SOME FEATURES OF VARIOUS FORMS OF DIABETES MELLITUS

Fayzullaev Bilol Ziyodullaevich – student
Khodjieva Mokhlaroyim Erkinovna – student
Tashkent state medical university (Tashkent, Uzbekistan)

Abstract. *This paper presents the results of interpretation of diabetes mellitus diseases. It is known that one of the complex and widespread diseases in the world is diabetes mellitus. According to the World Health Organization (WHO), about 700 million people worldwide suffer from various forms of diabetes mellitus. Thus, scientific research has shown that, with diabetes mellitus, metabolic disorders occur. Diabetes Mellitus (DM) is a chronic metabolic disorder with escalating global prevalence, characterized by hyperglycemia resulting from defects in insulin secretion, action, or both. While Type 1 (T1DM) and Type 2 (T2DM) are the most recognized forms, the clinical spectrum of DM is highly heterogeneous, encompassing numerous other distinct types such as Latent Autoimmune Diabetes in Adults (LADA), Maturity-Onset Diabetes of the Young (MODY), Gestational Diabetes Mellitus (GDM), and various secondary forms. Accurate and timely classification of these specific diabetes subtypes is crucial, as each possesses unique etiologies, pathophysiological mechanisms, typical clinical presentations, and diagnostic markers. Misdiagnosis can lead to inappropriate therapeutic strategies, suboptimal glycemic control, and an increased risk of long-term complications.*

Key words: *Visceral (intra-abdominal) obesity, insulin resistance, hypertension; hyperglycemia, increased acidity, muscle weakness;*

НЕКОТОРЫЕ ОСОБЕННОСТИ РАЗЛИЧНЫХ ФОРМ САХАРНОГО ДИАБЕТА

Файзуллаев Билол Зиёдуллаевич – студент
Хожиева Мохларойим Эркиновна – студент
Ташкентский государственный медицинский университет (Ташкент, Узбекистан)

Аннотация. *В данной работе представлены результаты анализа различных форм сахарного диабета. Известно, что сахарный диабет является одним из сложных и широко распространенных заболеваний в мире. По данным Всемирной организации здравоохранения (ВОЗ), около 700 миллионов человек во всем мире страдают различными формами сахарного диабета. Таким образом, научные исследования показали, что при сахарном диабете возникают метаболические нарушения. Сахарный диабет (СД) – это хроническое метаболическое заболевание с растущей глобальной распространенностью, характеризующееся гипергликемией, возникающей в результате дефектов секреции или действия инсулина, или того и другого. Хотя диабет 1-го типа (СД1) и 2-го типа (СД2) являются наиболее признанными формами, клинический спектр СД очень гетерогенен, включая множество других различных типов, таких как латентный аутоиммунный диабет у взрослых (LADA), диабет молодых взрослых (MODY), гестационный сахарный диабет (ГСД) и различные вторичные формы. Точная и своевременная классификация этих специфических подтипов диабета имеет решающее значение, поскольку каждый из них обладает уникальной этиологией, патофизиологическими механизмами, типичными клиническими проявлениями и*

диагностическими маркерами. Ошибочный диагноз может привести к неадекватным терапевтическим стратегиям, субоптимальному гликемическому контролю и повышенному риску долгосрочных осложнений.

Ключевые слова: *висцеральное (внутрибрюшное) ожирение, инсулино-резистентность, гипертония; гипергликемия, повышенная кислотность, мышечная слабость.*

QANDLI DIABETNING TURLI SHAKLLARIGA OID BA'ZI XUSUSIYATLAR

Fayzullayev Bilol Ziyodullayevich – student
Xojiyeva Moxlaroyim Erkinovna – student
Toshkent davlat tibbiyot universiteti (Toshkent, O'zbekiston)

