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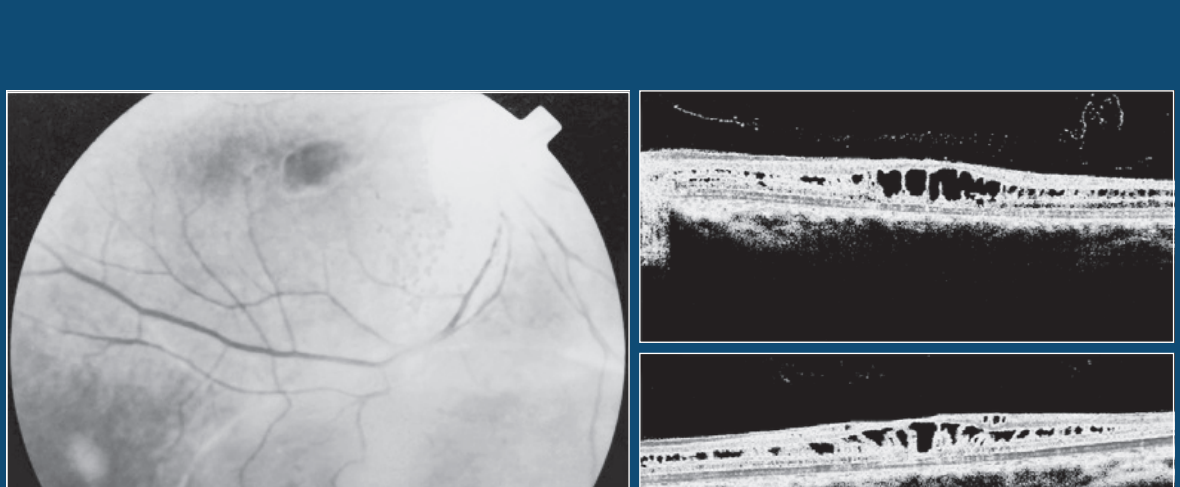

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- Study of asphericity coefficient and longitudinal spherical aberration surface corneal

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Analysis of the prevalence of patients in need eyeglasses in Ophthalmologic Hospital in Goiânia, Goiás, Brazil: Projeto Olhar Brasil

Análise da prevalência dos pacientes que necessitam de óculos

Eduardo Ribeiro Coutinho Dalia[1] , Luana Miranda Campos[1], Leonardo Pinheiro Teixeira[1], Mateus Martins Cortez Vilar[1], Pedro Henrique de Lima Abreu[1], João Jorge Nassaralla Junior[2]

ABSTRACT

Objective: *Measure the "Projeto Olhar Brasil" under a critic point of view, examining the prevalence of patients referred for ophthalmological appointment, post-screening, that show refractive errors uncorrected.* ***Methods:*** *Review of records between March 2014 and August 2016, in totality of 339 patients between 6 and 18 years old, 5 preschools (2 – 6 years and 11 months) 124 school (7 – 9 years and 11 months) and 210 teenagers (10 – 20 years old). There were 156 males and 183 females, in an Ophthalmologic Hospital in Goiânia, Goiás, Brazil.* ***Results:*** *In total of 339 patients examined, 143 (42.1%) needed optical correction against 196 (57.8%) that not benefiting from the same. There were 74 (47.4%) males patients who required the use of eyeglasses, against 69 (37.7%) of females gender who obtained eyes test alterations. In relation to age, the teenagers, school and preschool showed in absolute numbers and percentage respectively 102 (48.5%), 40 (32.2%) and 2 (40%) indications of corrective lenses.* ***Conclusion:*** *The "Projeto Olhar Brasil" has great importance for society in general reducing the loss of students in school, improving school performance and consequently the quality of life of the beneficiaries, although it needs better training and improvement of professionals in primary health care, elementary school teachers and educators that are responsible for screening.*

Keywords: *Visual acuity; Prevalence; Refraction; School health; Eye health*

RESUMO

Objetivo: Avaliar o projeto Olhar Brasil sob um olhar crítico, examinando a prevalência dos pacientes encaminhados para consulta oftalmológica, pós-triagem, que realmente apresentem vícios de refração não corrigidos. **Métodos:** Revisão de prontuários entre Março de 2014 e Agosto de 2016, totalizando 339 pacientes entre 6 e 18 anos de idade, sendo 5 pré-escolares (2 – 6 anos e 11 meses), 124 escolares (2 – 6 anos e 11 meses) e 210 adolescentes (10-20 anos) entre os quais 156 do sexo masculino e 183 do feminino , em um hospital oftalmológico em Goiânia, Goiás, Brasil. **Resultados:** No total dos 339 pacientes examinados 143 (42,1 %) necessitaram de correção e 196 (57,8%) não. Entre os 156 pacientes do sexo masculino 74 (47,4%) apresentaram necessidade de uso de óculos contra 82 (52,5%) que não precisaram, em relação ao sexo feminino os números foram de 69 (37,7%) que tiveram alteração ao exame e 114 (62,2%) que não apresentaram alterações refrativas. Em relação a faixa etária, os adolescentes, escolares, e pré-escolares apresentaram em números absolutos e porcentagem respectivamente 102 (48,5%), 40 (32,2%) e 2 (40%) de indicação de lentes corretivas. **Conclusão:** O projeto Olhar Brasil tem importância relevante para sociedade em geral, com diminuição da evasão escolar, melhor rendimento escolar e consequentemente da qualidade de vida dos beneficiários, embora necessite melhor treinamento e aperfeiçoamento dos profissionais da Atenção Básica em Saúde, professores do ensino fundamental e os alfabetizadores que são responsáveis pela triagem.

