GURDAK, Kinga, KOPCZYŃSKA, Urszula, KOPCZYŃSKI, Cezary, PARTYKA, Aleksandra, BŁASZCZAK, Ewa, WÓJCIK, Jakub, DYREK, Martyna, DYDYK, Martyna, MALINOWSKI, Piotr and MAŁACHOWSKI, Aleksander. Pregnancy as an important risk factor for the progression of diabetic retinopathy. Journal of Education, Health and Sport. 2024;70:55822. eISSN 2391-8306.
https://dx.doi.org/10.12775/JEHS.2024.70.55822
https://apcz.umk.pl/JEHS/article/view/55822

The journal has had 40 points in Minister of Science and Higher Education of Poland parametric evaluation. Annex to the announcement of the Minister of Education and Science of 05.01.2024 No. 32318. Has a Journal's Unique Identifier: 201159. Scientific disciplines assigned: Physical culture sciences (Field of medical and health sciences); Health Sciences (Field of medical and health sciences).
Punkty Ministerialne 40 punktów. Załącznik do komunikatu Ministra Nauki i Szkolnictwa Wyższego z dnia 05.01.2024 Lp. 32318. Posiada Unikatowy Identyfikator Czasopisma: 201159. Przypisane dyscypliny naukowe: Nauki o kulturze fizycznej (Dziedzina nauk medycznych i nauk o zdrowiu); Nauki o zdrowiu (Dziedzina nauk medycznych i nauk o zdrowiu).© The Authors 2024;
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The authors declare that there is no conflict of interests regarding the publication of this paper.
Received:26.09.2024. Revised: 29.10.2024. Accepted: 30.10.2024. Published: 31.10.2024.

Short article

Pregnancy as an important risk factor for the progression of diabetic retinopathy

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Abstract

Diabetic retinopathy, also defined as diabetic eye disease is one of the main causes of eye complications and blindless in the world therefore leads to irreversible vision disorder and vision loss. A pregnant women as a patient is always a real challenge for doctors of various specialties. During this period, numerous systemic changes occur, such as increased blood pressure in the third trimester, increased blood volume insulin resistance with worsening glycemic control and excessive coagulation. The above complication may be reflected in the image of the fundus of the eye. Pregnancy may induce retinal disease such as diabetic retinopathy. This review article presents the incidence, pathogenesis and risk factors associated with diabetic retinopathy during pregnancy. More over in the following paper discussed management of diabetic retinopathy in pregnancy and guidelines are recommended based on the achievable evidence.

Aim of the study

This article aims to determine the progression of diabetic retinopathy in pregnant women with diabetes and the importance of the regular ophthalmological consultations in each trimester of pregnancy.

Materials and methods

A scrupulous review of the literature was done using the keywords: pregnancy, diabetes, diabetic retinopathy, diabetic retinopathy in pregnancy and as well as its Polish equivalents in

online databases such as PubMed and Google Scholar. The articles most relevant to the subjects have been chosen.

Keywords: diabetes, diabetic retinopathy, pregnancy, diabetic retinopathy in pregnancy

Introduction

Diabetes is a metabolic disease pertaining to chronic hyperglycemia as a consequence of decreased sensitivity of the cellular reception to insulin or absence of endogenous insulin. Globally 537 million adults between 20 and 79 years of age are living with diabetes for the year 2021, which is to say 1 in 10 people in the world. Moreover, this quantity is predicted to increase to 643 million by 2030 and 783 million by 2045. Diabetes is accountable for 6,7 million deaths in 2021, meaning 1 every 5 seconds. [1] Not only is it a very insidious disease, but also frequently it develops unnoticed for years.

Hyperglycemia in pregnancy

Hyperglycemia first diagnosed during pregnancy is classified as gestational diabetes or diabetes in pregnancy. Gestational diabetes occurs when a patient meets the criteria according to an oral glucose tolerance test. On the other hand diabetes in pregnancy is pregnant women fulfil the World Health Organization (WHO) requirements of diabetes in the nonpregnant inhabitants. [2] Gestational diabetes may cause either maternal or fetal complication including: eclampsia, cardiovascular disease, prematurity or macrosomia. [1],[2]

Diabetic retinopathy

One of the most frequent complications of diabetes is diabetic retinopathy. In addition the incidence of diabetic retinopathy in gestational diabetes has been estimated at 10%-27%. The common occurrence of diabetic retinopathy in pregnancy was more recurrent in patients with diabetes type 1 than with type 2. [3],[4] Diabetic retinopathy is included in the group of disease called microangiopathy, which means changes in the retina resulting from circulatory disorders. The pathomechanism of the reaction mainly concerns arterioles and venules, which ultimately causes vascular occlusion and the loss of tightness of the vessel walls.[5]

