

Corneal Thickness in Congenital Glaucoma

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ABSTRACT

Central corneal thickness is very important measurement in glaucoma treatment because it influences the eye pressure measurements. A thinner cornea gives us artifactually lower intraocular pressure and a thicker cornea gives higher intraocular pressure reading, so it has to be corrected in both cases. The aim of this study is to compare central corneal thickness between congenital glaucoma patients and normal subjects. Prospective study included 27 patients with congenital glaucoma and 35 patients in control group. First group was subdivided in two subgroups: A – 8 earlier operated patients, B – 19 patients treated with topic therapy. Patients had no other corneal disorders, history of trauma, corneal surgery and they were not contact lens wearers. Measurements were performed by specular microscope Tomey EM 3000 on central corneas. This study showed that patients with congenital glaucoma have lower central corneal thickness than normal subjects. Also, the study showed that antiglaucomatous operation doesn't influence central corneal thickness. Central corneal thickness need to be a routine part of examination measurements because of need to correct intraocular pressure according to it, but also the thinner corneas values can suggest congenital glaucoma diagnosis beside the other parameters.

Key words: corneal thickness, pachymetry, congenital glaucoma

Introduction

The thickness of cornea influences the eye pressure measurements. It may affect the accuracy of the applanation tension by changing the resistance of the cornea to indentation. A thinner cornea may require less force to bend it leading to underestimation of the true intraocular pressure (IOP), while a thicker cornea would need more force to bend it thus giving an artifactually higher IOP reading^{1,2}.

A difference in central corneal thickness (CCT) of 0.07 mm from the »normal« of 0.52 mm was found to cause an over or under estimation of IOP by 5 mmHg³.

Any factor that alters the value of the IOP can lead to misclassification. A relatively minor change in CCT can produce a statistically significant change in IOP readings, so measurements of corneal thickness may be necessary for the accurate interpretation of applanation tonometry.

Corneal pachymetry is the process of measuring the thickness of the cornea using either contact methods such as ultrasound and confocal microscopy or non contact optical method. By specular microscope we can measure the central corneal thickness by optical method⁴.

Primary congenital glaucoma is characterised by maldevelopment of the angle structures (isolated trabeculodysgenesis) characterized by absence of the ciliary body band due to translucent amorphous material that obscures the trabeculum. Congenital glaucoma is classified as congenital glaucoma, when IOP becomes elevated during intrauterine life or manifests in first three years of life, or juvenile which manifests between three and sixteen years of age^{5,6}.

The aim of this study is to compare central corneal thickness between congenital glaucoma patients and normal subjects.

Patients and Methods

Central corneal thicknesses in twenty seven patients (fifty four eyes) with primary congenital glaucoma were compared with central corneal thickness in thirty five patients (seventy eyes) in control group in a prospective study. They were examined at the Department of Ophthalmology, Rijeka University Hospital from June 2010 to December 2010. Exclusion criteria included other cor-

neal disorders, history of trauma, corneal surgery and contact lens use. All patients have congenital glaucoma diagnosed in first three years of life. When examined they were from eighteen to twenty nine years of age, thirteen males, fourteen females. We examined them in two different subgroups: group A were earlier operated patients (antiglaucomatous operation) – eight patients, and group B with nineteen patients treated only with topic therapy.

Pachymetry was performed by non contact specular microscope Tomey EM 3000 and we measured central corneal thickness. The data was analysed by T-test.

Results and Discussion

In congenital glaucoma group mean central corneal thickness was 513 ± 23 micrometers. In control group result for mean central corneal thickness was 535 ± 27 micrometers. The mean pachymetry values in group with congenital glaucoma was significantly lower than in control group (T-test, $p < 0.05$).

In group A (earlier operated patients) mean central corneal thickness was 512 ± 21 micrometers and in group B (patients treated with topic therapy) mean central corneal thickness was 513 ± 19 micrometers. There was no

significant difference between central corneal thickness values in these two groups.

Results of the study correspond with other studies, central corneal thickness was significantly thinner and CCT may be another confounding factor when measuring intraocular pressure and examining patients with congenital glaucoma^{7,8}.

Conclusion

The study suggests that central corneal thickness in patients with congenital glaucoma is significantly lower than in control group, and also that there is no significant difference between central corneal thickness in congenital glaucoma patients earlier operated compared to those who were treated with topic therapy only. Thinner cornea may be caused by corneal distension which happens in early stage of congenital glaucoma.

Lower central corneal thickness values results in lower tonometrically recorded intraocular pressure so it need to be measured and intraocular pressure has to be corrected according to CCT measurements. Also, lower central corneal thickness values should be taken as a part of examination in congenital glaucoma diagnostics.

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DEBLJINA ROŽNICE U KONGENITALNOM GLAUKOMU

SAŽETAK

Centralna debljina rožnice je vrlo važna u glaukomsom liječenju, jer utječe na vrijednost mjerenja intraokularnog tlaka. Tanja rožnica nam daje lažno niže vrijednosti tlaka, a deblja rožnica daje više vrijednosti intraokularnog tlaka, pa u oba slučaja treba učiniti korekciju. Cilj ove studije je da usporedi centralnu debljinu rožnice pacijenata s kongenitalnim glaukomom i osoba zdravih očiju. Prospektivna studija uključila je 27 pacijenata s kongenitalnim glaukomom i 35 pacijenata u kontrolnoj grupi. Prva je grupa bila podijeljena u dvije podgrupe: A – 8 ranije operiranih pacijenata, B – 19 pacijenata liječenih topičkom terapijom. Pacijenti nisu imali druge rožnične bolesti, povijest ranije traume, rožnične oeracije i nisu bili nositelji kontaktnih leća. Mjerenja su učinjena spekularnim mikroskopom Tomey EM 3000 u području centralne rožnice. Ova je studija pokazala da pacijenti s kongenitalnim glaukomom imaju niže vrijednosti centralne debljine rožnice nego osobe zdravih očiju. Također, studija je pokazala da antiglaukomska operacija ne utječe na centralnu debljinu rožnice. Centralna debljina rožnice treba biti obavezan dio pregleda radi potrebne korekcije vrijednosti intraokularnog tlaka, a također tanje vrijednosti rožnice mogu sugerirati dijagnozu kongenitalnog glaukoma uz ostale parametre.