Descritores: Acuidade visual; Prevalência; Refração; Saúde escolar; Saúde ocular

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Introduction

On April 24, 2007, Projeto "Olhar Brasil" was instituted by the Federal Government through Interministerial Ordinance No. 15/2007 as an initiative of the Ministry of Health and the Ministry of Education with direct supervision of the Civil House of the Presidency of the Republic. The goal of "Olhar Brasil" is to identify visual problems in students enrolled in the public elementary school system (1st to 8th grade), in students of Programa "Brasil Alfabetizado" of MEC, and in the population over 60 years of age, providing ophthalmological care with supply of eyeglasses in cases of detection of refractive errors (Figure 1).[1]

This initiative, besides expanding access to eye health, aims to improve the learning of children and adults in school phase. That is, it acts in the identification of visual problems, reducing the rate of school dropout, contributing to the learning of students who participate in Programa "Saúde na Escola" (PSE) and of alphabetized students enrolled in Programa "Brasil Alfabetizado". [1]

Projeto "Olhar Brasil" is the natural development of various campaigns developed by the Brazilian Council of Ophthalmology (CBO), as "Veja Bem" and "Olho no Olho". It has a different approach, with a perennial nature structured within the Single Health System, and focusing on people (children and adults) who are developing their basic education.[1] Thus, it is already fulfilling the main objectives chosen in "Plano de Ação Global para a Prevenção da Cegueira Evitável e Deficiência Visual 2014 – 2019 – na busca da Saúde Ocular Universal", approved by the LXIV World Health Assembly in May 2013. The new Plano de Ação Global (PAG) is currently the most important strategic eye-health document and represents a significant step towards "universal access" to eye health. [2].

This study was carried out in order to evaluate Projeto Olhar Brasil from a critical point of view, examining the prevalence of patients referred for ophthalmologic appointment, post-screening, who actually present uncorrected refractive errors.

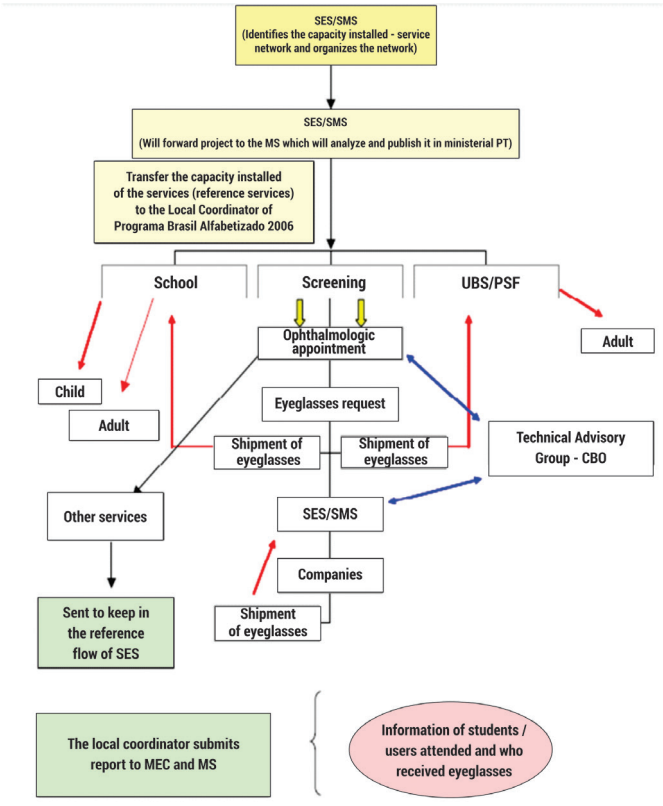

Figure 1: Service Flow Olhar Brasil

Source: Brazil. Ministry of Education. Interministerial Normative Ordinance No. 15 of April 24, 2007. Available at: http://portal.mec.gov.br/arquivos/pdf/olhar_brasil.pdf

Methods

Descriptive retrospective cross-sectional epidemiological study using medical records from Instituto de Olhos de Goiânia (IOG) of the period from March 2014 to August 2016, totaling 339 patients between 6 and 18 years of age. All patients were screened from Projeto Olhar Brasil and underwent a complete ophthalmologic examination at the IOG. They were evaluated as to the gender, age and whether they needed corrective lenses. Patients who had incomplete data on registration form were excluded from the survey. Children and adolescents were grouped into age groups commonly used in the medical literature according to the World Health Organization (WHO): nurseling (0 to 1 years), preschoolers (2 to 6 years), schoolers (7 to 9 years) and adolescents (10 to 20 years), accounting for 5 preschoolers, 124 schoolers and 210 adolescents at the end of the study (Figure 2). Regarding gender, 156 were males and 183 females (Figure 3).

