

PERSONAL PROFILES OF FASTING GLUCOSE AS EARLY INDICATORS THAT ANTEDATE SYMPTOMATIC DIABETES MELLITUS

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Introduction. Diabetes mellitus (DM) is a chronic and complex metabolic disease characterized by varying degree of hyperglycemia as a main laboratory characteristic. This condition must be detected early for timely and proper treatment as well as prevention of its microvascular and macrovascular complications. The diagnosis of DM is based on the abnormally high levels of glycemia detection. This task may appear to be simple on the face of it, but should not be underestimated. A large number of different clinical situations such as pregnancy or acute critical illness may hamper the interpretation of laboratory tests results. However, population-based norms of glucose levels do not enable the detection of DM at an early enough stage to thwart complications. Personal profiles of glucose levels show steep increases a number of years prior to DM final diagnosis.

The main purpose: to clarify that a comparable time-dependent deviation in an individual blood glucose level may be an early manifestation of the disease in rats with streptozotocin-induced (STZ) DM.

Materials and methods. A total of 48 adult male Wistar rats (250-270 g) bred in the PE "Biomodelservis" (Kyiv) were used in the study. All the animals were housed in a controlled environment (temperature 22°C on a 12:12-h light-dark cycle with standard laboratory food and tap water ad libitum. After acclimatization, in all overnight-fasted animals except the control, DM was induced by a single intraperitoneal injection of STZ (SIGMA Chemical, USA) in a dose of 50 mg/kg freshly prepared in 0.1 M citrate buffer (pH 4.5). Blood was withdrawn from tail vein for glucose (glucometer GlucoCard-II, Japan) measurements following the indications of the manufacturer. Rats with fasting blood glucose of > 12 mmol/l were considered diabetic.

Results. STZ-induced DM led to basal hyperglycemia of varying degree in rats. The severity and duration of hyperglycemia have been shown to influence the diabetic symptoms manifestation.

Conclusions. Analysis of personal profiles of blood glucose will promote earlier diagnosis, intervention and a greater reduction in DM complications than current standards, which are based on population-based norms.

Key words: Diabetes mellitus, diagnosis, prevention, blood glucose, hyperglycemia.

THE FREQUENCY OF DETECTION OF NONTUBERCULOUS MYCOBACTERIA IN HIV-INFECTED PATIENTS IN ANTI-TUBERCULOSIS CLINICS IN THE DNIPRO REGION

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Objective. In recent years among HIV-infected patients there has been an increase not only tuberculosis, but also mycobacteriosis, the causative agents of which are nontuberculous mycobacteria (NTM). The real situation with the prevalence of NTM in Ukraine and in the Dnipro region is unknown.

The aim of the work was to determine the frequency of detection and characteristics of non-tuberculous mycobacteria in HIV-infected individuals with suspected pulmonary tuberculosis who were examined in the regional TB center.

Materials and methods. We analyzed the results of laboratory methods (microscopy, molecular genetic method GeneXpert ®MTB/RIF, culture methods on Middlebrook liquid and Lowenstein–Jensen solid medium) for the study of sputum, bronchial lavage in patients which were examined and / or treated in our clinics during the period from 2015 to 2019. The efficacy of various laboratory diagnostic methods in patients was compared depending on HIV status.

Results and discussion. Over the past 5 years, there has been a significant increase in bacteriologically confirmed cases of mycobacteriosis (from 22 cases in 2015 to 45 cases in 2019), which is primarily associated with a progressive increase in the number of people with HIV-infection, as well as with an improvement in the quality of laboratory diagnostics. The specific gravity of detection of nontuberculous mycobacteria in positive sputum culture samples was 1.8% in 2015 and 7.7% in 2019. The vast majority of people who identified nontuberculous mycobacteria had HIV status: 77.8 %, 68.3%, 48%, respectively, in 2017, 2018, 2019. At the same time it notes annual increase the proportion of patients with mycobacteriosis in HIV-negative individuals.

We compared the informative value of two cultural methods in the diagnosis of mycobacteriosis. It should be noted that solid culture is more informative for HIV-infected patients compared with the Middlebrook liquid medium.

We analyzed the frequency of detection of various classes of NTM according to phenotypic signs of their growth on nutrient media. It should be noted that in the HIV-positive patients of our region, nontuberculous mycobacteria of the second (44.1%) and third (23.2%) groups were more often determined. Non-tuberculous mycobacteria of the second (45.6%) group, as well as the fourth, rapidly growing (28.4%), were also predominantly identified in HIV-negative individuals.

Conclusions. An increase in the proportion of mycobacterioses in both HIV-positive and HIV-negative individuals needs an improvement in laboratory diagnostics with the possibility of genetic identification of the type of NTM for timely diagnosis of mycobacteriosis and the appointment of appropriate treatment.

БЛОК KLOTNO – СУЧАСНИЙ БІОМАРКЕР СЕРЦЕВО-СУДИННИХ ЗАХВОРЮВАНЬ

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В останні роки спостерігається великий інтерес до білка Klotho, як біомаркера в процесах старіння. Вчені намагаються визначити функцію Klotho і його роль в дисфункції багатьох органів. Розуміння механізму захисту Klotho може надати інформацію про найбільш поширені розлади, такі як серцево-судинні захворювання. Klotho – це антивіковий однопрохідний мембранний білок, який переважно продукується в нирках, з виділенням амінокінцевого позаклітинного домену в системний кровотік. Циркуючі рівні розчинного Klotho зменшуються з віком, тим самим це пов'язано з підвищеним ризиком вікових захворювань. Виділяють три форми білка Klotho, які мають різні функції.

Мембранна форма білка Klotho утворює комплекс з рецепторами фактора росту фібробластів (FGF), та функціонує як обов'язковий корецептор для FGF23, який в свою чергу бере участь в старінні та розвитку хронічних захворювань за допомогою регуляції P і метаболізму вітаміну D.

Секреторна форма Klotho функціонує, як гуморальний фактор з плеїотропною активністю, включаючи регуляцію окисного стресу, передачу сигналів фактора росту та іонний гомеостаз.

Внутрішньоклітинна форма Klotho пригнічує запальне клітинне старіння і мінеральний обмін.

Регуляція рівня Klotho і FGF в сироватці та їх експресія в кардіоміоцитах може мати важливе значення для клітинного метаболізму, правильної функції серця і захисту при деяких порушеннях. З огляду на очевидну важливість Klotho, його можна розглядати як новий життєво важливий фактор при ішемічній травмі серця, такій як інфаркт міокарда. Нарешті, представляється правдоподібним, що активність Klotho може бути захисною в пошкодженій тканині міокарда і відкрити новий шлях для лікування серцево-судинних захворювань.