OPHTHALMOLOGICAL DISEASES IN PREGNANCY AND THEIR IMPACT ON CHOOSING THE DELIVERY METHOD – REVIEW

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ABSTRACT

During pregnancy, the woman’s body undergoes many physiological changes, also such that can cause progression of existing pathologies. A decrease in intraocular pressure and enhanced humor aqueous circulation can improve the course of diseases as pre-conceptional glaucoma, which might even result in reduced dosage of medications. Material and Methods: Full-text publications released between 2000-2018 were analyzed. PubMed and Ovid search engines were used for the articles retrieval. Following phrases were applied in the search strategy: ‘cesarean section’, ‘complications’, ‘labor’, ‘ophthalmological indications’, and ‘pregnancy’. One of the greatest concerns of gynecologists and ophthalmologists is the presence of Valsalva reflex during the second stage of labor and its potentially negative effect on pathologies such as myopia or history of surgery for retinal detachment. Ophthalmological indications for the Cesarean section occurring without additional systemic disorders are relatively rare. They must be of very high intensity and difficult to control. More often, the ophthalmological indications accompany other indications and may, in these cases, determine the final choice of delivery method. The increasing frequency of the Cesarean section forces the evaluation of current recommendations for this procedure. The decision should be established in collaboration between the obstetrician and ophthalmologist. A regular ophthalmological control is also vital.
BACKGROUND

During pregnancy, numerous physiological hormonal, metabolic, hematological and immunological changes in woman's body take place. The purpose of these processes is the preparation of the pregnant woman for the forthcoming 40 weeks and for the fetus demands. On the other hand, physiological adjustments may also be accompanied by pathological changes [1].

Eyes are also affected by pregnancy. Most of lesions disappear within a few months after childbirth, however, some may lead to permanent vision deterioration. Pathologies associated with pregnancy, may be clinically new, represent changes in the course of existing ophthalmic diseases or manifest themselves as complications of systemic disorders [2].

Over the last 20 years, there has been an increase in amount of deliveries ending with Cesarean sections [3]. In Europe, the number of pregnancies ended this way is estimated to be around 25% of all labors [4]. From retrospective studies, which investigated the indications of 4895 Cesarean sections, 2.04% were ophthalmological reasons. Among them the most common was myopia higher than - 6D (57%), proliferative diabetic retinopathy (20%) and glaucoma (9%) [5]. However, we are missing extensive Evidence Based Medicine (EBM) research on this matter, which is followed by limited transparent guidelines. One of questioned aspects concerns Valsalva reflex during the second stage of labor and its potential impact on the eye function and pathology.

This article presents ophthalmological diseases which may be affected by pregnancy and their influence on the choice of the delivery method.

MATERIALS

The data were collected on the basis of the full-text scientific publications analysis. In order to present the current state of knowledge, only the articles which were published between 2000-2018 were examined. PubMed and Ovid search engines were used for the articles retrieval. Following phrases were applied in the search strategy: ‘Cesarean section’, ‘complications’, ‘labor’, ‘ophthalmological indications’, and ‘pregnancy’.

68 abstracts were identified using this method. After the initial evaluation, 45 abstracts were selected for full text analysis. Finally, 27 articles fully covering desired issues, were included in the review.

RESULTS

Diabetic Retinopathy

Progression of lesions in the fundus are typical for pre-pregnancy diabetic patients. These changes depend on diabetes duration (more severe course if diabetes lasts over 15 years), eyes condition before pregnancy (non-proliferative retinopathy may progress to proliferative retinopathy in about 20% of cases), glycemic control and coexistence of hypertension [6]. Studies show that 10% of patients without diabetic retinopathy (DR) may develop non-proliferative lesions. Placental lactogen, high levels of estrogen and progesterone are suggested as a cause of this progression [7]. These changes tend to diminish within a few months after childbirth, even in case of significant advancement. During pregnancy, a laser photocoagulation can be performed to control the progress of retinopathy (PRP) [7]. Pregnancy is a risk factor for the exacerbation of DR, but no significant association between pregnancy and long-term results concerning DR severity were observed [8]. Gestational diabetes, due to its relatively short duration, does not result in DR development [7].