Results

Of the 339 patients examined, 143 (42.1%) needed correction and 196 (57.8%) did not. Among the 156 male patients, 74 (47.4%) needed to wear eyeglasses compared to 82 (52.5%) who did not need it; regarding females, the numbers were 69 (37.7%) who had an alteration in the exam compared to 114 (62.2%) who did not have it (Figure 4). In relation to the age group, adolescents, schoolers, and preschoolers presented in absolute numbers and percentage, respectively, 102 (48.5%), 40 (32.2%) and 2 (40%) of prescription of corrective lenses (Figure 5).

Discussion

According to WHO, it is estimated that 12.8 million children between the ages of 5 and 15 have uncorrected refractive error (URE), being the main cause of visual deficiency in childhood, with a global prevalence of 0.96%.[3,4]

Over the last decade, several population-based studies composing a series known as "Estudo de erros de refração em crianças oculares" (Refractive error study in children – RESC) and using the same research methodology were performed in populations of different Ethnic and cultural backgrounds in various regions of the world.[4,5] Said studies have confirmed that the prevalence of visual impairment caused by uncorrected refractive errors is considerably high in school-age children in low- and middle-income countries, including Brazil. [6]

RESC Brasil revealed that the prevalence of visual impairment in schoolers aged 11 to 14 years old in a low-income urban region had URE as the main cause in 72.3% of cases.[6]

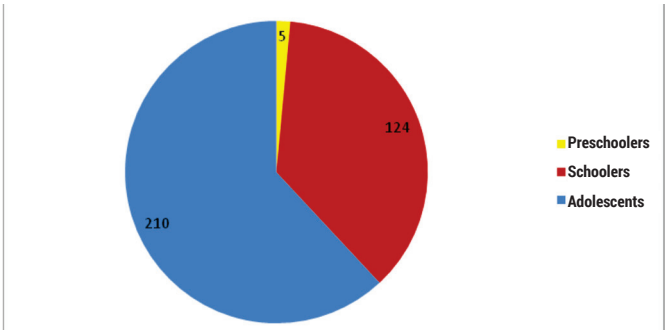

Figure 2: Age group of patients in the reference Ophthalmic Service of Projeto Olhar Brasil - Goiânia-GO

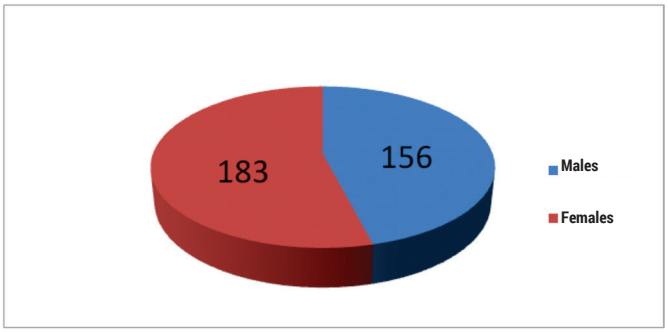

Figure 3: Gender of patients in the reference Ophthalmic Service of Projeto Olhar Brasil - Goiânia-GO

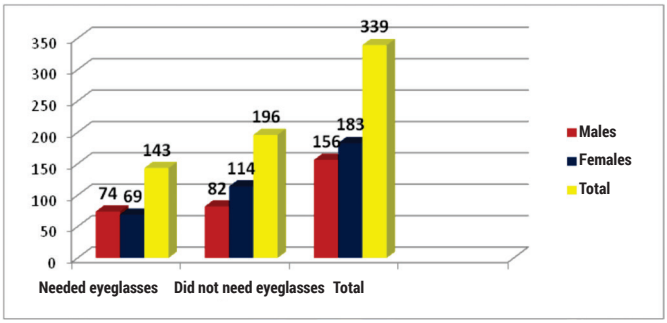

Figure 4: Need of wearing eyeglasses by gender in patients examined in the Ophthalmic service in Goiania-GO: Projeto Olhar Brasil

