DOI 10.5935/0034-7280.20180078

Peripapillary retinoschisis and serous detachment of neurosensory retina after a non-penetrating deep sclerectomy

Retinosquise peripapilar e descolamento seroso de retina neuro-sensorial após esclerectomia profunda não penetrante

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Abstract

Case report of a 46-year-old patient with unsatisfactory clinical controlled juvenile glaucoma and peripapillary retinoschisis who, after being submitted to non-penetrating deep sclerectomy, evolved with serous detachment of the neurosensory retina. The association between peripapillary retinoschisis and serous detachment after filtering surgery is rare and only one case has been described in the literature. The purpose of this report is, besides to emphasize the rarity of the association, to show the importance of investigating peripapillary retinoschisis in glaucomatous patients, especially if associated with retinal nerve fiber layer, and the importance of adequate explanation to patients of possible serous detachment of retina in the postoperative of filtering surgery.

Keywords: *Retinoschisis; Retinal detachment; Filtering surgery; Glaucoma; Nerve fibers; Case reports*

Resumo

Relato de caso de um paciente de 46 anos com glaucoma juvenil de controle clínico insatisfatório, portador de retinosquise peripapilar que, após ser submetido à esclerectomia profunda não penetrante, evoluiu com descolamento seroso da retina neuro-sensorial. A associação entre retinosquise peripapilar e o descolamento seroso pós cirurgia filtrante é de ocorrência rara, tendo sido descrito apenas um caso na literatura. A partir deste relato temos por objetivo, além de enfatizar a raridade da associação, mostrar a importância de investigar retinosquise peripapilar em pacientes glaucomatosos, em especial se associada a camada de fibras nervosas, e a importância da explanação adequada aos pacientes de um possível descolamento seroso de retina no pós-operatório de cirurgia filtrante.

Descritores: Retinosquise; Descolamento retiniano; Cirurgia filtrante; Glaucoma; Fibras nervosas; Relatos de casos

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The authors declare no conflict of interests.

Received for publication 07/12/2017 - Accepted for publication 21/05/2018.

Rev Bras Oftalmol. 2018; 77 (6): 356-9

Introduction

Peripapillary retinoschisis has been described as several entities including X-linked retinoschisis, congenital optic disc abnormalities, and myopia. Many recent studies have documented the observation of retinoschisis in patients with glaucoma, and the clinical characteristics of each one are variable.[1]

When not controlled with topical antiglaucomatous medication, it is possible to treat glaucoma with invasive surgical procedures occasionally evolving with hypotension in the immediate postoperative period.

The occurrence of serous detachment of the neuro-sensory retina after hypotension caused by the filtering procedure has few reports. However, the association of both lesions described in the same patient has not yet been described. Next, we will report the case of a patient with peripapillary retinoschisis associated to glaucoma evolving with serous detachment of the neuro-sensory retina after filtering procedure.

Case Report

Patient P.C.G., male, 46 years old, Caucasian, civil servant, natural and from São Paulo, diagnosed at age 29 with juvenile glaucoma. He made use, in both eyes, of latanoprost 0.005% eyedrops once daily, timolol 0.5% eyedrops twice daily, brimonidine 0.2% eyedrops twice daily, brinzolamide 1% eyedrops twice daily, acetazolamide 250mg orally every 8 hours, and potassium chloride 600mg orally once daily.

On 07/05/2016, he sought care because he was presenting low visual acuity (VA) for one month, with an intraocular pressure (IOP) peak of 45mmHg in both eyes (BE), according to the patient's description. The examination showed VA of 20/25 in the right eye (RE) with best correction (-1.25DS, -0.50CD at 85º) and 20/50 in the left eye (LE) with best correction (-0.50DS, -0.50CD at 70°). Anterior biomicroscopy showed a medium depth anterior chamber, transparent cornea, phakic BE. IOP of 24mmHg in RE and 20mmHg in LE measured with Golmann applanation tonometer. Gonioscopy visualizing ciliary band at 180º and trabeculated pigment at 180º in RE, and ciliary band at 90º and pigmented trabecular at 270º in LE, both eyes with 3+/4+ pigmentation and persistence of pectine ligaments, but with absence of goniosynchia and neovascularization of angle. Fundoscopy with retina applied in both eyes and excavation/disc relation of 0.9 in BE. Absence of other systemic or ocular comorbidities.

