ORIGINAL ARTICLE

Anterior chamber depth measurement in teenagers. Comparison of two techniques

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Abstract
Purpose: The aim of this study is to determine the anterior chamber depth (ACD) in teenagers using two different devices: partial coherence interferometry IOLMaster (Carl Zeiss Meditec) and anterior segment optical coherence tomography (Visante™ OCT, Carl Zeiss Meditec) and to evaluate the degree of agreement between ACD measurements carried out by both instruments.
Methods: In this prospective study 68 eyes of 34 emmetropic Caucasic patients (18 girls and 16 boys) were analysed. ACD was measured from the anterior corneal surface to anterior surface of the crystalline lens. For each age the ACD size was calculated and the difference between IOLMaster and Visante-OCT measurements was analysed using Bland–Altman plot and paired *t*-test.
Results: For all data the mean (SD) anterior chamber depth was 3.56 (0.19) mm with the IOL-Master and 3.65 (0.21) mm with the Visante-OCT. IOLMaster measurements were an average of 0.10 (0.12) mm less than Visante-OCT (paired *t*-test, $p < 0.0001$).

In our study ACD mean differences (SD) by age obtained had been −0.139 (0.163), −0.044 (0.112), −0.082 (0.054) and −0.105 (0.101) for 13, 14, 15 and 17 respectively. The 13-age group showed the larger standard deviation compared to the other groups.
Conclusions: IOLMaster and Visante-OCT are good and useful non-contact methods for measuring ACD in the healthy eyes of teenagers. The measurement differences between two devices were quite small, however, they should take into account in order to calculate the power on intraocular lens. The findings provide more normative date for this age group.
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PALABRAS CLAVE

Cámara anterior;
Adolescentes;
Pacientes caucásicos
emetrópicos;
Pruebas diagnósti-
cas/investigación

Medición de la profundidad de la cámara anterior en adolescentes. Comparación de dos técnicas de medición

Resumen

Objetivo: El objetivo de este estudio es determinar la profundidad de la cámara anterior en adolescentes, utilizando dos dispositivos diferentes: la interferometría de coherencia parcial IOLMaster (Carl Zeiss Meditec) y la tomografía de coherencia óptica del segmento anterior (Visante™ OCT, Carl Zeiss Meditec), así como evaluar el grado de concordancia entre las mediciones de la profundidad de la cámara anterior realizadas, utilizando ambos instrumentos.

Métodos: En este estudio prospectivo se analizaron 68 ojos de 34 pacientes caucásicos emetrópicos (18 chicas y 16 chicos). Se midió la profundidad de la cámara anterior desde la superficie anterior de la córnea a la superficie anterior del cristalino. Se calculó el tamaño de la profundidad de la cámara anterior para cada grupo de edad, y se analizó la diferencia entre las mediciones con IOLMaster y Visante-OCT, utilizando el gráfico Bland-Altman y la prueba de *t* pareada.

Resultados: Para todos los datos, la profundidad de la cámara anterior media (DE) fue de 3,56 (0,19) mm con IOLMaster y de 3,65 (0,21) con Visante-OCT. Las mediciones con IOLMaster fueron de media 0,10 (0,12) mm menores que las realizadas con Visante-OCT (Prueba de *t* pareada, $p < 0,0001$).

En nuestro estudio, las diferencias medias (DE) de la profundidad de la cámara anterior por edad fueron de -0,139 (0,163), -0,044 (0,112), -0,082 (0,054) y -0,105 (0,101) para los grupos de 13, 14, 15 y 17 años, respectivamente. El grupo de 13 años aporta una desviación estándar superior a la del resto de grupos estudiados.

Conclusiones: IOLMaster y Visante-OCT constituyen métodos de no contacto buenos y útiles para la medición de la profundidad de la cámara anterior en los ojos sanos de adolescentes. Las diferencias de medición entre ambos dispositivos fueron bastante pequeñas, sin embargo, estas diferencias deberían tenerse en cuenta para el cálculo de la lente intraocular. Los hallazgos son interesantes ya que aportan más datos normativos para este grupo de edad.

Introduction

Anterior chamber depth (ACD) measurement is very useful to provide valuable information in different fields of ophthalmology. Recently, this parameter has become increasingly important because it is essential for the new theoretical biometric formulas used to calculate the power on intraocular lenses (IOLs), as well as in surgical planning of IOL implantation and also it is used as a screening risk factor for glaucoma.[1-5]

Different methods for measuring the ACD are available, based in ultrasonic, optical and photographic techniques.[6,7] The most common method for ACD measuring has been ultrasound (US) biometry. This method requires corneal contact and corneal applanation could be possible, which may lead to false results due to indentation of the cornea, and the exact axial placement of the probe relative to the centre of the cornea.[8-12]

Like all contact methods, it may be uncomfortable for the patient or even lead to damage of the corneal epithelium. Thus, non-contact methods are preferred for the ACD measurement.[13,14]

The optical systems to measure ACD, such as IOLMaster and Visante-OCT, were made commercially available several years ago. These devices have potential advantages, provide non-contact measurements and their use is reported to require minimal training.[15-17]

Previous reports[5,7,11,17] have studied the agreements between ACD measurements obtained with these devices with different study population, for example: different pathologies and refractive errors, sex, ethnicity, and so on, in order to establish possible influence factors that could affect the clinical diagnostic.

Most of these studies[5,11,17] have been carried out with adult populations, being less frequently among children and teenager population.

The aim of this study was to determinate the ACD in healthy emmetropes teenagers and to assess the agreements obtained using two methods of noninvasive ACD measurements, the IOLMaster and Visante-OCT, and to describe the potential advantages and disadvantages of each method, in order to verify the adequacy of both instruments to characterise the eyes of this population group.

Materials and methods

This prospective study enrolled 34 healthy Caucasic emmetropic teenagers, with no anterior eye segment pathology on slitlamp examination, no previous intraocular surgery, no glaucoma of any type, and no wearer contact lenses. Emmetropia was defined as a spherical equivalent of ±0.25 D. The study was performed in compliance with the tenets of the Declaration of Helsinki. Informed consent was