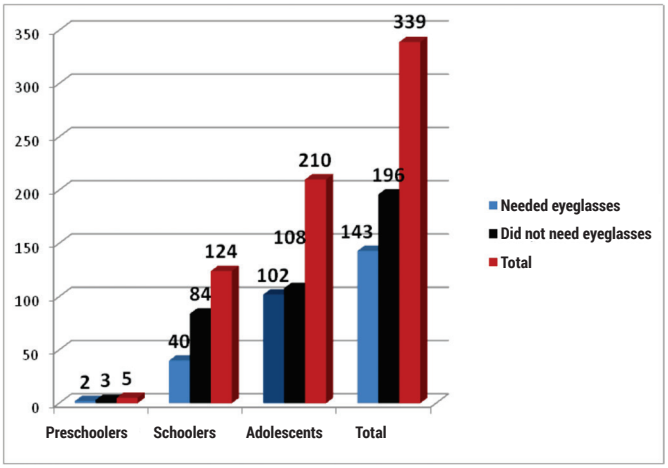

Figure 5: Need of wearing eyeglasses by age group in patients examined in the Ophthalmic service in Goiania-GO: Projeto Olhar Brasil

According to data from the Brazilian Council of Ophthalmology (CBO) in non-population studies, URE is also the main cause of visual impairment in schoolers in the country. [7] According to the CBO, about 20% of elementary school students present some ophthalmological alteration, approximately 10% of them require optical correction, and of these, 5% present a severe reduction of visual acuity.[8]

In view of the high prevalence of visual impairment due to URE in children, and because they are easily diagnosed, measured and corrected with eyeglasses or contact lenses, in order to obtain normal vision and functional improvement, the correction of URE is an excellent intervention of low cost and high benefit.[3,4,9] This fact was corroborated by cross-sectional population-based studies revealing the benefit of wearing eyeglasses in schoolers aged 5 to 15 years old. [3,8]

At school age from 7 to 14 years, factors for which RE are not corrected can also be attributed to the lack of perception of the need and the ocular problem by the individual and the family, or by lack of screening, besides the difficult access and availability of services for eye examination and obtaining free or low cost eyeglasses.[9-11]

The Brazilian Ministry of Health acknowledges that, although they may be corrected by an apparently simple measure with simple eyeglasses, refractive errors still have a difficult resolution in the Single Health System due to the demand for ophthalmological appointment be greater than the supply, as well as the cost and acquisition of the eyeglasses, which often makes the appropriate treatment unfeasible. [12]

Even in economically developed societies where there is availability for screening, routine exams and free or low-cost eyeglasses, it is observed that adhesion is also low and with high levels of abstention. [10]

Absenteeism in the ophthalmological exam of the children referred is significant in community eye health programs, which also contributes for schoolers to continue with URE in the country. [14,15]

Studies in the Brazilian population have shown that transportation difficulties, lack of guidance, and skipping a working day are causes of non-attendance. However, even with access to the exam, transportation, food and eyeglasses, absenteeism is high, ranging from 31.2 to 68.7%. [14]

The screening or "visual screening" aims to detect suspected cases of URE and other ocular pathologies to be referred for diagnosis and treatment. Screening is performed by measuring the visual acuity (visual acuity test - VAT), and in schools it can be done by teachers who are able to identify changes in the student's behavior and performance, and by trained education agents or volunteers. [12,13]

The choice of age, from the age of 7 years, was justified because it is the first year of compulsory school enrollment, when the child needs glasses for school activities, and is already able to understand and accept better the treatment, when compared to younger ages. In addition, at this age, parents are usually more present to follow their children, facilitating the educational work regarding notions of eye health. [13]

Nassaralla Jr et al. [16] studied the refractive errors of 16,806 schoolers from the municipal public schools of Goiânia n the period from October 1995 to December 2000, with the result of twenty-four percent (24%) having mixed astigmatism, 15% with simple myopic astigmatismo, and 7% with compound myopic astigmatism. Thirty-one percent (31%) of eyes had hypermetropia, and only 2% had myopia only.

Conclusion

Primary health care professionals, elementary school teachers and literacy teachers are the main responsible for the screening of patients for tertiary care, so a very large number were observed, specifically of the subgroup of schoolers who did not need optical correction. We came to the conclusion that improvement and better training of those responsible for the initial exam would be of key importance to the project's even greater success, with emphasis on the above-mentioned age group.

