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Does women's vision change during pregnant? Cornea and pregnancy.

Karol Taradaj MSc, Tomasz Ginda, Prof. Bożena Kociszewska – Najman MD PhD, Piotr Maciejewicz MD PhD, Prof. Dariusz Kęćik MD PhD

Purpose:

The main goal of the study was to determine whether the uncomplicated pregnancy and the natural labor exert influence on the cornea and the anterior chamber of the eye. The additional aim was to assess whether pregnancy implies the change in corneal astigmatism, which could be evaluated analyzing the value of the refractive error itself and its derivatives.

Material and methods:

The study included 218 eyes of 109 patients who were recruited in the physiological pregnancy clinic of the First Chair and Clinic of Obstetrics and Gynecology of the Medical University of Warsaw. The patients who were interested in participating in the study and expressed their written consent were directed to the Ophthalmology Clinic where the imaging examination of the anterior segment of the eye using the Scheimpflug camera (Pentacam system) was performed.

The analyzed parameters included: central corneal thickness (CCT), keratometric parameters: flat (K1) and steep (K2), astigmatism value and axis, anterior chamber depth (ACD), anterior chamber volume (ACV) and iridocorneal angle (ACA). The protocol of the prospective study involved performing procedures during two visits: in the 36th week of pregnancy and in the 6th week after delivery. Due to resignation from the postnatal study, 104 eyes of 52 patients were excluded from the project. Finally, the analyzed group consisted of 114 eyes (57 patients). The inclusion and exclusion criteria are listed in Table 1.

The measurements were performed by two independent, experienced researchers (who performed over 500 tests). The result value is the arithmetic mean of both measurements obtained in the statistical analysis. All the tests were carried out without the use of mydriasis and cycloplegia with the consent of the Bioethical Committee.

Results:

The average age of the surveyed women was 28.25 ± 5.55 years (the age range of 18–35 years). Table 2 presents mean values and standard deviations of the analyzed parameters: CCT, K1, K2, cylindrical refraction defects, astigmatism axes, ACD, ACV, ACA.

The results were compared, respectively, for the tests performed in HBD 36 and in the sixth week after delivery. The bolded font was used for the parameters with statistically significant differences. Statistically significant were differences in the pregnancy and the postpartum for parameters that meet the conditions for the rejection of the null hypothesis with no mean differences in the student's t-test and the equality of the sum of negative and positive rank for the Wilcoxon test with the significance level $\alpha = 0.05$. The graphs (Fig. 1–3) illustrate the statistical differences based on the Student's t-test and the Wilcoxon pairs order test with the Marascuilo and McSweeney continuity correction for CCT, ACD, ACA before and after delivery.

The statistically significant differences were not shown for K1, K2, cylindrical refractive error, astigmatism axis and ACV.

Table 2. Mean values. standard deviations. differences and values of Student's t-test and Wilcoxon-sequence test with the Marascuilo and McSweeney continuity correction for CCT, K1, K2, cylindrical refraction error, astigmatism axes, ACD, ACV, ACA

Parameters	Value in 36 HBD	Value 6 weeks after delivery	Difference	p-value of t-Student's test	p-value of t-Wilcoxon's test
CCT	565.04 ± 36.49	561.09 ± 36.95	3.951	0.004	0.001
ACD	3.08 ± 0.33	3.06 ± 0.35	0.023	0.07	0.02
ACA	37.71 ± 5.90	36.75 ± 5.94	0.959	0.031	0.04
ACV	183.46 ± 38.34	181.93 ± 36.51	1.537	0.204	0.280
K1	43.34 ± 1.24	43.36 ± 1.23	0.025	0.737	0.12
K2	44.23 ± 1.29	44.22 ± 1.34	0.010	0.706	0.73
Cylindrical refraction error	0.89 ± 0.50	0.93 ± 0.54	X	X	0.09
Axis of cylindrical refraction error	91.90 ± 75.77	87.98 ± 77.28	X	X	0.73

Conclusion:

1. The morphology of the cornea and the anterior chamber in the third trimester of pregnancy changes compared to the post-partum period.
2. The thickness of the central part of the cornea in the third trimester of pregnancy increases compared to the early postnatal period.
3. The defect of cylindrical refraction and its determinants in pregnancy do not change.
4. The plasticity of the anterior chamber seen before delivery can be a natural adaptive mechanism of the female body, which counteracts the excessive increase in intraocular pressure in the second stage of delivery.

Inclusion criteria	Exclusion criteria
Informed consent for participation in the study	No Informed consent for participation in the study
Age 18–35	18 years > Age > 35 years
Physiological Birth or caesarean section	Complications of pregnancy
Single pregnancy	Multiple Pregnancy
Refractive error -4.00 to +4.00 D sph.	Refractive error greater than -4.00 and +4.00 D sph.
Good cooperation during research	Lack of cooperation during research
No eye diseases	Active eye disease
no operations or ophthalmic procedures, including refractive surgery in history	Condition after surgery or ophthalmic surgery, including refractive surgery
Delivery after 36 HBD	Premature delivery < 36 HBD
V = 5/5 sc. s. cc. (BCVA)	V < 5/5 cc.
Sn = D.0.5 sc. s. cc. (BCVA)	Sn < D.0.5 cc.

Table 1 Inclusion and exclusion criteria