He brought visual campimetry 24.2 Humphrey (Carl Zeiss Meditec®, Jena, Germany) carried out on 06/14/2016, with reliability rates in RE within the parameters of acceptability and false negatives not evaluated in LE. In RE: VFI: 24%; MD: -24.59dB; GHT outside normal limits (Figure 1). In LE: VFI: 4%; MD: -30.71dB; GHT outside normal limits (Figure 2).

Non-penetrating deep sclerectomy in LE was indicated to be performed on 07/30/2016, with mild hypotonia in the first postoperative period. It evolved with an IOP of 14mmHg without the use of topical ocular medication in LE with acetazolamide 500mg a day orally. VA of LE remained 20/50 with best correction.

Fundus biomicroscopy examination showed a retinal elevation in the inferior region of the papilla (Figure 3).

Optical Coherence Tomography (OCT) Spectralis (Heidelberg Engineering®, Heidelberg, Germany) was performed in LE, which revealed peripapillary retinoschisis in the nerve fiber layer (Figure 4) and serous detachment of the neurosensory retina inferior to the papilla (Figure 5). When the optic nerve was observed in the same apparatus, it was possible to visualize deep papilla excavation with a lamina cribrosa defect, leading to retinoschisis (Figure 6).

In August 2016, with IOP stabilization, there was regression of serous detachment (Figure 7), but maintaining the peripapillary retinoschisis (Figure 8).

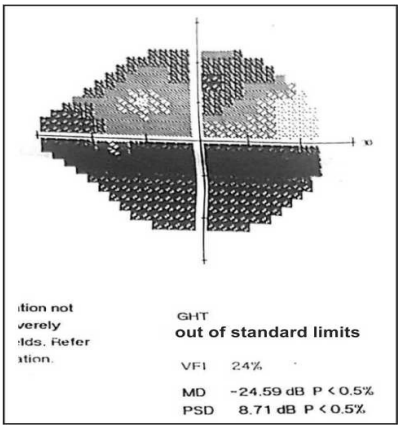

Figure 1: Visual field RE (grayscale)

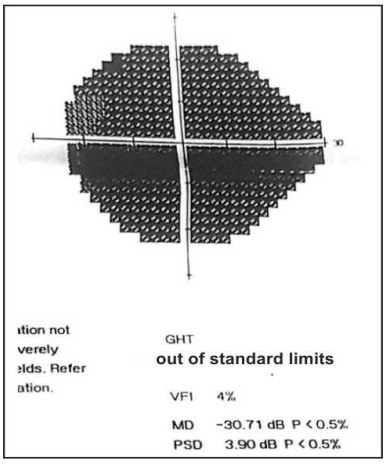

Figure 2: Visual field LE (grayscale)