References

1. Alves, MR, et al. Refração ocular: Uma necessidade social. Rio de Janeiro: Cultura Médica; 2014.
2. World Health Organization. Universal eye health: A global action plan 2014-2019. Geneva: WHO. 2013.
3. Alves MR, Kara-José M. O que fazer pela saúde ocular das nossas crianças. São Paulo: Vozes; 1996. 160p.
4. Taleb A, Faria MA, Ávila M, Mello PA. As condições de saúde ocular no Brasil. São Paulo: CBO; 2012.
5. Resnikoff S, Pascolini D, Mariotti S, Pokharel P. Global magnitude of visual impairment caused by uncorrected refractive errors in 2004. Bull World Health Organ. 2008;86(1):63-70.
6. Holden BA, Fricke T, Ho S, Wong R, Schlenter G, Cronje S, et al. Global vision impairment due to uncorrected presbyopia. Arch Ophthalmol. 2008;126(12):1731-9.
7. Burns MJ. Building a priority for a national vision health care. Eye Ear Nose Throat Mon. 1973;52(10):353-6.
8. Bicas HE, Alves AA, Uras R. Refratometria ocular. Rio de Janeiro: Cultura Médica; 2005.
9. Gonçalves ER. Apresentação. In: Bicas HE, Alves AA, Uras R. Refratometria ocular. Rio de Janeiro: Cultura Médica; 2005.
10. Kara-José N, Gonçalves ER, Carvalho RS. Olho no Olho. "Campanha Nacional de Prevenção à Cegueira e Reabilitação Visual do Escolar". Rio de Janeiro: Cultura Médica; 2006.
11. Conselho Brasileiro de Oftalmologia (CBO). Censo 2010: distribuição dos oftalmologistas por estado. São Paulo: CBO; 2011.
12. Ricupero R. O pior dos dois mundos. A saúde no Brasil em 2021. Reflexões sobre os desafios da próxima década. São Paulo: Cultura Médica; 2012. p. 62 – 71
13. Dzau V. Instituições acadêmicas de ciências da saúde. A saúde no Brasil em 2021. Reflexões sobre os desafios da próxima década. São Paulo: Cultura Acadêmica; 2012. p. 62-71
14. Solla J. Nada melhor que o SUS. A saúde no Brasil em 2021. Reflexões sobre os desafios da próxima década. São Paulo: Cultura Acadêmica; 2012. p. 16-29.
15. World Health Organization. Vision 2020: the right to sight. Global initiative for the elimination of avoiadable blindness. Action plan 2006 – 2011. Geneva: WHO; 2007;
16. Nassaralla Jr JJ, Nassaralla BRA. Atendimento oftalmológico no sistema público de ensino em Goiânia – Projeto Boa Visão. Rev Bras Oftalmol. 2002;61(6):446-52.

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Study of asphericity coefficient and longitudinal spherical aberration surface corneal

Estudo do coeficiente de asfericidade e aberração esférica longitudinal da superfície corneana

Abrahão da Rocha Lucena[1], Daniel da Rocha Lucena[2], David da Rocha Lucena[3], Thiciana Barcelos F Guariguasi[4], Davyson Sampaio Braga[4], Marilhia Teixeira Bueno Machado[4]

Abstract

Objective: *To correlate the asphericity coefficient (Q) with longitudinal spherical aberration (LSA) of the corneal surface, also correlating each of these variables with the average keratometry* ***Methods:*** *An observational study was conducted by collecting preoperative data from the medical records of individuals candidate cataract surgery, i.e., patient sex and age, as well as Q, LSA of the corneal surface and mean keratometry (Km). Patients who had been subjected to any corneal surgical procedure who would alter Q, LSA and Km measuements were excluded. The corneanl topograph selected, fixedly, a 4.5 mm area of the anterior surface of the cornea for the measurement of Q and LSA, having the pupillary axis as the central point, since the occurrence of LSA is relevant in dim environments in individuals with a pupil wider than 3 mm* ***Results:*** *The sample consisted of 70 eyes of 35 individuals, 24 of them women (68.6%) and 11 men (31.4%) ranging in age from 48 to 89 years (mean: 69.97 ± 8.29). Km ranged from 41.00 to 46.50 D, with a mean of 43.94 ± 1.48D, and mean Q of the corneal surface was -0.15 ± 0.15. Six corneas showed a spherical design (Q= 0.0) and only one showed an aspheric design with Q = -0.50, generating an LSA of 0.0. Mean LSA of the corneal surface was +0.33 ± 0.14 µm. Only one eye showed an LSA equal to 0.0µm, and five showed an LSA of +0.10 to +0.30µm. No eye showed a negative LSA of the corneal surface. There was no correlation between Km and Q (r = -0.005 / p = 0.965) or between Km and LSA (r = 0.167 / p = 0.170). A correlation (r = 0.962 / p = 0.000) was observed between Q and LSA* ***Conclusion:*** *There was a correlation between Q and LSA of the corneal surface. There was no correlation between the sphericity coefficient or longitudinal spherical aberration with the average keratometry.*

Keywords: *Corneal topography; Cornea/physiology; Ocular physiological phenomena; Keratometry*

