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Change in intraocular pressure during scleral depression



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KEYWORDS

Intraocular pressure;
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Abstract

Purpose: Manometric studies have found that intraocular pressure (IOP) rises 116–350 mmHg during scleral depression in surgical settings. No information is available regarding the effect of scleral depression on IOP in routine clinical settings. The aim of this study is to quantify the change in IOP that occurs when scleral depression is performed on normal eyes in a routine clinical setting.

Methods: A total of 28 eyes from 28 normal subjects were included. Tono-Pen tonometry was performed while scleral depression was performed in each of the two quadrants: superotemporal (ST) and inferonasal (IN). A post-procedure IOP measurement was obtained following each scleral depression examination. Both ST and IN quadrants were tested on all eyes, with the quadrant tested first chosen at random (15 ST, 13 IN).

Results: The mean IOP during scleral depression was 65.3 mmHg ST and 47.8 mmHg IN, with a maximum recorded IOP of 88 mmHg. The mean change in IOP for the ST quadrant was 51.9 ± 17.3 mmHg and 46.4 ± 16.0 mmHg for the right and left eyes, respectively. The mean change in IOP for the IN quadrant was 45.3 ± 22.7 mmHg and 16.8 ± 15.8 mmHg for the right and left eyes, respectively.

Conclusions: Scleral depression as performed in a routine office setting produces wide fluctuations in IOP and may impair ocular perfusion. Additional studies are needed to determine the long-term consequences of routine scleral depression.

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PALABRAS CLAVE

Presión intraocular;
Depresión escleral;
Oftalmoscopia
indirecta binocular

Cambio en la presión intraocular durante la depresión escleral**Resumen**

Objetivo: Los estudios manométricos han hallado que la presión intraocular (PIO) se eleva de 116 a 350 mmHg durante la depresión escleral en el ámbito quirúrgico. No se dispone de información en relación al efecto de la depresión escleral sobre la PIO en la rutina del ámbito clínico. El objetivo de estudio es la cuantificación del cambio en la PIO que se produce cuando se realiza la depresión escleral en ojos normales en un escenario clínico rutinario.

Métodos: Se incluyeron un total de 28 ojos de 28 sujetos normales. Se realizó una tonometría Tono-Pen, mientras que la depresión escleral se llevaba a cabo en dos cuadrantes: superotemporal (ST) e inferonasal (IN). Se realizó una medición de la PIO tras llevar a cabo cada depresión escleral. Se realizaron las medidas en ambos cuadrantes ST e IN en todos los ojos, eligiéndose el primer cuadrante a testar al azar (15 ST, 13 IN).

Resultados: La PIO media durante la depresión escleral fue de 65,3 mmHg ST y 47,8 mmHg IN, con una PIO máxima registrada de 88 mmHg. El cambio mínimo de la PIO para el cuadrante ST fue de $51,9 \pm 17,3$ mmHg y de $46,4 \pm 16,0$ mmHg para los ojos derechos e izquierdos, respectivamente. El cambio medio de la PIO para el cuadrante IN fue de $45,3 \pm 22,7$ mmHg y $16,8 \pm 15,8$ mmHg para los ojos derechos e izquierdos, respectivamente.

Conclusiones: La depresión escleral, realizada en un entorno clínico rutinario, produce fluctuaciones de la PIO y puede afectar a la perfusión ocular. Son necesarios estudios adicionales que determinen las consecuencias a largo plazo de la depresión escleral rutinaria.

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Scleral depression, sometimes referred to as "scleral indentation", is a routine clinical procedure performed during binocular indirect ophthalmoscopy (BIO) to enhance visualization of the peripheral fundus.¹ The procedure is used to extend visualization of the fundus further into the periphery and to accentuate the clinical appearance of certain lesions, such as retinal holes and tears, and hence increase the likelihood of their detection.

Scleral depression is performed by indenting the wall of the eye with an instrument known as a scleral depressor while the region of the fundus being indented is viewed ophthalmoscopically. Indentation of the globe during scleral depression produces an increase in intraocular pressure (IOP) because the contents of the globe are compressed into a smaller volume. Studies using manometry on enucleated eyes² and during scleral buckling surgery³ have recorded IOP readings of 116 mmHg to 350 mmHg during scleral depression.

Published data do not currently exist on the amount of IOP elevation that occurs in normal eyes during scleral depression under conditions of routine ophthalmoscopic examination. Published studies that have investigated this question were conducted on diseased rather than normal eyes, and IOP measurement was performed using an invasive procedure (manometry) rather than tonometry. The purpose of this study is to quantify the elevation in intraocular pressure during scleral depression in normal adult human eyes using tonometry under conditions resembling a routine office setting.

Methods

This study was conducted in accordance with the principles of the Declaration of Helsinki and good clinical practice. All

protocols were approved by the institutional review board at the University of the Incarnate Word. Subjects provided informed consent after being appropriately informed of the nature of the study.

Inclusion criteria for participation in this study were persons of 18–70 years of age with self-report of an eye exam within the last 4 years, no history of current or prior eye disease, and VA correctable to at least 20/30 in each eye. Exclusion criteria were any active ocular disease, intraocular surgery within the past 30 days in the tested eye, current or past history of glaucoma, anterior chamber angles of grade 2 or less using the Van Herick estimation technique, baseline IOP of 25 mmHg or higher, any condition that could be exacerbated by acute elevations of IOP (such as myopic macular degeneration or angiod streaks), any media opacity that impairs visibility of the ocular fundus, or any ocular condition or abnormality that would impair accurate measurement of intraocular pressure. If both eyes of a subject were eligible for inclusion in the study, the study eye was selected at random.

Subjects underwent a screening examination, including best-corrected visual acuity, tonometry and biomicroscopy. The test eye was anesthetized with proparacaine and the pupil was dilated using 1% tropicamide and 2.5% phenylephrine. After the pupil had dilated to a minimum of 8 mm in diameter, the subject was placed into a supine position and a screening ophthalmoscopic examination was performed without scleral depression.

All IOP measurements were made using the same Tono-Pen® XL tonometer (Reichert Inc., Depew, NY) that was calibrated prior to each session. Examiner #1 performed a baseline tonometry reading after the patient remained in the supine position for 5 min. The average of 4 good quality tonometry readings was recorded as the IOP measurement, according to manufacturer's recommendations (Tono-Pen

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