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Retinal nerve fiber layer thickness in pediatric glaucoma patients, measured by scanning laser polarimetry

Abstract

Introduction

Glaucoma is the leading cause of irreversible blindness worldwide. It is characterized as progressive neuropathy of retinal ganglion cells. Diagnosis of glaucoma can be difficult and often requires several different investigations, performed repeatedly. Evaluation of thickness of retinal nerve fiber layer (RNFL) by scanning laser polarimetry (with GDxVCC machine) belongs to the most sensitive objective methods of glaucoma diagnostics and monitoring and it is also easy to perform. Importance of this method is even higher in children, as the performance of other diagnostic methods is difficult due to poor cooperation. Normative databases of machines providing objective measurement of RNFL thickness, including GDxVCC, don´t comprise data of subjects younger 18 years.

Methods

The aims of our work were to assess normative values of RNFL parameters on GDxVCC in healthy children and to compare them with values of children diagnosed with glaucoma. We performed measurements of RNFL thickness and basic ophthalmological testings in 186 children of age 7-17 years. During our study there were published papers pointing the influence of atypical birefringence pattern (ABP) on RNFL values. Therefore, we performed testing of our data for presence of ABP and its eventual impact on normative data. Finally, we evaluated RNFL parameters in 20 children with diagnosed glaucoma and we compared it with our normative values.

Results

The inclusion criteria of eyes with no pathology were met by 120 children. We obtained normative RNFL parameters by statistical evaluation of their measurements. These parameters were significantly different from values in adults. As for ABP, it significantly influenced most of RNFL parameters, however inclusion of data of eyes with ABP into normative database had minimal clinical impact. RNFL parameters of eyes with diagnosed glaucoma were significantly lower than those of healthy eyes.

Conclusion

RNFL thickness measurement with GDxVCC is suitable for diagnostics and mainly for monitoring of glaucoma. Its impact is even higher in children for its easiness together with sensitivity. Normative data of children are significantly different from adults. It is important to pay attention to the results of measurements regarding to possible ABP.

Key words: pediatric glaucoma, scanning laser polarimetry, GDxVCC, RNFL thickness