Resumo

Objetivo: Correlacionar o coeficiente de asfericidade com a aberração esférica longitudinal na superfície corneana, correlacionando também cada uma dessas variáveis com a ceratometria média **Métodos:** Realizou-se um estudo observacional através da coleta de dados pré-operatórios nos prontuários de indivíduos candidatos a facectomia. Os dados coletados se referiam ao sexo e idade, além do Q, LSA da superfície corneana e ceratometria média (Km). Foram excluídos do estudo os pacientes que realizaram qualquer procedimento cirúrgico corneano, por alterar as medidas da Q, LSA e Km. O topógrafo selecionou, de maneira fixa, uma área 4,5mm da superfície anterior da córnea para medida do Q e da LSA, tendo como ponto central o eixo pupilar. A ocorrência da LSA é relevante em ambientes de penumbra, em indivíduos com pupila maior que 3mm. **Resultados:** A amostra foi composta por 70 olhos de 35 indivíduos: 24 (68,6%) mulheres e 11 (31,4%) homens. A idade variou de 48 a 89 anos (média de 69,97 ± 8,29). A Km variou de 41,00D a 46,50D com média de 43,94 ± 1,48D. Na avaliação do Q da superfície corneana se observou uma média de -0,15 ± 0,15. Seis (8,57%) córneas apresentaram desenho esférico com Q= 0 e apenas uma córnea apresentou desenho asférico com Q= -0,50, gerando LSA= 0,0µm. Em relação a LSA da superfície corneana se observou média de +0,33 ± 0,14 µm. Quarenta e dois olhos (60,0%) apresentaram LSA entre +0,31 a +0,64µm e 19 (27,15%) entre +0,16 a +0,30µm. Não houve correção entre a Km e o Q (r= -0,005 / p= 0,965), assim como entre Km e a LSA (r= 0,167 / p= 0,170). Observou-se correlação (r= 0,962 / p= 0,000) entre as variáveis Q x LSA. **Conclusão:** Foi observada correlação entre o Q e a LSA da superfície corneana. Não foi observado correlações entre o coeficiente de asfericidade ou aberração esférica longitudinal com a ceratometria média.

Descritores: Topografia da córnea; Córnea / fisiologia; Fenômenos fisiológicos oculares; Ceratometria

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Introduction

The technical evolution in cataract surgery and the improvement in the design of intraocular lenses brought improvements in the visual quality of the individuals submitted to a facectomy.

The coefficient of asphericity (Q) is defined as the curvature variation rate in a lens as it moves away from its center. Normally, the cornea has a proton design, that is, it decreases its curvature as it approaches the periphery, thus being aspherical with a negative Q.[1] But spherical lenses have a curvature radius anywhere on their surface, thus having a Q of zero.[2]

The longitudinal spherical aberration (LSA) is an optical phenomenon generated when the wavefront tangentially reaches the periphery of a spherical lens, enhancing its convergence effect, producing a second focus (positive LSA) anterior to the main focus. The measurement of LSA is made by the difference in diopters between the rays incident on the periphery of the lens and the rays of the paracentral region[2]. It is a high-order, physiological aberration, but very symptomatic in individuals with pupils larger than 3mm, generating halos around the lights, inducing glare and low contrast sensitivity. In youngsters, it is naturally neutralized by a negative LSA generated by the lens.[3,4]

Intraocular lenses (IOLs) may be spherical, generating positive LSA[5], and aspheric. The latter is divided into neutral aspheres, which do not induce any type of LSA, and negative aspheres, which induce a negative LSA. The existence of these IOLs gives the surgeon the opportunity to manipulate the patient's corneal LSA with the implant, improving their quality of vision.[6,7]

The aim of the present study was to correlate the coefficient of asphericity to the longitudinal spherical aberration on the corneal surface, also correlating each of these variables to the average keratometry.

Patients who underwent some kind of corneal surgical procedure (refractive surgery, corneal transplant, facectomy, pterygium surgery, etc.) were excluded from the study because they changed the measurements of asphericity, spherical aberration and keratometry.

The topographer fixedly selected 4.5 mm of the anterior surface of the cornea to measure Q and LSA, which corresponds to the physiological mesopic diameter of the elderly individuals.[8] The central point was the pupillary axis. The occurrence of LSA is relevant in shadowy environments, in individuals with a pupil greater than 3mm.[9]

The data were treated using descriptive and analytical statistical techniques with the SPSS program. The Shapiro-Wilk test was used to evaluate the normal distribution of continuous quantitative variables. For the correlation analysis to be considered significant, p = 0.01 was adopted. The significance level for the rest of the analyzes was 0.05.

Table 1

Distribution of the coefficient of asphericity (Q) of the corneal surface by eyes

Q-value	Amount	%
-0,47 a -0,50	02	2,84
-0,40 a -0,30	15	21,42
-0,29 a -0,20	15	21,42
-0,19 a -0,10	17	24,28
-0,09 a 0,0	12	17,14
+0,01 a +0,09	07	10,00
+0,13 a +0,14	02	2,85
Total	**70**	**100**

Table 2

Distribution of the longitudinal spherical aberration (LSA) of the corneal surface by eyes

Value of LSA (µm)	Amount	%
+0,0 a +0,15	09	12,85
+0,16 a +0,30	19	27,15
+0,31 a +0,64	42	60,00
Total	**70**	**100**

