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ORIGINAL ARTICLE

Intraoperative use of coherence tomography in vitreoretinal surgery☆

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KEYWORDS
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Abstract
Background: Optical coherence tomography is a useful tool in several diseases. Its intraoperative use with the intention of improving anatomical results has recently been described.
Purpose: To determine the usefulness and safety of optical coherence tomography during pars plana vitrectomy for several vitreoretinal diseases.
Material and methods: A prospective case series is reported, in which the decision that influenced the use of the optical coherence tomography imaging during pars plana vitrectomy is evaluated. A RESCAN 700 microscope that includes a spectral domain tomography was used to obtain the images. At the end of each procedure the surgeons completed a questionnaire to determine if the tomographic image had an influence when making decisions during the surgery, or change the decision during the procedure.
Results: Thirteen patients with pars plana vitrectomy were included, with cataract surgery also performed in 6 patients. The surgeon considered that the intraoperative image influenced the decision during the procedure in 8 cases.
Conclusion: Intraoperative optical coherence tomography is helpful for a safe patient diagnosis. It does not affect the surgery time, and in some cases it is useful for optimising the procedure in vitreoretinal surgery.

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PALABRAS CLAVE
Tomografía de coherencia óptica;
Vitrectomía;
Limitorrexis

Utilidad transquirúrgica de la tomografía de coherencia óptica en cirugía vítreo-retiniana

Resumen
Antecedentes: La tomografía de coherencia óptica es una herramienta diagnóstica de gran utilidad en diversos padecimientos. Recientemente se ha descrito su uso transquirúrgico, con la intención de mejorar los resultados anatómicos.
Objetivo: Determinar la utilidad y seguridad de la tomografía de coherencia óptica transquirúrgica, en el tratamiento de cirugías de retina y vítreo.
Material y métodos: Serie de casos prospectiva. Se evalúa la influencia que tiene la imagen de tomografía de coherencia óptica en la toma de decisiones, durante la vitrectomía vía pars plana. Para la obtención de imágenes se utilizó RESCAN 700, un microscopio que cuenta con un tomógrafo de dominio espectral integrado. Al final de cada procedimiento, los cirujanos contestaron un cuestionario para determinar si la imagen tomográfica influyó en la toma de decisiones durante la cirugía.
Resultados: Fueron intervenidos 13 pacientes mediante vitrectomía pars plana; en 6 de ellos se realizó también cirugía de catarata. En 8 casos, el cirujano consideró que la imagen transoperatoria influyó en la toma de decisiones durante el procedimiento.
Conclusiones: La tomografía de coherencia óptica transquirúrgica es un auxiliar diagnóstico, seguro para el paciente, que no influye en el tiempo quirúrgico y que en algunos casos es de utilidad para la optimización del procedimiento en cirugía vítreo-macular.

Background

In recent years optical coherence tomography (OCT) has come to play a highly important role in eye and vitreous diseases, as its capacity to provide high resolution tomographic images of biological tissues[1–3] has made it possible to gain better understanding of the physiopathology of a large number of illnesses. It also permits making early diagnoses, determining prognostic factors and, very importantly, in many cases it offers the guideline for decision-making in the follow-up of pathologies which affect the macula as well as the vitreoretinal interface.[4–7]

Devices have been developed that make it possible to use this technology in the operating theatre to better understand the behaviour of tissue and the affect of manipulating it during surgery. This aims to maximise surgical performance and thereby offer patients better anatomical and visual results.[8,9]

Transurgical OCT has been reported to be useful in a wide range of procedures. These include macular holes, epiretinal membrane, optic nerve pit and the vitreomacular traction syndrome, as well as anterior segment procedures such as cataract surgery and penetrating keratoplasty.[10–14]

Studies have been reported that show the usefulness of a spectral domain OCT (SD-OCT) device mounted as an accessory on the surgical microscope. Another option for this purpose is the RESCAN 700 (Carl Zeiss Meditec, Germany), a visual domain tomograph included in the surgical microscope. This makes it possible to obtain images in real time and permits interaction with the *X–Y* functions of the microscope pedal to centre the image.[8]

The aim of this study is to determine the utility and safety of transurgical OCT in retina and vitreous humour surgery.

Material and methods

This is a prospective series of cases. The study was conducted in 2 hospitals in Mexico during September and October 2015. The procedures were performed by 3 surgeons experienced in retina and vitreous humour surgery. All of the patients operated for conditions of the vitreous humour or retina were included, regardless of whether or not they also received cataract surgery. The Constellation Vision System (ALCON) platform was used for the surgical procedure, which used calibre 23 and 25. For correct visualisation of the epiretinal membrane and the internal limiting membrane (ILM) trypan blue and brilliant blue stains were used, respectively.

The RESCAN 700 system was used to obtain images. This microscope contains integrated OCT as well as an interactive screen system, an external display panel and the pedal to control the OCT scanner. This system is based on the Lumera 700 platform (Carl Zeiss Meditec).

During the procedure a compound stereoscopic image is projected consisting of the view through both microscope eyepieces. This makes it possible for the surgeon to identify the site being analysed by tomographic analysis. This image may be projected in 2 different ways: one in the form of a cross representing the *X–Y* axes, while the other consists of 5 lines showing 5 parallel slices at different levels. For this the *X–Y* function of the microscope pedal is replaced by control of the stereoscopic image that indicates the site