Journal français d'ophtalmologie (2016) xxx, xxx—xxx

Disponible en ligne sur ScienceDirect www.sciencedirect.com

Elsevier Masson France EM|consulte www.em-consulte.com

SFO COMMUNICATION

Longitudinal evaluation of central corneal thickness in congenital glaucoma☆

Épaisseur cornéenne centrale dans le glaucome congénital : une étude longitudinale

R.A. Paletta Guedes[a,b,c,*], A.B. Pena[a,b], V.M. Paletta Guedes[a,b], A. Chaoubah[c]

[a] *Paletta Guedes Ophthalmological Center, Juiz de Fora, MG, Brazil*
[b] *Santa Casa de Misericórdia Hospital, Juiz de Fora, MG, Brazil*
[c] *Federal University of Juiz de Fora, Juiz de Fora, MG, Brazil*

Received 17 January 2016; accepted 18 March 2016

KEYWORDS
Primary congenital glaucoma;
Central corneal thickness;
Pachymetry;
Glaucoma surgery;
Intraocular pressure

Summary
Purpose. — To assess the central corneal thickness in primary congenital glaucoma before and after surgical treatment and compare it with a normal population.
Methods. — We conducted a longitudinal analysis of primary congenital glaucoma patients, in whom we measured central corneal thickness before and after treatment (Group 1). We compared our results with a normal population (Group 2), who underwent ophthalmological examination under anesthesia for other reasons.
Results. — Mean age (months) in Group 1 ($N = 23$) and Group 2 ($N = 40$) at the time of the first exam was 5.5 and 9.2 ($P = 0.004$), respectively. Mean central corneal thickness (microns) in Group 1 was: 663 before treatment and 557 after treatment ($P < 0.001$). In Group 2, mean central corneal thickness (microns) was 551. Comparisons show statistical difference between mean values before and after treatment ($P < 0.001$), but not between post-treatment CCT mean values in Group 1 and mean CCT values in Group 2 ($P = 0.627$).
Conclusion. — In primary congenital glaucoma, central corneal thickness values show unique peculiarities. They are higher than normal before treatment (thicker corneas), due to corneal edema caused by elevated intraocular pressure. After surgical treatment, central corneal thickness measurements decrease toward the mean values for the normal population.

☆ Part of this study was presented as an oral communication during the 119th French Society Meeting in Paris on May 12th 2013.
* Corresponding author. Av. Barão do Rio Branco, 2337/807, Centro, 36010-905 Juiz de Fora, MG, Brazil.
E-mail address: palettaguedes@yahoo.com (R.A. Paletta Guedes).

http://dx.doi.org/10.1016/j.jfo.2016.03.010
0181-5512/

MOTS CLÉS
Glaucome congénital primitif ;
Épaisseur centrale de la cornée ;
Pachymétrie ;
Chirurgie du glaucome ;
Pression intraoculaire

Résumé
But. — Évaluer l'épaisseur cornéenne centrale (ECC) des patients avec glaucome congénital primitif (GCP) avant et après traitement chirurgical et comparer avec une population normale.
Matériels et méthodes. — Une étude longitudinale a été conduite pour analyser l'ECC avant et après le traitement chirurgical dans le GCP (groupe 1). Une comparaison a été faite avec une population sans glaucome (groupe 2) et qui a été soumise à un examen ophtalmologique sous anesthésie générale pour d'autres raisons.
Résultats. — L'âge moyenne du groupe 1 ($n = 23$) et groupe 2 ($n = 40$) au moment du premier examen a été, respectivement : 5,5 et 9,2 mois. Les valeurs moyennes de l'ECC dans le groupe 1 étaient 633 microns avant traitement et 557 après traitement. Le groupe 2 présentait 551 microns d'ECC moyenne. Les comparaisons montrent qu'il y avait une différence entre les valeurs moyennes d'ECC avant et après traitement dans le groupe 1 ($p < 0{,}001$), mais pas pour les valeurs moyenne après traitement dans le groupe 1 et la moyenne du groupe 2 ($p = 0{,}627$).
Conclusion. — L'ECC présente des caractéristiques particulières et uniques dans l'évaluation du glaucome congénital. Au moment du diagnostic, les valeurs sont souvent très élevées, mais elles descendent vers les valeurs normales après le contrôle de la maladie.

Introduction

Globally, an estimated 19 million children below age 15 are visually impaired and 1.4 million are irreversibly blind for the rest of their lives [1]. Glaucoma is among the most frequent causes of childhood vision impairment [2]. In the United Kingdom, it is responsible for 2% of severe visual impairment and blindness in children [3].

Primary congenital glaucoma (PCG) is caused by malformation of the angle structures (isolated trabeculodysgenesis), clinically characterized by the absence of the ciliary body band in gonioscopy, due to translucent amorphous material that blocks the trabeculum [4]. This malformation results in aqueous humor drainage deficiency and consequently in elevated intraocular pressure (IOP) that damages the optic nerve head.

IOP reduction is the main target of glaucoma treatment and is recognized as the only effective way to stop the optic nerve damage and visual loss caused by the disease, but tonometry in eyes with congenital glaucoma is more susceptible to misinterpretation due to extreme corneal changes found in these patients [5].

It is well-known that central corneal thickness (CCT) and keratometry influence the IOP measurements in adults [5—8]. In these patients, CCT measurement is essential for the evaluation of glaucoma, since it can lead to misinterpretation of IOP values. Thinner corneas tend to underestimate true IOP values and thicker corneas, to overestimate it. One exception to this rule is when cornea is thicker due to edema. In this particular case, IOP will be underestimated, although CCT values are higher than normal.

Conversely, influence and clinical significance of CCT in congenital glaucoma is not so clear. The literature shows mixed results for CCT in a PCG population. Some authors have found that CCT in this population is thinner when compared to a normal population [9—13], while others have found that it is comparable to a normal population [14,15] and, there is even one study in which it was found to be thicker than in a normal population [16]. To our knowledge, only two studies show the longitudinal follow-up of CCT in congenital glaucoma [17,18] and just one of these had a control group.

The aim of the present study is to evaluate the CCT of patients with PCG before and after surgical treatment and to compare it to a normal population.

Materials and methods

We conducted a retrospective analysis of records from consecutive patients who had been submitted to an ophthalmological examination under anesthesia between April 2007 and November 2012. Inclusion criteria were: children under 3 years old, ophthalmological exam for suspicious or confirmed PCG, ophthalmological exam for other causes than PCG. Exclusion criterion: absence of CCT values. In cases where both eyes of a same patient were eligible for the study, we randomized only one eye. This study was approved by the Research Ethics Committee of Santa Casa de Juiz de Fora Hospital and the tenets of the Declaration of Helsinki were followed.

We divided the patients into two groups:

- Group 1 — patients diagnosed with PCG;
- Group 2 — control: patients without glaucoma or other anterior segment congenital anomalies, who had been submitted to an ophthalmological exam under anesthesia for other reasons (suspicion of congenital glaucoma due to enlargement of the optic nerve cup; lachrymal drainage obstruction, etc.).

We analyzed the following variables in each group:

- Group 1:
  - patients' characteristics (age, race, age at onset of symptoms);
  - ophthalmological exam before glaucoma surgery and 1, 3, 6 and every 6 months after surgery, including:
    - tonometry with Tonopen® (Reichert Inc., Buffalo, NY, USA) — mean of 3 measurements with good reliability,

Please cite this article in press as: Paletta Guedes RA, et al. Longitudinal evaluation of central corneal thickness in congenital glaucoma. J Fr Ophtalmol (2016), http://dx.doi.org/10.1016/j.jfo.2016.03.010