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ANXIETY STATE IN CHILDREN WITH TYPE 1 DIABETES MELLITUS

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Abstract. The aim of this study was the early identification of anxiety states in children under 18 years of age with type 1 diabetes mellitus, which would allow timely provision of medical and psychological care and contribute to the reduction of possible disorders associated with the central nervous system. To assess the level of anxiety in children and adolescents with type 1 diabetes mellitus (T1DM) depending on disease duration and to determine its clinical significance. The study included 102 patients with T1DM aged 7 to 18 years, including 48 girls (47.3%) and 54 boys (52.6%). The duration of the disease ranged from 1 to 15 years. Patients were divided into three groups: up to 3 years, 3–6 years, and more than 6 years of disease duration. Psychoemotional status was assessed using the Spielberger–Khanin Anxiety Inventory (evaluation of state and trait anxiety). A statistically significant increase in both state and trait anxiety levels was found with increasing disease duration ($p < 0.001$). In the early stages of T1DM, moderate state anxiety predominated, reflecting adaptation to the disease. In patients with a disease duration of 3–6 years, a significant increase in trait anxiety was observed, indicating the development of stable psychoemotional disturbances. The highest levels of anxiety were identified in patients with a disease duration of more than 6 years, suggesting the accumulation of the psychological burden of chronic illness. Anxiety disorders are widespread among children with T1DM and tend to progress with increasing disease duration. The obtained data highlight the need for early detection and correction of psychoemotional disturbances, as well as the integration of psychological support into the standard management of patients with T1DM.

Keywords: Anxiety, psychoemotional, diabetes mellitus, children, glycemic control, cognitive dysfunction.

БАЛАЛАР АРАСЫНДАҒЫ 1-ШІ ТИПТІ ҚАНТ ДИАБЕТІ КЕЗІНДЕГІ МАЗАСЫЗДЫҚ КҮЙІ

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Аңдатпа. Бұл зерттеудің мақсаты – 18 жасқа дейінгі 1 типті қант диабеті бар балалардағы мазасыздық жағдайларын ерте анықтау, бұл өз кезегінде дер кезінде медициналық және психологиялық көмек көрсетуге мүмкіндік беріп, орталық жүйке жүйесімен байланысты мүмкін бұзылыстардың алдын алуға ықпал етеді. 1 типті қант диабеті (СД1) бар балалар мен жасөспірімдердегі мазасыздық деңгейін аурудың ұзақтығына байланысты бағалау және оның клиникалық маңызын анықтау. Зерттеуге 7–18 жас аралығындағы 102 СД1 бар пациент енгізілді, оның ішінде 48 қыз (47,3%) және 54 ұл (52,6%). Аурудың ұзақтығы 1 жылдан 15 жылға дейін болды. Пациенттер үш топқа бөлінді: 3 жылға дейін, 3–6 жыл және 6 жылдан астам. Психоэмоционалдық жағдай Спилбергер–Ханин мазасыздық шкаласы арқылы бағаланды (ситуациялық және тұлғалық мазасыздық). Ауру ұзақтығы артқан сайын ситуациялық және тұлғалық мазасыздық деңгейінің статистикалық тұрғыдан мәнді жоғарылауы анықталды ($p < 0,001$). СД1-дің бастапқы кезеңдерінде ауруға бейімделуді көрсететін орташа деңгейдегі ситуациялық мазасыздық басым болды. Ауру ұзақтығы 3–6 жыл болған пациенттерде тұлғалық мазасыздықтың айқын жоғарылауы байқалды, бұл тұрақты психоэмоционалдық бұзылыстардың қалыптасуын көрсетеді. Ең жоғары мазасыздық деңгейі ауру ұзақтығы 6 жылдан асқан пациенттерде анықталды, бұл созылмалы аурудың психологиялық жүктемесінің жинақталуын көрсетеді. СД1 бар балалар арасында мазасыздық бұзылыстары кең таралған және ауру ұзақтығына байланысты үдеуге бейім. Алынған нәтижелер психоэмоционалдық бұзылыстарды ерте анықтау мен түзетудің, сондай-ақ СД1 бар пациенттерді жүргізу стандартына психологиялық қолдауды енгізудің қажеттілігін көрсетеді.