Furthermore, there is no relationship between the Valsalva reflex, which occurs during the second stage of labor, and the number of ophthamological complications in diabetic patients. On the other hand, the American Diabetes Association (ADA) indicates epidural anesthesia and assisted childbirth or Cesarean section as the preferred method for delivery in case of confirmed DR [8].

Glaucoma

Intraocular pressure (IOP), contrary to primary opinion, tends to drop during pregnancy overall by 2-3 mmHg, with the highest reduction during the second trimester. It is attributed to the impact of progesterone and relaxin, which influence the filtration process, increase the drainage of the aqueous humor and reduce its production [9, 10].

A different situation occurs in case of a coincidence of gestational hypertension, preeclampsia or eclampsia. Research on the group of 78 pregnant women showed that 59% of them had changes in the fundus (Grade I and II by Keith-Wagener), which alleviated after childbirth [10]. In addition, visual disturbances in the preeclampsia, in the form of peripheral vision loss, diplopia and temporal anopsia, are associated with retinal vasoconstriction [11].

Also, during the second stage of labor IOP increases as a consequence of Valsalva reflex. However, it normalizes after labor and does not lead to damage of the optic nerve in patients without exacerbated glaucoma [11]. Advanced and poorly controlled glaucoma is an indication for shortening of the second stage of delivery in order to avoid greater loss in retinal ganglion cells and further vision reduction [12].

Cataract

Generalized stasis of fluids in the body, including eyes, increases the hydration of lens and can contribute to exacerbation in the already existing cataract [13]. No further data was found as cataract is more likely to occur among patients over 60 years old.

Central Serous Chorioretinopathy

Central Serous Chorioretinopathy (CSC) is a disease typical for pregnancy. CSC is considered to be associated with elevated serum cortisol levels and increased vessels permeability during pregnancy [14]. A significantly more frequent presence of subretinal fibrin accretion in pregnant women with CSC (90%) was also observed, which is a much rarer condition in the rest of population with CSC (20%) (14). Changes developed in pregnancy usually fully disappear during the perinatal and post-natal period (95%) (15). Laser photocoagulation may be considered when deposits are in the proximity of...
the fovea centralis, after assessment in OCT (fluorescent angiography is not recommended due to the lack of information about safety in pregnancy and limited data on its teratogenicity in the first trimester) [15]. Moreover, increased incidence of CSC in the preeclampsia was observed [8].

**Rhegmatogenous Retinal Detachment**

Rhegmatogenous Retinal Detachment (RRD) is a condition of imminent threat of anopsia, commonly found in myopia. During pregnancy, retinal detachments associated with preeclampsia and eclampsia might be observed [16]. A survey carried out among obstetricians in the UK showed, that the vast majority would propose ending delivery by Cesarean section or assisted labor in patients with history of retinal detachment surgery [16]. In other study, 76% of gynecologists opted for similar solution. From research conducted on 50 myopic pregnant women (from -4.5D to -15D), none had any ophthalmological indication for Cesarean section. The similar situation occurred among pregnant patients with prior surgery because of retinal detachment. An isolated increase in IOP in the second stage of delivery is not a risk factor for the RRD. However, if an increase in IOP is caused by a difficult outflow of aqueous humor from the anterior chamber of the eye (glaucoma, cataract), the risk of detachment is increased and it is recommended to perform Cesarean section in such cases [17].

**Uveal Melanoma**

It is estimated that one in three pregnancies concerns women over 30 years old. This age is a possible risk factor for the onset of uveal melanoma. In a retrospective study conducted in 2013 on the group of 524 pregnant women, the presence of uveal melanoma was found in 27 cases. No influence of pregnancy on the course of the disease was detected. However, the incidence of uveal melanoma among pregnant women has been confirmed to be more frequent than in the general population [18]. It has also been proven, that this tumor can be treated effectively during pregnancy by the use of proton radiation [19].

