it indicates impaired carbohydrate metabolism and possible diabetes development.

Hormonal examinations are also important. Determining the level of insulin helps evaluate the functioning of the pancreas. If insulin production is insufficient or if body cells become resistant to insulin, blood glucose levels increase and diabetes develops. Therefore, hormonal tests are essential in determining the type of diabetes and choosing the appropriate treatment strategy.

Treatment

The main goal of diabetes treatment is to maintain blood glucose levels within normal limits, prevent complications, and improve the patient's quality of life. Comprehensive treatment methods are used, including insulin therapy, proper dietary management, regular physical activity, and continuous monitoring of blood glucose levels.

Insulin therapy is one of the most important methods for treating diabetes. In patients with type 1 diabetes, the body cannot produce enough insulin; therefore, this hormone must be administered externally. Insulin preparations help regulate blood glucose levels and maintain metabolic balance. Properly selected insulin doses improve the patient's condition and prevent complications.



Dietary management is also very important during treatment. Patients should limit foods rich in carbohydrates and follow a balanced and healthy diet. The diet should include vegetables, protein-rich foods, and foods rich in essential vitamins. Proper nutrition helps prevent sudden increases in blood glucose levels and improves overall health.

Physical activity also plays a significant role in diabetes management. Regular exercise improves metabolism, increases the sensitivity of body cells to insulin, and helps reduce blood glucose levels. Therefore, patients are recommended to engage in daily physical activities such as light exercise, walking, or other forms of physical activity.

Regular monitoring of blood glucose levels is also essential. Special medical devices allow patients to measure blood glucose levels regularly. This helps evaluate treatment effectiveness, adjust medication doses when necessary, and detect complications early.

Overall, insulin therapy, proper nutrition, physical activity, and continuous monitoring of blood glucose are the main factors in effective diabetes management.

Prevention

Preventing diabetes in children is an important task for the healthcare system. Following a healthy lifestyle, maintaining proper nutrition, increasing physical activity, and undergoing regular medical check-ups can help reduce the risk of the disease.

Healthy nutrition plays a major role in prevention. Children's daily diet should be balanced and include sufficient vitamins, minerals, proteins, and other beneficial nutrients. Excessive consumption of sugar and easily digestible carbohydrates may increase blood glucose levels. Therefore, children should consume more vegetables, fruits, whole grains, and protein-rich foods.

Regular physical activity also plays an important role. Exercise strengthens children's overall health, prevents excess weight, and increases insulin sensitivity. Children should be encouraged to participate in sports, outdoor activities, and regular physical exercise.

Regular medical examinations are another important preventive measure. Periodic health check-ups help detect the disease at an early stage. This is especially important for children with a family history of diabetes.

In addition, promoting a healthy lifestyle and reducing stress are also important components of prevention. Parents and teachers should pay close attention to children's physical and psychological well-being.

Conclusion

In conclusion, diabetes mellitus in children is one of the urgent problems in modern medicine. Early diagnosis and proper treatment of this disease are crucial for preserving children's health and improving their quality of life. Studies show that genetic factors, improper nutrition, low physical activity, stress, and environmental factors play significant roles in the development of the disease.

The main clinical symptoms include excessive thirst, frequent urination, weight loss, increased appetite, and fatigue. Early recognition of these symptoms allows timely diagnosis. Laboratory diagnostic methods, particularly blood glucose testing, are also essential in diagnosing the disease.

Treatment includes insulin therapy, proper dietary management, regular physical activity, and continuous monitoring of blood glucose levels. These measures help control the disease, prevent complications, and improve patients' overall health.



Preventive measures such as healthy nutrition, active lifestyle, and regular medical examinations are also important in reducing the risk of diabetes in children and ensuring their healthy growth and development.

Thus, studying diabetes mellitus in children, ensuring early diagnosis, effective treatment, and the application of preventive measures is important not only for the medical field but also for society as a whole.

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