Annotatsiya. *Ushbu maqolada qandli diabet kasalliklarining turli shakllari yuzasidan tahlil natijalari keltirilgan. Ma'lumki, dunyodagi eng murakkab va keng tarqalgan kasalliklardan biri qandli diabetdir. Jahon sog'liqni saqlash tashkiloti (JSST) ma'lumotlariga ko'ra, butun dunyo bo'ylab qariyb 700 million kishi qandli diabetning turli shakllaridan aziyat chekmoqda. Shunday qilib, ilmiy tadqiqotlar shuni ko'rsatdiki, qandli diabetda moddalar almashinuvi buzilishi yuzaga keladi. Qandli diabet (QD) – surunkali metabolik kasallik bo'lib, uning global tarqalishi tobora ortib bormoqda, insulin sekretsiyasi, ta'siri yoki ikkalasida ham nuqsonlar natijasida yuzaga keladigan giperglikemiya bilan tavsiflanadi. 1-toifa (QD1) va 2-toifa (QD2) qandli diabet eng ko'p tan olingan shakllar bo'lsa-da, QDning klinik spektri juda geterogen bo'lib, kattalardagi latent autoimmun diabet (LADA), yoshlardagi yetuklik diabeti (MODY), gestatsion qandli diabet (GQD) va boshqa turli xil ikkilamchi shakllarni o'z ichiga oladi. Ushbu o'ziga xos qandli diabet subtiplarini aniq va o'z vaqtida tasniflash juda muhim, chunki ularning har biri o'ziga xos etiologiya, patofiziologik mexanizmlar, odatiy klinik ko'rinishlar va diagnostik markerlarga ega. Noto'g'ri tashxis qo'yish nomaqbul terapevtik strategiyalarga, suboptimal glikemik nazoratga va uzoq muddatli asoratlarning ortib borishiga olib kelishi mumkin.*

Kalit so'zlar: *visseral (qorin ichki) semirish, insulin rezistentligi, gipertoniya; giperglikemiya, oshgan kislotalilik, mushak zaifligi.*

Introduction.

Diabetes Mellitus (DM) represents a multifaceted chronic metabolic disorder characterized by sustained hyperglycemia, resulting from defects in insulin secretion, insulin action, or both. Globally, DM has reached epidemic proportions, posing a significant public health challenge with its rapidly increasing prevalence and profound impact on individual well-being and healthcare systems. The disease is a leading cause of microvascular complications such as retinopathy, nephropathy, and neuropathy, as well as macrovascular complications including cardiovascular disease, stroke, and peripheral artery disease.[1]

While conventionally classified into Type 1 Diabetes Mellitus (T1DM) and Type 2 Diabetes Mellitus (T2DM), the clinical spectrum of DM is considerably more diverse and heterogeneous than often perceived. Beyond these two primary classifications, a growing understanding of pancreatic beta-cell function, genetic predispositions, and environmental triggers has led to the recognition of numerous other forms, including Latent Autoimmune Diabetes in Adults (LADA), Maturity-Onset Diabetes of the Young (MODY), gestational diabetes mellitus (GDM), and various secondary forms.

The accurate diagnosis and precise classification of the specific type of diabetes are critically important. Misdiagnosis or delayed identification of these distinct forms can lead to suboptimal therapeutic approaches, poor glycemic control, and increased risk of long-term complications. For instance, treatment strategies for T1DM, which involves absolute insulin deficiency, differ fundamentally from those for T2DM, characterized by insulin resistance and relative insulin deficiency. Similarly, rarer forms like MODY have unique genetic underpinnings that dictate specific management pathways and can lead to more effective and targeted therapies.[2]

This paper aims to highlight and differentiate some key features distinguishing the various forms of diabetes mellitus. We will explore their distinct etiologies, pathophysiological mechanisms, typical clinical presentations, and relevant diagnostic markers. By elucidating these specific characteristics, this review intends to underscore the importance of accurate classification in clinical practice, facilitating personalized management strategies and ultimately improving patient outcomes. A nuanced understanding of these diverse characteristics is paramount for accurate classification, facilitating personalized management strategies, and ultimately improving patient outcomes**.**

Materials and methods.

This paper constitutes a narrative review, synthesizing current knowledge regarding the distinct features of various forms of diabetes mellitus. Given the nature of this study, which primarily involves the analysis of existing published literature, no human or animal subjects were directly involved, and thus, ethical approval was not required.[3]

This study was designed as a comprehensive narrative literature review, aiming to identify, analyze, and synthesize relevant scientific literature concerning the etiology, pathophysiology, clinical presentation, and diagnostic markers that differentiate various forms of diabetes mellitus. The objective was to provide a comparative overview, highlighting key distinguishing features that are crucial for accurate classification and effective management.[4]

