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Original article

Macular choroidal thickness after vitreoretinal surgery: Long-term effect of *pars plana* vitrectomy with and without encircling scleral buckling surgery^{☆,☆☆}

I. Gama^{a,b,*}, H. Proença^{a,b}, A. Gonçalves^{a,b}, M. Faria^{a,b}, L. Almeida^{a,b}, T. Bernardo^a, R. Couceiro^{b,c}, M. Monteiro-Grillo^{a,b}

^a Servicio de Oftalmología, Clínica Universitaria de Oftalmología, Hospital Santa Maria, Centro Hospitalario Lisboa Norte, Lisboa, Portugal

^b Facultad de Medicina, Universidad de Lisboa, Lisboa, Portugal

^c Servicio de Oftalmología, Hospital de Vila Franca de Xira, Vila Franca de Xira, Portugal

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ABSTRACT

Purpose: To evaluate the macular choroidal thickness (CT) of eyes subjected to *pars plana* vitrectomy (PPV) whether or not combined with encircling scleral buckling (ESB) surgery for primary rhegmatogenous retinal detachment repair at 6 months or more after surgery.

Methods: This observational study included: 15 eyes (15 patients) submitted to combined ESB + PPV; 15 eyes submitted to PPV and their respective 30 normal fellow eyes (FE). Two 6 mm lineal perpendicular optical coherence tomography B-scans centered on the fovea with enhanced depth imaging were performed on each eye. CT was measured at several macular locations: subfoveal (SF-CT) and at a radius of 1, 2, and 3 mm from the fovea. CTs of the eyes in the CE + PPV group were compared to CT in the PPV group and the CTs of all operated eyes were compared to the CTs of their FE.

Results: SF-CT of the eyes in the ESB + PPV group was significantly increased compared to their FE ($p = 0.001$). CT at a radius of 1, 2, and 3 mm from the fovea of the ESB + PPV group were significantly increased ($p = 0.001$, $p = 0.005$, and $p = 0.001$, respectively). The SF-CT of the PPV group was similar to their FE ($p = 0.691$). The SF-CT of the ESB + PPV group was significantly increased compared to SF-CT of the PPV group ($p = 0.019$).

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* Corresponding author.

E-mail address: ivogama20@hotmail.com (I. Gama).

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Conclusions: The CT of the eyes subjected to combined ESB and PPV was significantly increased at 6 months or more after surgery compared to the CT of their FE and to the CT of the eyes subjected to PPV alone, which could be explained by a venous engorgement caused by the ESB.

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Grosor coroideo macular después de la cirugía vitreoretiniana: efecto a largo plazo de la vitrectomía con y sin cerclaje escleral

R E S U M E N

Palabras clave:

Cerclaje escleral
Vitreotomía *pars plana*
Grosor coroideo
Flujo sanguíneo coroideo
Drenaje venoso ocular

Objetivo: Evaluar el espesor coroideo (EC) macular a largo plazo tras vitrectomía *pars plana* (VPP) con o sin cerclaje escleral (CE) para la reparación del desprendimiento de retina regmatógeno primario, después de al menos 6 meses de la cirugía.

Métodos: Estudio observacional que incluyó: 15 ojos (15 pacientes) que se sometieron al CE añadido a VPP; 15 ojos (15 pacientes) que se sometieron a VPP y los 30 ojos contralaterales (OC) normales. Se obtuvo, en cada ojo, con la tomografía de coherencia óptica *enhanced depth imaging*, 2 escáneres de una línea de 6 mm perpendiculares, centrados en la fovea. Se midió el EC en varios puntos maculares: subfoveal (EC-SF) y en un radio de 1, 2 y 3 mm respecto a la fovea. El EC de los ojos sometidos a CE + VPP se comparó con el EC de los OC respectivos y con el EC de aquellos sometidos a VPP.

Resultados: El EC-SF de los ojos del grupo CE + VPP fue significativamente mayor en comparación con los OC ($p=0,001$). Los EC en un radio de 1, 2 y 3 mm respecto a la fovea de los ojos operados estaban significativamente aumentados en los ojos del grupo CE + VPP ($p=0,001$, $p=0,005$ y $p=0,001$, respectivamente). El EC-SF de los ojos del grupo VPP y el EC-SF de los OC fue similar ($p=0,691$). El EC-SF de los ojos del grupo CE + VPP fue significativamente mayor que el EC-SF de los ojos del grupo VPP ($p=0,019$).

Conclusiones: El EC de los ojos sometidos a CE + VPP estaba aumentado después de al menos 6 meses de la cirugía, en comparación con el EC de los respectivos ojos adelfos y el EC de los ojos sometidos a VPP, lo que podría deberse a una reducción del drenaje venoso causada por el CE.

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Introduction

Encircling 360° scleral buckling (ESB) is a surgical option frequently utilized for repairing regmatogenous retina detachment (RD). ESB can be associated to *pars plana* vitrectomy (PPV).¹⁻⁵ Surgical management of RD has evolved considerably in the last 3 decades.³ At present there is no consensus among vitreoretinal surgeons about the optimal management of RD surgery.³ PPV is gaining popularity for treating RD as it features potential advantages over ESB in non-complicated RD cases, including less complications associated to the use of ESB.¹⁻³ Some surgeons utilize combined PPV and ESB surgery in particular RD cases, such as inferior RD, extensive RD with multiple ruptures, giant ruptures or pseudophakic eyes.^{1,2} Diminished blood flow in the retina, choroids and the optic nerve as well as anterior segment ischemia are possible and well-known complications of ESB.¹⁻³ The choroid is a very important structure for retinal nutrition.⁶ Optical coherence tomography with enhanced depth imaging (OCT-EDI) has enabled in vivo study⁷ of choroidal thickness (CT). Literature

has demonstrated the existence of choroidal circulation alterations in laser scan Doppler fluximetry after ESB surgery and that choroidal circulation alterations produce alterations in the CT.⁸⁻¹⁷ There are just a few studies that analyze the effect of ESB on macular CT, only one being a long-term study (>6 months).¹⁸⁻²² The purpose of this study is to assess the long-term effects of ESB and PPV on macular CT.

Subjects, material and methods

An observational study comprising 60 eyes of 30 patients submitted to unilateral vitreoretinal surgery for repairing primary regmatogenous RD. Procedures complied with the ethical principles of the Helsinki declaration. All participants signed an informed consent. Overall, 3 groups were established: group 1 included 15 eyes of 15 patients submitted to circumferential 360° ESB plus unilateral PPV; group 2 included 15 eyes of 15 patients submitted to unilateral PPV on its own, and group 3 (control group) included the normal fellow eyes of said 30 patients. Group 3 was subdivided into groups 3A and

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