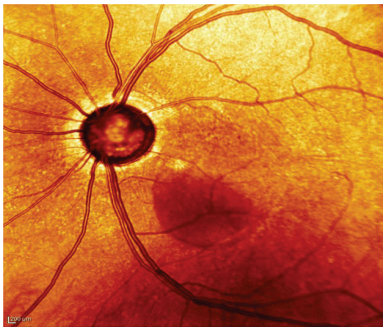

Figure 3: LE fundus showing retinal elevation inferior to the papilla

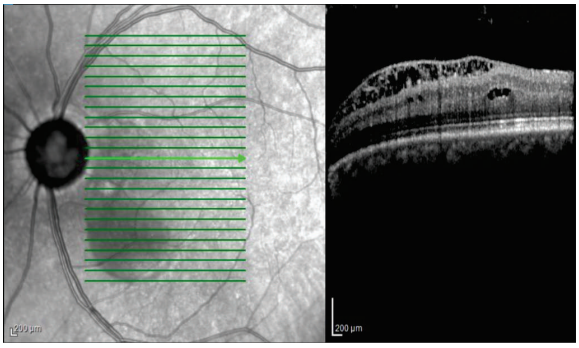

Figure 4: OCT LE showing peripapillary retinoschisis

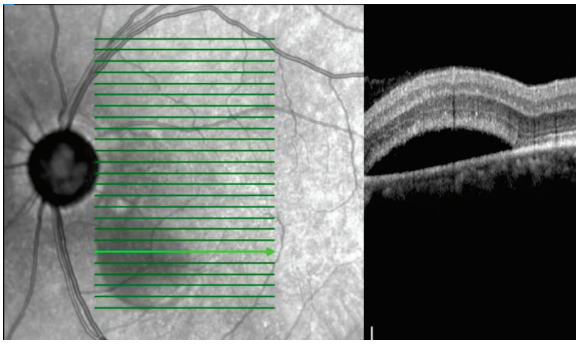

Figure 5: OCT LE showing serous detachment of the neuro-sensory retina.

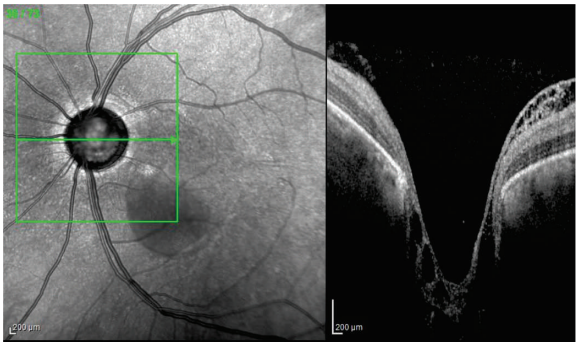

Figure 6: OCT LE showing deep papilla excavation with defect of lamina cribrosa.

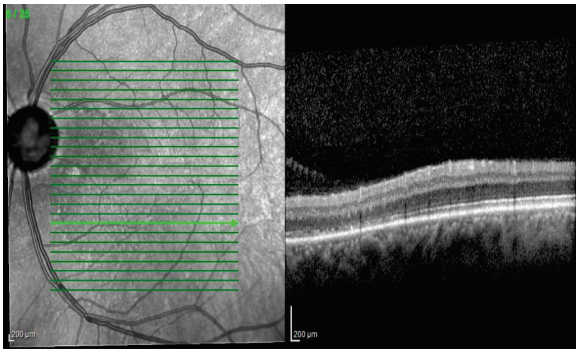

Figure 7: OCT LE showing improvement of serous detachment of the neuro-sensory retina with retina applied

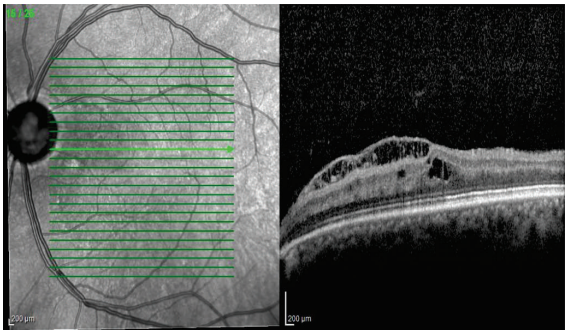

Figure 8: OCT LE showing peripapillary retinoschisis.

Discussion

Retinoschisis is a defect of the neuro-sensory retina, with peripapillary retinoschisis being most frequently reported in glaucomatous eyes with deep disc excavation. Its pathogenic mechanism seems to be associated with defects of the lamina cribrosa similar to the optic disc pit.[3-8] It is believed that this defect promotes a conduit allowing the liquid accumulating there to originate from both the vitreous cavity[9,10] and the subarachnoid space.[10-13] In the cases without optic disk pit there is no established etiology for retinoschisis. However, the topographic correlation between retinoschisis and the defect of the nerve fiber layer of glaucoma suggests that microscopic interconnections between the vitreous space, the nerve fiber layer and the optic disk developed during the thinning process of the optic nerve tissues provides a fluid inlet conduit in the retina of glaucomatous eyes.[14-16]

Another etiology proposed by Besada et al. is that the persistence of the Cloquet's canal may allow the leakage of fluid in an optical disk pit, in addition to a tangential vitreous traction can promote the opening of a fistula in the optic disc pit and add additional vitreous fluid to the esquise.[17]

The development of the lesion varies from spontaneous resolution,[14,18] to retinal detachment requiring surgical intervention.[15]

According to Lee et al.,[2] the location of the defects of the lamina cribosa are associated with the involvement of the retinal layers, with the defects located in the center related to retinoschisis of more internal layers, and the peripheral defects to retinoschisis up to the outer nuclear layer. The same study showed that the abnormality is more common in the lower temporal region of the optic disc.