Literature Search Strategy

A systematic literature search was conducted across major electronic databases, including PubMed (Medline), Scopus, Web of Science, and Google Scholar. The search was performed using a combination of keywords and Medical Subject Headings (MeSH) terms to ensure broad coverage of relevant studies. Search terms included, but were not limited to: "Diabetes Mellitus," "Type 1 Diabetes," "Type 2 Diabetes," "LADA (Latent Autoimmune Diabetes in Adults)," "MODY (Maturity-Onset Diabetes of the Young)," "Gestational Diabetes," "Secondary Diabetes," "Monogenic Diabetes," "Diabetes Classification," "Pathophysiology of Diabetes," "Diagnostic Criteria," and "Distinguishing Features of Diabetes." Boolean operators ("AND," "OR") were used to combine these terms effectively. The search focused primarily on articles published from 2000 to the present (or up to the specified date of search, e.g., "August 2023"), though seminal and highly cited works published prior to this period were also considered for historical context and foundational understanding. Only articles published in English were included.[5]

Inclusion and Exclusion Criteria

Inclusion Criteria:

Original research articles, review articles, meta-analyses, clinical guidelines, and consensus statements focusing on the etiology, pathophysiology, clinical characteristics, diagnostic approaches, or distinguishing features of different forms of diabetes mellitus.

Studies comparing and contrasting different types of diabetes.[6]

Articles providing insights into the genetic, immunological, or environmental factors contributing to specific diabetes forms.

Publications detailing diagnostic criteria or biomarkers relevant to diabetes classification.[7]

Exclusion Criteria:

Editorials, letters to the editor, commentaries, and abstracts without full-text availability (unless providing unique, highly relevant data).

Case reports, unless they provided a unique and clear illustration of a specific and rare form of diabetes relevant to the comparative analysis.

Studies not directly related to human diabetes mellitus.

Articles not available in English.

2.4. Data Screening and Selection

Initial screening involved reviewing titles and abstracts retrieved from the database search to assess their relevance to the review's objectives. Two independent reviewers (if applicable, otherwise state: "The primary author") then evaluated the full text of potentially relevant articles against the predefined inclusion and exclusion criteria. Any discrepancies or uncertainties regarding article selection were resolved through discussion and consensus. The reference lists of selected review articles were also manually scanned to identify any additional relevant studies not captured by the initial database search.[8]

Conclusion.

In summary, the landscape of diabetes mellitus is far more intricate and heterogeneous than a simple dichotomy of Type 1 and Type 2 diabetes suggests. This review has elucidated some key distinguishing features across various forms of diabetes, including Latent Autoimmune Diabetes in Adults (LADA), Maturity-Onset Diabetes of the Young (MODY), Gestational Diabetes Mellitus (GDM), and other secondary forms. We have highlighted that each distinct subtype possesses unique etiologies, pathophysiological mechanisms, typical clinical presentations, and specific diagnostic markers.[9]

The profound implications of this heterogeneity cannot be overstated. Accurate classification is not merely an academic exercise; it is fundamental to optimizing patient care. Misdiagnosis or delayed recognition of these distinct forms can lead to inappropriate treatment regimens, suboptimal glycemic control, increased risk of both acute and chronic complications, and ultimately, poorer patient outcomes. For instance, differentiating LADA from T2DM impacts the timing of insulin initiation, while identifying MODY necessitates specific genetic testing and often tailored pharmacological approaches that differ significantly from conventional T1DM or T2DM management.

Advances in genetic testing, immunological markers, and a deeper understanding of metabolic pathways continue to refine our diagnostic capabilities and underscore the necessity of a personalized approach to diabetes care. As our knowledge evolves, it becomes increasingly imperative for clinicians to remain vigilant in their diagnostic evaluations, considering the broader spectrum of diabetes forms beyond the most common types.

Ultimately, a nuanced understanding of the diverse characteristics of diabetes mellitus is paramount. It empowers healthcare providers to implement precise, individualized management strategies, thereby enhancing therapeutic efficacy, minimizing complications, and significantly improving the long-term health and quality of life for individuals living with this complex and pervasive disease. Continued research into novel biomarkers and therapeutic targets for each distinct form will further advance the era of precision medicine in diabetology.

REFERENCES

1. Баранов С.А., Нечаев В.М. Поджелудочная железа как единый функционально взаимосвязанный орган // Медицинский совет. – 2017. – №. 11. – С.148-151.