Risk factor for the development of diabetic retinopathy

Diabetes in Early Pregnancy (DIEP) data showed that the most importing determinants of the progression of diabetic retinopathy during pregnancy were duration of diabetes and level of the advancement of preexisting retinopathy.[6] If the retinopathy does not occur at the beginning of pregnancy, the chance of developing retinal complications is tremendously low. [7] Nevertheless the present earlier retinopathy can become more severe form – proliferative.[8] Metabolic control is one of the most significant risk factor during pregnancy. DIEP assessed the impact of metabolic control on retinopathy and the results were that the possibility for advancement of diabetic retinopathy enlarge by initial glycosylated hemoglobin elevations as minimum value as 6 standard deviations above the control mean.[6] In addition DIEP found that diabetic retinopathy progressed in women with insufficient diabetes control and who had retinopathy at the time of conception. [6]Moreover Diabetes Control and Complications Trial showed that the risk of any worsening of retinopathy was 1,63-fold greater in pregnant women (from before to during pregnancy) compared with nonpregnant women. [9] Additional factors that increase the risk for the progression of diabetic retinopathy during pregnancy contain: chronic hypertension, elevated HbA1c (glycated hemoglobin) in the first trimester, rapid normalization of blood glucose. [1]

Treatment

Pan-retinal panphotocoagulation is recommended in patient with proliferative retinopathy during pregnancy, nevertheless anti-VEGF therapy should be avoided. [10, 11] Mild diabetic macular edema requires only observation, owing to the fact that it usually resolves after delivery. In the diagnosis of diabetic retinopathy, it has been proven that fluorescein dye penetrates to the placenta and is present in breast milk for up to 72 hours, nevertheless indocyanine dye does not cross the placenta. It is highly recommended, whenever is possible, to use non-invasive methods included: OCT and/or OCT angiography, instead of invasive

examinations. [10] Vitreoretinal surgeries during pregnancy are uncommon, although if vitrectomy is necessary, it must be performed with the full support of the obstetric team. The preferred option for anesthesia is local anesthesia, which is relatively safe during pregnancy, whereas bupivacaine should be avoided. [10, 12]

Recommendations

Screening for diabetic retinopathy among patients with gestational diabetes is not required owing to the fact that it does not cause an increased risk in pregnancy.[13] Proper control of diabetes is extremely important in treating and delaying the progression of changes in diabetic retinopathy during pregnancy. Elevated and unstable glycemia levels result in faster development of changes in the fundus of the eye and worse response to treatment. [14] Rapid reduce of blood sugar may result in fast proliferation of pathological vessels in the fundus of the eye. All women with diabetes in preconception time should have a comprehensive and extended eye examination by optometrist and ophthalmologist.

Patients should be informed about the risk of developing and/or progressing diabetic retinopathy during pregnancy.[9, 13, 14]. Control examination should be performed at least once in each trimester or more often depending on the condition of the eye. According to the National Institute for Health and Care Excellence retinal assessment should be considered at 28 weeks if the first examination was normal, on the other hand if and diabetic retinopathy was present at the initial visit the retinal assessment should be performed at 16-20 weeks. [15] After pregnancy, progression of diabetic retinopathy may persist in 6-20% patients with type 1 diabetes, therefore dilated eye examination should be performed 1 year postpartum.[16]

Conclusions

Pregnancy is an risk factor for the progression of the diabetic retinopathy. Diabetic retinopathy in pregnant women is intriguing in terms of understanding the incidence, assessing the risk factors contributing to the pathogenesis, and the issues associated with the treatment. Hormonal changes that occur in women’s body during pregnancy have a remarkable impact on the eye. Therefore, vigilant ophthalmic examination and follow-up are essential for the pregnant women with diabetes and thanks to that, the risk of later complications will be significantly reduced.

Authors Contributions

Conceptualization, K.G. and U.K.; Literature Review, K.G., U.K. and C.K.; Writing – Abstract, K.G., A.P. and M.Dyr.; Writing – Introduction, K.G. and E.B.; Writing – Hyperglycemia in pregnancy, J.W. and P.M.; Writing – Diabetic retinopathy, M.Dyd. and A.M.; Writing – Risk factor for the development of diabetic retinopathy, U.K. and C.K.; Writing – Treatment, A.P. and E.B.; Writing – Recommendations, J.W. and M. Dyr.; Writing – Conclusions, K.G. and M.Dyd.; Editing and reviewing, K.G., U.K. and C.K.

All authors have read and agreed with the published version of the manuscript

Funding Statement

This research received no external funding.

Conflict of Interest Statement

The authors declare no conflict of interest.

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