In another study, patients with open angle glaucoma associated with retinoschisis had worse mean deviation (MD) in visual fields and higher IOP fluctuation than patients without retinal defect.[1] The resolution of the condition was seen in some cases with decreased IOP both by trabeculectomy and with the combination of other medication.[1]

In eyes with peripapillary retinoschisis, the thickness of the nerve fiber layer drastically reduces after resolution of the retinoschisis when compared to the measurement made at the time of injury, whenthe thickness was falsely increased. If measurement data is observed without testing the existence of retinoschisis, one may mistakenly consider this decrease in thickness as a rapid structural progression of glaucoma.[1]

One of the treatments proposed by Kiang et al., in addition to follow-up and reduction of IOP, was vitrectomy with gas-buffering, which resolved the lesion in 100% of their cases.[19]

Another important aspect evidenced in our case was the onset of serous detachment of the neuro-sensory retina after the filtering procedure. A similar case was described by Aydin et al in 2012 in which one patient underwent trabeculectomy and evolved with central serous detachment postoperatively followed by severe hypotonia.[20]

Another case occurred in a bilateral manner 24 hours after the patient had undergone a selective laser trabeculoplasty (SLT), with the appearance of macular subretinal fluid, strongly suggesting a cause and effect relation and raising the suspicion that the cause could be due to inflammation and/or hypotonia.[21]

In addition to the hypotonia hypothesis, direct communication among the vitreous, the optic nerve pit and the subretinal space has been demonstrated, and the migration of fluid from the vitreous through the pit up to below the retina is reported.[22] Vitreous traction may also play a role, with vigorous traction in the pit being observed during ocular movements.[23]

In the study conducted by Zumbro et al., 5 patients with increased optic disk excavation due to glaucoma, but without obvious disk pit or colobomas, evolved with subretinal elevation in the macular region. Zumbro et al. believe that the fluid comes from the vitreous through a hole in the thin tissue from the optic disc excavation to the retina.[24] Patients did not improve with observation alone; 2 had to undergo vitrectomy with posterior hyaloid peeling, gas injection and head position, and 1 had resolution only with intraocular pressure control.

Besada et al. also reported 2 cases of central serous retinopathy, one with optic nerve pit and foveolar retinoschisis, and another after abrupt reduction of intraocular pressure with the use of anti-glaucomatous eyedrops.[17]

Conclusion

From our literature review, it is possible to conclude that the association between peripapillary retinoschisis in glaucomatous patients and serosal detachment of neuro-sensory retina after hypotensive procedure is rare and reported only once by Besada et al., which occurred with use of eyedrops and not with filtering surgery as in our case. The occurrence of both pathologies simultaneously and after an anti-glaucomatous surgery is reported for the first time, and shows us the importance of investigating peripapillary retinoschisis in patients with glaucomatous eyes as well as the correct preoperative guidance of the possibility of serous detachment after anti-glaucomatous procedure with transient or permanent reduction of visual acuity.

