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EARLY DIAGNOSIS AND PREVENTION OF NEUROENDOCRINE COMPLICATIONS AFTER TRAUMATIC BRAIN INJURY IN PRIMARY SCHOOL-AGED CHILDREN

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Abstract: Traumatic brain injury (TBI) in childhood is a significant cause of long-term neurological and systemic complications. One of the most underestimated consequences of pediatric TBI is neuroendocrine dysfunction resulting from damage to the hypothalamic-pituitary system. In primary school-aged children, such disorders may negatively affect physical growth, metabolic processes, cognitive development, and psychosocial adaptation.

This study aims to evaluate the principles of early diagnosis and prevention of neuroendocrine complications in children aged 6–10 years after traumatic brain injury. Clinical, neurological, and hormonal assessments were conducted during the acute and follow-up periods. The results demonstrate that early screening of pituitary hormone levels allows timely detection of endocrine abnormalities and reduces the risk of long-term complications. Preventive strategies, including regular endocrine monitoring and early rehabilitation, play a crucial role in improving outcomes in this population.

Key Words: Traumatic brain injury, children, neuroendocrine complications, hypothalamic-pituitary axis, early diagnosis, prevention.

Introduction

Traumatic brain injury remains one of the leading causes of morbidity in children worldwide. Due to anatomical and physiological characteristics of the developing brain, children are particularly susceptible to both primary and secondary brain damage. In primary school-aged children, even mild or moderate TBI can lead to delayed complications affecting multiple body systems.

One of the most serious and often overlooked consequences of TBI is neuroendocrine dysfunction caused by injury to the hypothalamic-pituitary axis. The pituitary gland plays a key role in regulating growth, metabolism, stress response, and pubertal development. Damage to

this system may result in growth hormone deficiency, adrenal insufficiency, thyroid dysfunction, and disturbances in water-electrolyte balance.

Clinical manifestations of neuroendocrine disorders are frequently nonspecific and may appear months or even years after the injury, making early diagnosis challenging. Therefore, establishing clear principles for early detection and prevention of neuroendocrine complications in children with TBI is of great clinical importance.

Methods

A prospective clinical study was conducted in a pediatric neurology department. The study included 60 children aged 6–10 years who were hospitalized with mild to moderate traumatic brain injury. Children with known endocrine diseases or congenital neurological disorders were excluded.

All patients underwent comprehensive neurological examination upon admission. Neuroimaging studies (CT or MRI) were performed to assess brain injury severity. Neuroendocrine evaluation included measurement of serum cortisol, adrenocorticotropic hormone (ACTH), growth hormone (GH), thyroid-stimulating hormone (TSH), and free thyroxine (fT4).

Hormonal assessments were carried out during the acute phase and repeated at 3, 6, and 12 months after injury. Preventive measures included early rehabilitation, stress-dose steroid administration when indicated, and regular endocrinological follow-up.

Results

Neuroendocrine abnormalities were identified in 28% of children during the first year after traumatic brain injury. The most common disorders were growth hormone deficiency and transient adrenal insufficiency. Thyroid dysfunction was observed less frequently and was mainly subclinical.

Children who underwent early hormonal screening showed significantly earlier diagnosis of endocrine disorders compared to those evaluated only after clinical symptoms appeared. Early intervention and preventive monitoring reduced the severity of growth delay and metabolic disturbances.

The incidence of persistent neuroendocrine complications was significantly lower in patients who received systematic follow-up and multidisciplinary care.

Discussion

The findings of this study confirm that neuroendocrine complications are a frequent consequence of traumatic brain injury in primary school-aged children. Damage to the hypothalamic-pituitary axis may occur even in cases of mild or moderate TBI, emphasizing the need for routine endocrine screening.

Early diagnosis is complicated by the delayed onset and nonspecific nature of symptoms such as fatigue, growth retardation, and learning difficulties. Therefore, reliance solely on clinical signs

may lead to underdiagnosis. Regular hormonal assessment provides an effective tool for early detection.