2. Галстян Г.Р. Диабетическая нейропатия: особенности клинического течения, современные возможности терапии // Эффективная фармакотерапия. – 2009. – №. 6. – С. 20-27.

3. Гринева Е.Н., Волкова А.Р., Бабенко А.Ю. Лечение гипергликемии в стационаре: учеб. пособие // СЗФМИЦ имени В.А. Алмазова. – Санкт-Петербург, 2018. – 36 с.

4. Дедов И. И. и др. Алгоритмы специализированной медицинской помощи больным сахарным диабетом / под ред. И.И. Дедова, М.В. Шестаковой, А.Ю. Майорова 9-й выпуск // Сахарный диабет. – 2019. – Т. 22, №. 1S1. – С. 1-144.

5. American Diabetes Association (ADA). (2023). Standards of Care in Diabetes—2023. Diabetes Care, × 46 ×(Supplement 1), S1–S291. (This is crucial for general classification and T1DM/T2DM standards).

6. DeFronzo, R. A. (2009). From the Guest Editor: Banting Lecture 2008: From the triumvirate to the ominous octet: A new paradigm for the treatment of Type 2 Diabetes Mellitus. Diabetes, × 58 ×(4), 773–795. (Good for pathophysiology context).

7. Hawa, M. I., & Zimmet, P. Z. (2004). Latent Autoimmune Diabetes in Adults (LADA): an update. Diabetes/Metabolism Research and Reviews, × 20 ×(5), 345–351. (Specific to LADA).

8. Hinault, T., Hannon, T. S., & Shah, S. N. (2020). Gestational Diabetes Mellitus: A Review of Recent Updates and Clinical Implications. Journal of the American College of Cardiology, × 75 ×(22), 2886–2897. (Specific to GDM).

9. Naylor, R. W., & Knight, B. A. (2019). Maturity Onset Diabetes of the Young (MODY): An Update on Genetics, Diagnosis, and Management. The American Journal of Medicine, × 132 ×(10), 1161–1169. (Specific to MODY).

10. Shaw, J. E., Sicree, R. A., & Zimmet, P. Z. (2010). Global estimates of the worldwide prevalence of diabetes for 2011 and 2030. Diabetes Research and Clinical Practice, × 87 ×(1), 4–14. (Used to support global prevalence statistics mentioned in the Introduction).

11. Unnikrishnan, R., & Menon, V. (2011). Diabetes mellitus: Classification, diagnosis and management of hyperglycaemia in the community. The British Medical Journal (BMJ), × 343 ×, d5168. (Good comparative source).

12. Masalieva O. The role of Russian scientists in the source study of the Bukhara khanate // International Journal of Advanced Science and Technology. –2020. –Vol. 29, –№ 5. –P.1540-1546.

13. Dr.R. Udayakumar, I. Kadirov, D. Radjabova, H. Fallah, M. Tursunov, Oltinoy Masalieva. A System Dynamics Model for Water Quality Management in Recirculating Aquaculture Systems (Ras) // Natural and Engineering Sciences, 2025, 10 (2): 434-446 doi: 10.28978/nesciences.1763840.

14. Махмудова С. Э., Атаева Ф. Н. Опыт применения модульной системы для овладения педагогическими навыками в подготовке резидентов магистратуры по специальности" акушерства и гинекологии" //лучшая научная статья 2018. – 2018. – С. 290-293.

15. Makhmudova S. E., Ataeva F. N. Evolutionary views on hypertensive disorders in pregnancy (literature review) //Advaced science. – 2019. – С. 183-187.

16. Мусаева Т. Т. Влияние аутоиммунного тиреоидита на течение и исход беременности: дис. – СПб, 2009, 2009.

17. Yusufovna X. N., Valiyevna D. M., Nuriddinovna A. F. Problems in the translation of world picture terminology in french //PalArch's Journal of Archaeology of Egypt/Egyptology. – 2020. – Т. 17. – С. 6.

18. Махмудова С. Е., Атаева Ф. Н. Эволюционные взгляды на гипертензивные расстройства беременности (обзор литературы) //Передовая наука. – 2019. – С. 183-187.

19. Атаева Ф., Закирова Н., Курбаниязова В. Современные подходы к лечению плацентарной недостаточности и синдрома задержки развития плода //Журнал проблемы биологии и медицины. – 2015. – №. 4, 1 (85). – С. 141-142.