Түйін сөздер: Мазасыздық, психоэмоционалдық, қант диабеті, балалар, гликемиялық бақылау, когнитивті дисфункция

ТРЕВОЖНОЕ СОСТОЯНИЕ ПРИ САХАРНОМ ДИАБЕТЕ 1 ТИПА СРЕДИ ДЕТСКОГО КОНТЕНГЕНТА

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Аннотация. Целью данного исследования была раннее выявление тревожных состояний у детей до 18 лет с сахарным диабетом 1 типа, что могло бы позволить своевременно оказывать медицинскую и психологическую помощь, для снижению возможных нарушений, связанных с центральной нервной системой. Оценить уровень тревожности у детей и подростков с сахарным диабетом 1 типа (СД1) в зависимости от длительности заболевания и определить её клиническое значение. В исследование включены 102 пациента с СД1 в возрасте от 7 до 18 лет, из них 48 девочек (47,3%) и 54 мальчика (52,6%). Длительность заболевания варьировала от 1 до 15 лет. Пациенты были разделены на три группы: до 3 лет, 3–6 лет и более 6 лет заболевания. Оценка

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психоэмоционального состояния проводилась с использованием шкалы тревожности Спилбергера–Ханина (оценка ситуативной и личностной тревожности). Установлено статистически значимое увеличение уровней как ситуативной, так и личностной тревожности с увеличением длительности заболевания ($p < 0,001$). На ранних этапах СД1 преобладала умеренная ситуативная тревожность, отражающая адаптацию к заболеванию. У пациентов с длительностью заболевания 3–6 лет отмечено достоверное повышение личностной тревожности, что свидетельствует о формировании устойчивых психоэмоциональных нарушений. Наиболее выраженные показатели тревожности выявлены у пациентов с длительностью заболевания более 6 лет, что указывает на накопление психологического бремени хронического заболевания. Тревожные расстройства широко распространены среди детей с СД1 и имеют тенденцию к прогрессированию по мере увеличения длительности заболевания. Полученные данные подчеркивают необходимость раннего выявления и коррекции психоэмоциональных нарушений, а также интеграции психологической поддержки в стандарт ведения пациентов с СД1.

Ключевые слова: Тревожность, психоэмоциональные расстройства, сахарный диабет, дети, контроль уровня глюкозы в крови, когнитивные нарушения

Introduction. It is well known that diabetes mellitus (DM) is a chronic metabolic disease that develops due to an absolute deficiency of insulin in type 1 DM or its relative deficiency and insulin resistance in type 2 DM. Currently, diabetes mellitus is recognized worldwide as a so-called “non-communicable epidemic” [1]. This is due to its high prevalence across all age groups, as well as the extremely increased risk of developing complications with subsequent disability. This disease represents a serious problem, as it involves damage to multiple organs and systems, with the central nervous system being no exception.

The number of pediatric patients seeking medical care for diabetes mellitus is increasing every year. In this regard, childhood diabetes mellitus has for many years remained a pressing issue in global healthcare. The expansion of age boundaries, along with the development of fairly severe complications against the background of diabetes with possible subsequent disability, largely determine its leading position both in global and national programs aimed at timely prevention and provision of care to affected individuals [2,3,4].

As noted above, one of the main “targets” of the negative effects of hyperglycemia, even at the early stages of the disease, is the central nervous system (CNS). Various CNS-related pathologies occupy a certain priority among complications of diabetes mellitus in childhood due to the specific features of innervation, the heterogeneous nature of clinical manifestations, as well as the difficulty of diagnostic and especially therapeutic interventions. Moreover, cognitive impairments, which are the primary cerebral abnormalities in type 1 diabetes mellitus, negatively affect the achievement and maintenance of optimal glycemic control [5].

According to the literature, the initial manifestations of cognitive dysfunction in this disease may appear as early as 2–8 years after disease onset. In this regard, early assessment of quality of life and its subsequent dynamic evaluation throughout the course of the disease will

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contribute to the timely provision of medical and psychological support, which will naturally lead to a reduction in nervous system complications in patients with type 1 diabetes mellitus.

Objective. Early identification of anxiety in this group of children leads to the timely provision of medical and psychological care, which in turn results in a reduction of possible disorders associated with the central nervous system.

Materials and Methods. To achieve the stated objective, 102 children with type 1 diabetes mellitus were examined, including 48 girls (47.3%) and 54 boys (52.6%), with a disease duration ranging from 1 to 15 years. The study was conducted in the pediatric department of the Republican Specialized Scientific and Practical Medical Center of Endocrinology of the Republic of Uzbekistan. At the time of clinical data analysis, the children's ages ranged from 7 to 18 years. Clinical assessment included evaluation of complaints, neurological status, and analysis of the emotional sphere using the Spielberger–Khanin anxiety inventory.