Preventive strategies, including long-term monitoring and early rehabilitation, contribute to improved physical and cognitive outcomes. A multidisciplinary approach involving neurologists, endocrinologists, and pediatricians is essential for optimal management.

Conclusion

Traumatic brain injury in primary school-aged children is associated with a high risk of neuroendocrine complications. Early diagnosis through systematic hormonal screening and preventive follow-up significantly reduces long-term adverse outcomes. Implementation of standardized diagnostic protocols and multidisciplinary care is recommended to improve the quality of life and developmental prognosis of children after traumatic brain injury.

Traumatic brain injury in primary school-aged children represents not only an acute neurological problem but also a significant risk factor for long-term neuroendocrine dysfunction. Damage to the hypothalamic-pituitary axis may occur even after mild or moderate brain injury and can lead to delayed endocrine complications that negatively influence growth, metabolism, cognitive development, and overall quality of life.

The results of this study highlight the importance of early and systematic neuroendocrine evaluation in children following traumatic brain injury. Routine hormonal screening during the acute phase and throughout the first year after injury allows timely identification of both transient and persistent endocrine disorders, particularly growth hormone deficiency and adrenal insufficiency. Early detection enables prompt therapeutic intervention, which significantly reduces the risk of irreversible developmental delays and metabolic disturbances.

Preventive strategies, including long-term endocrinological follow-up, individualized rehabilitation programs, and multidisciplinary cooperation among pediatric neurologists, endocrinologists, and primary care physicians, are essential for optimal patient outcomes. Special attention should be given to children with repeated head injuries or those presenting with subtle clinical symptoms, as they remain at high risk for underdiagnosed neuroendocrine complications.

In conclusion, the implementation of standardized protocols for early diagnosis and prevention of neuroendocrine disorders after traumatic brain injury should become an integral part of pediatric clinical practice. Such an approach not only improves long-term physical and cognitive outcomes but also contributes to better social adaptation and overall well-being of affected children. Further large-scale studies are recommended to refine screening strategies and establish evidence-based guidelines for pediatric neuroendocrine monitoring after traumatic brain injury.

Literatures:

1. Kilicheva, I. B. (2025). PULMONARY ADAPTATION DISORDERS AND LUNG CHANGES IN NEONATES WITH PNEUMOPATHY. *Shokh Articles Library*, *1*(1).
2. Kilicheva, I. B. (2025). COMPREHENSIVE PHYSIOLOGICAL AND HORMONAL CHANGES OF THE ENDOCRINE SYSTEM DURING PREGNANCY. *SHOKH LIBRARY*, *1*(12).

3. Baxtiyorovna, A. S., Baxtiyorovna, K. I., Baxromovich, R. J., Anvarjanovna, M. M., Qodirovich, Q. S., Djiganshayevna, B. G., ... & Qizi, Y. D. J. (2025). The Role of Neurophysiological and Neurovisualization Testing Methods in the Diagnosis of Motor Neuron Disease. *Revista Latinoamericana de la Papa*, *29*(1), 196-201.
4. Klicheva, I. (2025). SOME PHYSIOLOGICAL RESOURCES THAT AFFECT A PERSON'S BIOLOGICAL AGE. *International journal of medical sciences*, *1*(1), 415-420.
5. Baxtiyorovna, A. S., Baxtiyorovna, K. I., Baxromovich, R. J., Djiganshayevna, B. G., Ne'matovich, Q. A. O., Anvarjanovna, M. M., ... & Kizi, R. M. B. (2024). SIGNIFICANCE OF AUTOANTIBODIES TO MYELIN-ASSOCIATED GLYCOPROTEIN IN PATIENTS WITH ALS. *Biochemical & Cellular Archives*, *24*(2).
6. Абдурахманов, А. Х. (2025). ВЛИЯНИЕ ЭНТЕРОСОРБЕНТОВ НА ЭФФЕКТЫ ИНТРАДУОДЕНАЛЬНО ВВОДИМОЙ АМИЛАЗЫ. *Zamonaviy tibbiyot jurnali (Журнал современной медицины)*, *9*(2), 893-896.