References

1. Lee EJ, Kim TW, Kim M, Choi YJ. Peripapillary retinoschisis in glaucomatous eyes. PLoS One. 2014;9(2): e90129.
2. Lee JH, Park HY, Baek J, Lee WK. Alterations of the lamina cribrosa are associated with peripapillary retinoschisis in glaucoma and pachychoroid spectrum disease. Ophthalmology. 2016;123(10):2066-76.
3. Prinzi RA, Desai A, Gao H. Laser treatment of macular retinoschisis due to acquired optic nerve pit from glaucoma. BMJ Case Rep. 2015; 2015.
4. Inoue M, Itoh Y, Rii T, Kita Y, Hirota K, Kunita D, et al. Spontaneous resolution of peripapillary retinoschisis associated with glaucoma optic neuropathy. Acta Ophthalmol. 2015;93(4):317-8.
5. Farjad H, Besada E, Frauens, BJ. Peripapillary schisis with serous detachment in advanced glaucoma. Optom Vis Sci. 2010;87(3):205-17.
6. Orazbekov L, Yasukawa T, Hirano Y, Ogura S, Osui H, Nozaki M, et al. Vitrectomy without gas tamponade for macular retinoschisis associated with normal-tension glaucoma. Ophthalmic Surg Lasers Imaging Retina. 2015;46(1):107-10.
7. Ornek N, Buyuktortop N, Ornek K. Peripapillary and macular retinoschisis in a patient with pseudoexfoliation glaucoma. BMJ Case Rep. 2013;2013.
8. Kahook MY, Noecker RJ, Ishikawa H, Wollstein G, Kagemann L, Wojtkowski M, et al. Peripapillary schisis in glaucoma patients with narrow angles and increased intraocular pressure, Am J Ophthalmol. 2007;143(4):697-9.
9. Brown GC, Shields JÁ, Patty BE, Goldberg RE. Congenital pits of the optic nerve head. I. Experimental studies in collie dogs. Arch Ophthalmol. 1979;97(7):1341-4.
10. Georgalas I, Ladas I, Georgopoulos G, Petrou P. Optic disc pit: a review. Graefes Arch Clin Exp Ophthalmol. 2011;249(8):1113-22.
11. Krivoy D, Gentile R, Liebmann JM, Stegman Z, Rosen R, Walsh JB, et al. Imaging congenital optic disc pits and associated maculopathy using optical coherence tomography. Arch Ophthalmol. 1996;114(2):165-70.
12. Kuhn F, Kover F, Szabo I, Mester V. Intracranial migration of silicone oil from an eye with optic pit. Graefes Arch Clin Exp Ophthalmol. 2006; 244(10):1360-62.
13. Imamura Y, Zweifel As, Fujiwara T, Freund KN, Spaide RF. High-resolution optical coherence tomography findings em optic pit maculopathy. Retina. 2010;30(7):1104-12.
14. Farjad H, Besada E, Frauens BJ. Peripapillary schisis with serous detachment in advanced glaucoma. Optom Vis Sci. 2010;87(3):205-17.
15. Zumbro DS, Jampol LM, Folk JC, Olivier MM, Anderson-Nelson S. Macular schisis and detachment associated with presumed acquired enlarged optic nerve head cups. Am J Ophthalmol. 2007;144(1):70-4.
16. Zhao M, Li X. Macular retinoschisis associated with normal tension glaucoma. Graefes Arch Clin Exp Ophthalmol. 2011;249(8):1255-58
17. Besada E, Barr R, Schartz S, Brewer C. Vitreal pathogenic role in optic pit foveolar retinoschisis and central serous retinopathy. Clin Exp Optom. 2003;86(6):390-8.
18. Kahook MY, Noecker RJ, Ishikawa H, Wollstein G, Kagermann L, Wojtkowski M, et al. Peripapillary schisis in glaucoma patients with narrow angles and increased intraocular pressure. Am J Ophthalmol. 2007;143(4):697-9.
19. Kiang L, Johnson MW. Formation of an intraretinal fluid barrier in cavitary optic disc maculopathy. Am J Ophthalmol. 2017;173:34-44.
20. Aydin A, Cakir A, Unal MH, Ersanli D. Central serous retinal detachment following glaucoma filtration surgery. J Fr Ophtalmol. 2012;35(7):529.
21. Phillis CA, Bourke RD. Bilateral subretinal fluid mimicking neovascularization within 24 hours after selective laser trabeculoplasty. J Glaucoma. 2016;25(2):110-4.
22. Johnson TM, Johnson MW. Pathogenic implications of subretinal gas migration through pits na atypical colobomas of the optic nerve. Arch Ophthalmol. 2004;122(12):1793-1800.
23. Hasegawa T, Akiba J, Ishiko S, Hikichi T, Kakehashi A, Hirokawa H, et al. Abnormal vitreous structure in optic nerve pit. Jpn J Ophthalmol. 1997;41(5):324-7.
24. Zumbro DS, Jampol LM, Folk JC, Olivier MMG, Anderson-Nelson S. Macular schisis and detachment associated with presumed acquired enlarged optic nerve head cups. Am J Ophthalmol. 2007;144(1):70-4.

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