**Myopia**

Myopia used to be the primary recommendation for Cesarean section due to its correlation with retinal detachment and the possibility of its occurrence in the second stage of labor [21]. In a study conducted in 1996 on patients with high myopia (>4D) and other risk factors for retinal detachment, there was no progression of ophthalmological abnormalities after vaginal delivery [10]. In other research on a group of more than 350 myopic pregnant women, vaginal delivery had not had any impact on vision, nor retinal detachment [10]. Currently, on the basis of EBM, it is considered that myopia is not an indication for Cesarean section, nor to assisted childbirth. The Valsalva reflex during labor is proven to last too short to cause detachment. In addition, the increase in IOP during the second stage of labor constitutes a defensive mechanism against RD [21].

**Keratoconus**

During pregnancy the cornea increases its curvature, but decreases its thickness and sensitivity, which is related to the extended secretion of hormones (mainly estrogen) [22]. This condition may lead to intolerance of contact lenses and even to reduced visual acuity. The changes mostly disappear during postpartum period [22]. Therefore, laser eyesight correction should not be performed within a period up to several months after childbirth. The effect of parturition on the exacerbation of changes has not been detected [23]. In 2014, an advanced or acute keratoconus had been put by the Polish Society of Ophthalmologists as an indication for Cesarean section [12].

**Retinopathy in preeclampsia**

Ophthalmological complications may be involved in the eclampsia in 30%-100% of cases. The most common form is vasoconstriction, which manifests as scotoma and photophobia [24]. In severe cases, damage of the optic nerve and hemorrhage may occur. The majority of patients, even with acute symptoms of retinopathy (temporal anopsia), present complete regression of lesions during the postpartum period [19]. The risk of ocular complications in the preeclampsia have an impact on the decision regarding the delivery [8, 13].

**DISCUSSION**

Isolated ophthalmological recommendations rarely indicate the decision on pregnancy and delivery. Most of the lesions which progress during pregnancy disappear almost completely during the postpartum period without any long-term effects [19]. However, coexistence with severe, systemic pathology as hypertension, preeclampsia, eclampsia, DIC, diabetes mellitus, may affect the decision of delivery method [5].

Misinterpretation of current indications leads to offering Cesarean section and assisted labor as a form of ‘prevention against theoretical complications’. In Germany during 1950 – 1970 the diabetic retinopathy was an indication for a termination of pregnancy [25]. In a survey from 2017, among 29 ophthalmologists and 19 gynecologists (with different work experience and academic degrees) from Iran, 10.5% of gynecologists identified intraocular tumors and a prior retinal detachment as indications for pregnancy termination. In addition, in conditions such as diabetic retinopathy, defects of refraction, glaucoma the majority abstained from answering or would recommend Cesarean section or assisted childbirth [25].

In Poland, between 1990 and 1994, the ophthalmological recommendations were the second most common non-obstetric indications for Cesarean section [5]. The vast majority of cases was recommended by ophthalmologists. As a result of better cognition of the Valsalva reflex mechanism and its meaning during labor, myopia is no longer the indication for Cesarean section [4].

During pregnancy, uveal melanoma, rhegmatogenous retinal detachment and retinopathy in hypertension occur with higher incidence than in the general population. However, it is possible to control the course of these pathologies in a way that will not be harmful for the mother nor the fetus [26]. It is also vital, that the average age of pregnancy is greater than it used to be [27]. With age, many eye disorders tend to progress (diabetic
CONCLUSIONS

Ideally, ophthalmological examination of every woman planning pregnancy would allow early treatment of ophthalmic diseases which could progress. If not before conception, then during the first gynecological appointment, a pregnant patient should be recommended to undergo ophthalmological examination with the visualization of the fundus. In the absence of pathology, re-evaluation should be performed during 28th week of gestation, while pregnant women with any kind of lesion in the examination or with diagnosed diabetes/hypertension should undergo ophthalmological consultation in each trimester. This practice would allow initial recognition of an adequate method of delivery. In addition, this decision ought to be a consensus between the obstetrician and the ophthalmologist.

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