Abstract

Retinopathy of prematurity (ROP) is a vaso-proliverative multifactorial disease of premature childern's retina. It is thought to be one of the leading causes of blindness in infants and children of young age nowadays. In the last few years incidence rate of ROP increases due to development in neonatal care and increase in praterm births. Disease affects 15–20% of all preterm children born each year. ROP occurs in 25 % babies with the birth weight <1000 g. Every year 28,300–45,600 newborns experience ROP associated blindness all over the world.

The goal was to evaluate corellation between birth data such as birth weight, gestational age at birth and Apgar score with best corrected visual acuity (BCVA) and morpho biometric features of macula and optic disc, obtained with optiacal coherence tomography in prematures either with history of spontaneous regression of the disease or requiring laser treatment. Comparison of this parameters with those obtained in ful term, healthy children.

The study included a group of 68 prematurely born children with ROP (study group- B) and a group of 48 full term born children (reference group- K). The study group consisted of 36 boys and 32 girls. The average age in the study group (B) was more than 9 years. Study group B was divided into two subgroups: group B1- 38 children (16 girls and 22 boys) with ROP in course of whom spontaneous regression of lesions occured, and group B2- 30 patients (14 girls and 16 boys) with ROP, in whom regression of lesions occured after laser photocoagulation of the retina was performed due to threshold disease diagnosis. Reference group K consisted of 22 boys and 24 girls. A precise interview was obtained regarding the course of pregnancy, birth, postnatal period and further development of all patients.

Comprehensive ophthalmological examination was performed in all patients with an assessment of the best corrected visual acuity (BCVA) and the spherical equivalent of refractive error. Optical coherence tomography with the use of SLO/ OCT Spectralis, Heidelberg was performed to evaluate the area of macula and optic disc to obtain parameters such as: total retinal nerve fiber layer thickness (TotalRNFL) [μ m], total macular volume (TMV) [mm3], central foveal thickness (CFT) [μ m], thickness of the retina in parafoveal zone (ParaFT) [μ m], thickness of the retina in perifoveal zone

(PeriFT) $[\mu m]$, subforeal choroidal thickness (CHORT) $[\mu m]$. The obtained test results were analysed statistically.

A comperative analysis of the results obtained in study group B compared to the reference group K revealed that:

* in study group B, statistically significant lower values were observed in terms of parameters such as gestational age at birth (HBD), birth weight (B.w.), Apgar score and total retinal nerve fiber layer thickness (TotalRNFL), thickness of the retina in parafoveal zone (ParaFT), subfoveal choroidal thickness (CHORT) and best corrected visual acuity (BCVA).

* in study group B, statistically significant higher values were observed in terms of parameters such as central foveal thickness (CFT) and total macular volume (TMV).

A statistical comperative analysis of the results obtained in study group B1 compared to the reference group K showed that:

* in study group B1, statistically significant lower values were observed in terms of parameters such as gestational age at birth (HBD), birth weight (B.w.), Apgar score and total retinal nerve fiber layer thickness (TotalRNFL), thickness of the retina in parafoveal zone (ParaFT) and subfoveal choroidal thickness (CHORT).

* in study group B1, statistically significant higher values were observed in terms of central foveal thickness (CFT).

* for parameters such as thickness of the retina in perifoveal zone (PeriFT), total macular volume (TMV) and best corrected visual acuity (BCVA) there were no statistically significant differences between groups B1 and K.

A comperative analysis of the results obtained in study group B2 in comparision to the reference group K revealed that:

* in study group B2, statistically significant lower values were observed in terms of parameters such as gestational age at birth (HBD), birth weight (B.w.), Apgar score and total retinal nerve fiber layer thickness (TotalRNFL), subfoveal choroidal thickness (CHORT) and best corrected visual acuity (BCVA). * in study group B2, statistically significant higher values were observed in terms of central foveal thickness (CFT), total macular volume (TMV) and thickness of the retina in perifoveal zone (PeriFT).

* for parameters such as thickness of the retina in parafoveal zone (ParaFT), and the spherical equivalent of refractive terror (SE) there were no statistically significant differences between groups B2 and K.

The achieved correlation analysis indicated statistically significant moderate negative correlations between birth weight and:

 \ast central foveal thickness (CFT)- with the increase in birth weight by the 100 g there was an decrease in central foveal thickness by the 4,5 μm

 \ast thickness of the retina in parafoveal zone (ParaFT)- with the increase in birth weight by the 100 g there was a decrease in thickness of the retina in parafoveal zone by the 3,1 μm

* thickness of the retina in perifoveal zone (PeriFT)- with the increase in birth weight by the 100 g there was a slight decrease in thickness of the retina in perifoveal zone by the 1,2 μ m

* subfoveal choroidal thickness (CHORT) with the increase in birth weight by the 100 g there was a decrease in subfoveal choroidal thickness by the 2,1 μ m

Based on the carried out research and the obtained results, the following conclusions were stated:

- The central foveal thickness (CFT) was statistically significant higher in all children born prematurely with a history of ROP compared to full term subjects. The Lower the gestational age at birth was, the higher was the value of central foveal thickness.
- 2. In all children with a history of ROP there was a varying degree of shallowing of the foveal pit depression, ranging from a slight decrease to its complete absence.

- 3. Among both groups of children with a history of ROP there was a reduced subfoveal choroidal thickness (CHORT) levels, comparing to full term controls.
- 4. There was a statistically significant reduction in best corrected visual acuity (BCVA) in most extreme premature children with more severe course of ROP and highest values of central foveal thickness (CFT), such correlation was not observed In subjects with milder course of disease. A decrease In BCVA May be therefore associated with macular structure abnormalities as well as with the degree of prematurity.
- 5. Appropriate ophthalmological care, combined with the use of modern diagnostic tools and fast therapy, will allow to gain good visual acuity and thus a higher quality of life in these children.