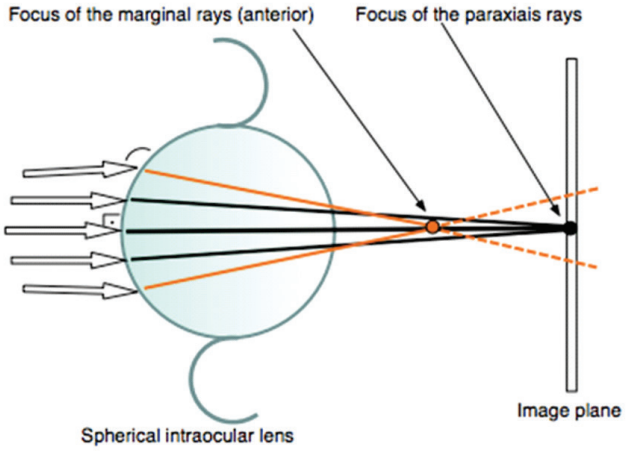

Figure 1: Longitudinal spherical aberration (LSA)

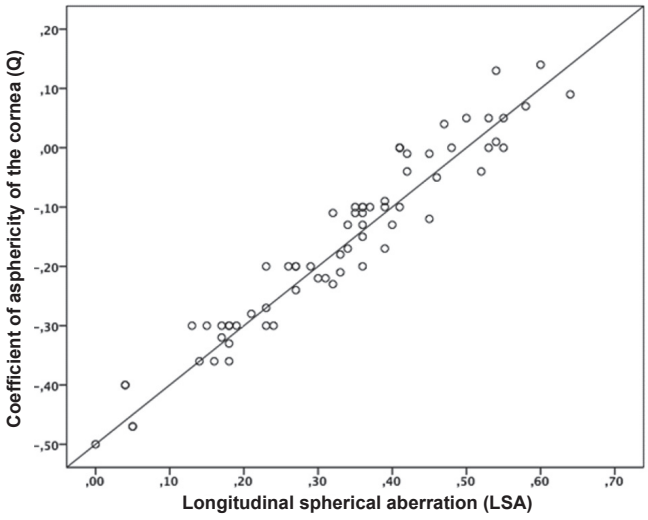

Figure 2: Corneal surface: Correlation between coefficient of asphericity (Q) x Longitudinal spherical aberration (LSA).

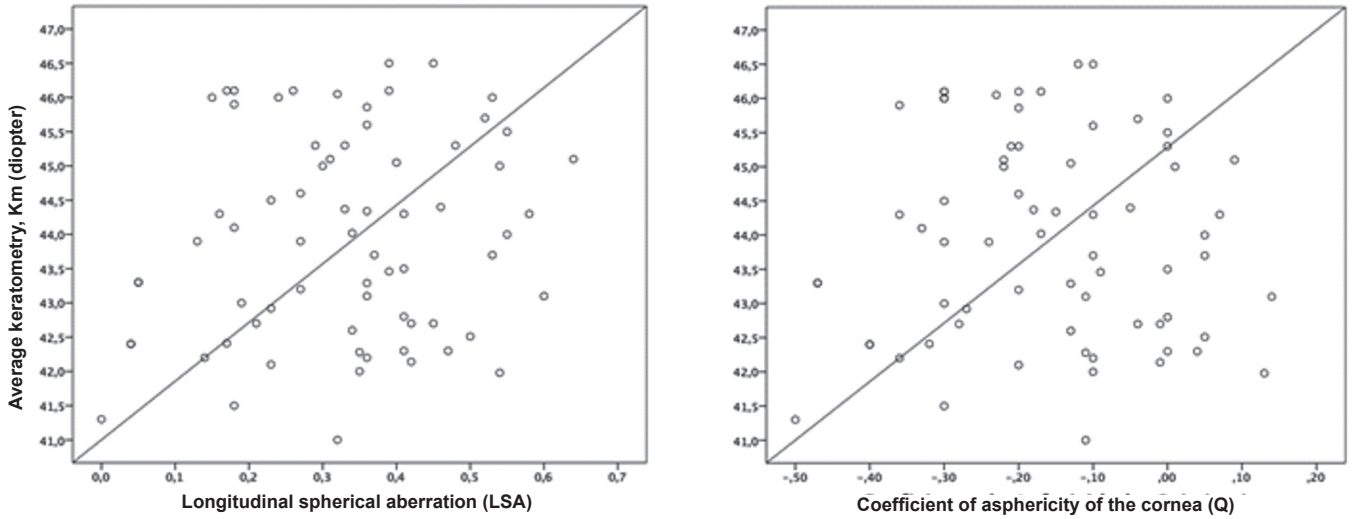

Figure 3: Average keratometry (Km): correlation between longitudinal spherical aberration (LSA) and coefficient of asphericity (Q).

Results

The sample consisted of 70 eyes of 35 individuals distributed as follows: 24 (68.6%) women, and 11 (31.4%) men. Age varied from 48 to 89 years, with an average of 69.97 ± 8.29.

In the evaluation of Q of the corneal surface an average of -0.15 ± 0.15 (95% CI = -0.19 to -0.12) was observed. Six (8.57%) corneas presented spherical design (Q = 0.0) and only one (1.42%) showed aspheric drawing with Q = -0.50 generating an LSA = 0.0 (Table 1).

