

POSTER PRESENTATIONS

DIABETES

PP-D-01

METABOLIC AND CIRCULATING microRNA PROFILING DURING MATERNAL DIABETES AND DIFFERENCES BY DIABETES TYPE

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OBJECTIVES

In pregnancies complicated by maternal diabetes, metabolic and epigenetic effects such as dysregulated microRNA (miRNA) expression, may influence pregnancy outcomes. This study aimed to assess the effect of maternal diabetes type on metabolic and circulating miRNA expression.

METHODOLOGY

C-peptide, total and high molecular weight (HMW) adiponectin, C-reactive protein (CRP) and triglyceride concentrations were quantified in serum (16 to 27 weeks gestation) from women with pregestational type 1 diabetes (T1D, n = 7), type 2 diabetes (T2D, n = 14), new T2D (n = 12), gestational diabetes mellitus (GDM, n = 17) and normoglycaemia (n = 24) using enzyme-linked immunosorbent assays (ELISA). MiRNAs were profiled in a subset of samples using the human serum/plasma miScript miRNA PCR array (n = 4 per group).

RESULTS

Lower C-peptide total and HMW adiponectin levels with higher CRP levels were observed in women with T2D and GDM compared to women with T1D and normoglycaemia. The expression of miR-19b-3p was lower in women with GDM (9.8-fold, p=0.033); miR-20a-5p was lower in women with T1D (4.5-fold, p=0.047) and miR-29a-3p was higher in women with T2D (1.8-fold, p=0.002). Several other miRNAs were differentially expressed between the diabetes groups but were not statistically significant. Bioinformatic analysis identified messenger RNA targets common and unique to the differentially expressed miRNAs.

CONCLUSION

Metabolic parameters and miRNA levels differed according to the type of maternal diabetes. MiRNA expression differences between T1D, T2D and GDM could be related to intrauterine hyperglycemia and epigenetic programming. These findings may be interesting areas for further studies.

PP-D-02

DIABETIC ENCEPHALOPATHY: A HISTOPATHOLOGICAL UPDATE

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OBJECTIVES

We aimed to examine small vessels in the brain for histological changes in patients with type 2 diabetes mellitus and diabetic encephalopathy.

METHODOLOGY

We studied the histopathological changes in the brain in 17 autopsy cases. The microscope slides were stained with Hematoxylin and Eosin, Nissl and Bielschowsky methods and PAS-reaction.

RESULTS

The high density of the capillary network, especially in the cortex of the frontal and temporal areas, together with segmental spasm and an expansion of the perivascular space of Robben-Virchow were observed. The early changes in the capillary wall were determined not only by the thickening of the basement membrane with the accumulation of PAS-positive substances but also by its cleavage with the proliferation of endothelial cells. Late manifestations of vessel changes include capillary fibrosis, characterized by the presence of argentophilic reticulin and collagen fibers and proliferation of pericytes in the capillary wall. Thin-walled microaneurysms, early morphological manifestations of diabetic encephalopathy, were also seen. Segmental fibrinoid necrosis with the formation of miliary dissecting aneurysms and parietal and obstructive thrombi were seen in areas of ischemic necrosis of brain tissue in the cortical cerebral arteries. Neurodystrophic changes





in neurons, loss of small-cell perivascular spongiosis and plaque formation were quite pronounced. The most obvious changes were in the upper layers of the cortex where focal atrophy was more prominent than laminar. A large number of corpora amylacea can be significant not only in the foci of necrosis but also in areas of chronic ischemia.

CONCLUSION

Cerebral microangiopathy is a morphological sign of diabetic encephalopathy.

PP-D-03

MORPHOLOGICAL CHANGES OF THE BRAIN IN PATIENTS WITH TYPE 2 DIABETES MELLITUS AND COVID-19

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OBJECTIVES

To investigate the brain tissue of patients with type 2 diabetes mellitus who died from COVID-19.

METHODOLOGY

This study included 31 patients with type 2 diabetes mellitus who had a positive test for SARS-CoV-2 detected by qRT-PCR and eventually expired in 2021 in Lviv regional and city hospitals from complications of COVID-19. We studied macroscopic and microscopic changes in the brain with the use of common histological and immunohistochemistry staining for activated astrocytes (GFAP, Thermo Scientific), activated microglia (CD68, Clone Ab-4, Thermo Scientific), T lymphocytes (CD3, Clone SP7, Thermo Scientific) in the cortex, basal ganglia, brainstem and cerebellum.

RESULTS

In all the cases, arteriolosclerosis with perivascular rarefaction was present. Ischemic lesions in the brain with focal encephalolysis were documented in 15 (48, 39%) out of 31 patients with type 2 diabetes mellitus. Hemorrhagic infarctions were rare. The main cyto/angio-architectural manifestations of brain damage were diffuse alteration of the basement membranes and vascular endothelium, capillary fibrosis and hyalinosis, pericyte proliferation, congophilic angiopathy accompanied by a sharp disruption of transcapillary transport. The astrogliosis with positive GFAP was seen in all cases but showed variable degrees. The perivascular activation of microglia and the microglial nodules with CD68 positive cells were in the studied regions of the brain, but less in the cerebellum. Perivascular infiltration by CD3 was most pronounced in the brainstem.

CONCLUSION

The morphological changes associated with COVID-19 and type 2 diabetes mellitus include pathology of the microvasculature, ischemic infarction with encephalolysis, astrogliosis, microgliosis and perivascular infiltration by CD3 in different regions of the brain.

PP-D-04

ASSOCIATION OF CIRCULATING HYPOXIA-INDUCIBLE FACTOR 1 ALPHA WITH TYPE 2 DIABETES IN INDIVIDUALS WITH SEVERE OBESITY

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OBJECTIVES

Obesity and type 2 diabetes (T2D) are often attributed to hypoxia. Adaptive responses to hypoxia are regulated by hypoxia-inducible factor 1 α (HIF1 α). The role of hyperglycemia in mediating HIF1 α expression and activity remains unclear. This cross-sectional study aimed to evaluate the relationship between plasma HIF1 α and T2D in individuals with severe obesity.

METHODOLOGY

The study involved adults with severe obesity recruited at the Khoo Teck Puat Hospital (N=252, age: 45 \pm 8 years, 38% men, body mass index: 41.1 \pm 6.5 kg/m²). The level of HIF1 α in plasma was measured by immunoassay. Spearman's correlation and modified Poisson regression analysis were used to evaluate the association of HIF1 α with glycated haemoglobin (HbA1c) and T2D, respectively.