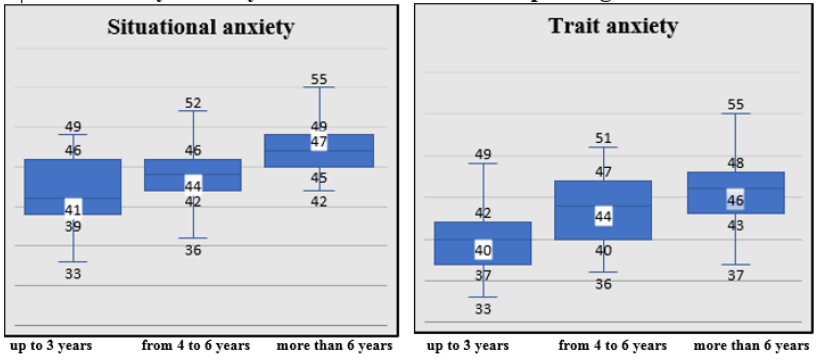
Results. The study included 102 children with type 1 diabetes (T1DM). Depending on the duration of the disease, the patients were divided into three groups: up to 3 years (Group I), 3–6 years (Group II), and more than 6 years (Group III).

Assessment of the psychoemotional state using the Spielberger–Hanin Anxiety Scale revealed a tendency toward increased anxiety levels as the duration of the disease increased. Indicators of both «State Anxiety Scale» and «Trait Anxiety Scale» differed significantly between groups ($p < 0.001$ and $p < 0.001$, respectively) **(Table 1.).**

In children of Group I (duration of illness ≤3 years), mild or moderate levels of situational anxiety were observed in most cases, which is likely associated with the stage of adaptation to the illness and the characteristics of the treatment being administered. At the same time, patients in Group II (3–6 years) showed a marked increase in the level of state anxiety, which may indicate the development of persistent emotional disturbances.

The highest levels of both situational and state anxiety were observed in patients in Group III (disease duration > 6 years). This category of patients is characterized by persistent psychoemotional stress, which is likely due to the prolonged course of the disease, the accumulation of psychological stress, as well as the fear of developing complications and the instability of glycemic control. Thus, a direct correlation has been established between the duration of T1DM and the severity of anxiety disorders. The results suggest that psychoemotional disturbances tend to progress and accumulate as the disease progresses.

Table 1. Analysis of Psychoemotional Disorders Depending on Disease Duration



* – The differences in indicators are statistically significant. ($p < 0,05$)

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Discussion

The results of this study demonstrate that anxiety disorders are widespread among children with T1D and are closely associated with disease duration. These findings are consistent with recent international studies showing that chronic metabolic diseases significantly increase the risk of psychological disorders in children. Recent data indicate that children and adolescents with T1DM have a 2- to 3-fold higher risk of anxiety and depressive disorders compared to healthy peers, which negatively impacts glycemic control and treatment adherence [6,7].

The progressive increase in anxiety levels observed in our study may be attributed to a number of factors, including the effects of chronic stress associated with long-term disease management, the need for continuous insulin therapy, regular glucose monitoring, and adherence to dietary restrictions [7]. The neurobiological consequences of chronic hyperglycemia also play a significant role, as it can alter the structure and function of the brain, particularly in areas responsible for emotional regulation, such as the hippocampus and prefrontal cortex. An additional factor is the growing fear of developing complications from the disease, which intensifies psycho-emotional stress [8].

As the duration of the disease increases, children become increasingly aware of possible complications, which contributes to increased personal anxiety. Our findings, indicating higher personal anxiety in the 3–6-year-old group, suggest a transition from reactive to chronic anxiety, which is clinically significant because personal anxiety is associated with long-term psychological maladjustment. The highest levels of anxiety among patients with a disease duration of more than 6 years indicate the need for early psychological intervention [9]. Without adequate support, anxiety can become chronic and contribute to impaired metabolic control, creating a vicious cycle between psychological and somatic health. It is important to note that recent studies emphasize that psychological disorders in T1DM.

The progressive increase in anxiety levels observed in our study may be attributed to a number of factors, including the effects of chronic stress associated with long-term disease management, the need for continuous insulin therapy, regular glucose monitoring, and adherence to dietary restrictions. The neurobiological consequences of chronic hyperglycemia also play a significant role, as it can alter the structure and function of the brain, particularly in areas responsible for emotional regulation, such as the hippocampus and prefrontal cortex. An additional factor is the growing fear of developing complications from the disease, which intensifies psycho-emotional stress are not only consequences but also predictors of worsening glycemic control and an increased risk of complications [9, 10, 11]. Thus, our results support the concept that routine psychological screening should be integrated into the management of diabetes in children, particularly in patients with longer disease duration.

Conclusion

Children with type 1 diabetes show a significant increase in anxiety levels as the duration of the disease increases. In the early stages of the disease, situational emotional reactions predominate, whereas more persistent anxiety states develop with long-term disease progression. The findings underscore the need for early detection of psychoemotional disorders, the inclusion of psychological support in standard treatment protocols, and the use of an interdisciplinary approach to patient management.

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