Methods

An observational study was performed with the collection of preoperative data in the medical records of individuals who were candidates to facectomy at a reference service in Fortaleza, Ceará. The data collected referred to gender and age, as well as indexes provided by the CSO® topographer as: corneal surface coefficient of asphericity (Q), longitudinal spherical aberration of the corneal surface (LSA, Figure 1), and average keratometry (Km).

In relation to the LSA of the corneal surface, we observed an average of +0.33 ± 0.14 µm (95% CI = +0.29 to +0.36). Only one (1.40%) eye had LSA equal to 0.0, and no eye had negative LSA (Table 2).

A correlation was observed (r = 0.962 / p = 0.000) between the variables Q x LSA (Figure 2).

Km varied from 41.00D to 46.50D, with an average of 43.94 ± 1.48D (95.0% CI= 43.70D to 44.41D). There was no correction between Km and Q (r = -0.005 / p = 0.965), as well as between Km and LSA (r = 0.167 / p = 0.170), Figure 3.

Discussion

To evaluate the coefficient of asphericity (Q) and the longitudinal spherical aberration (LSA), a sample of individuals with a high average age in the cataract department was chosen. Thus, it would be possible to make projections of possible IOL implants according to the LSA generated for this age group of individuals.

The normal cornea does not have a perfect aspherical design. This "imperfection" can generate positive LSA in subjects with a pupil greater than 3mm, causing vision with glare halos and low in contrast sensitivity.[10] Considering an ideal height of the object at the line of sight level, optimized topographies will make it flatter towards the ends (negative asphericity), minimizing or correcting this positive LSA.[11] In the relevant literature, values of Q ranging from -0.18 to -0.30 are found, generating positive spherical aberration.[12,13] On the one hand this may be good, since this aberration, though deleterious for mesopic vision, generates a focus anterior to the retina, improving near-sight vision. [14,15] In this study, a proton design of the anterior surface of the cornea was found with an average Q of -0.15 and a positive LSA with a average of + 0.33µm. Any lens, and here the cornea is included, varying its curvature (not spherical) can be called aspherical. Commercially the term aspheric was associated to synonymous of lenses with high optical quality, non-generating of spherical aberration (LSA zero). However, not all aspherical lenses fit that profile. In this research, only one cornea presented LSA zero with Q -0.50, that is, a "perfect" aspheric design. All the rest generated some level of positive LSA. No negative LSA was found. This finding may be justified by the exclusion from the search of eyes that have undergone refractive surgery or presented corneal ectasia. Highly prolated corneas that have undergone LASER refractive surgery for hypermetropia or that have central keratoconus tend to have an elevated negative LSA because they have a hyperprolonged design (very negative Q). Especially for these cases, it is indicated spherical IOLs naturally having a positive LSA with an average of + 0.18µm.[16] In contrast, individuals who undergo refractive surgery for myopia usually have a cornea with positive Q and LSA, inducing glare halos vision and low sensitivity to contrast. In these, in order to minimize this exaggerated positive LSA, the implant of an aspheric IOL with the most negative LSA value (-0.27µm) is indicated.

The benefit of the neutral aspheric IOL implant is to improve sensitivity to contrast and obfuscation under mesopic conditions.[8] These IOLs have a negative Q, around -0.50, generating LSA zero. It is suggested that individuals with corneal LSA between -0.15 and + 0.15µm receive a neutral aspheric IOL (Q around -0.50), i.e., free of LSA. Those with corneal LSA between +0.16 and + 33.0µm may receive an aspheric IOL (most prolated with Q> -0.50) generating a negative LSA around -0.20µm. Those with positive corneal LSA above + 0.33µm should receive an

aspheric IOL (even more prolated with more negative Q) generating LSA around -0.27µm.[17] In this survey, the majority of the eyes, 42 (60.0%) eyes, presented LSA greater than +0.30, and an implant of an aspheric IOL with negative LSA of -0.27µm was suggested. Nineteen (27.15%) eyes presented LSA between +0.16 and + 0.30µm, suggesting an aspheric IOL with negative LSA of -0.20µm. Nine (12.85%) eyes presented LSA between zero and + 0.15µm, and a neutral aspheric IOL was indicated.

In this sample, the average value of the anterior keratometry (Km) of the cornea was not correlated with Q nor with LSA, showing that the variation in Km does not modify the relation between the peripheral and paracentral curvatures of the cornea. Thus, the indication of the spherical aberration of the IOL according to the average keratometry has no real correspondence. The present study suggests not to indicate IOL implant, be it spherical or aspherical, based only on the Km, and the LSA generated by the Q of each individual should be routinely measured to indicate the most adequate IOL.

Conclusion

There was a correlation between the corneal coefficient of asphericity and longitudinal spherical aberration. No correlation was observed between the coefficient of asphericity or the longitudinal spherical aberration with the average keratometry.

References

1. Franco SMB, Almeida JMB, Mato MP. Determinação óptica da estrutura tridimensional da córnea. Janeiro 2005. Doutoramento em Ciências. Universidade do minho. Portugal.
2. Glasser A, Campbell MC. Presbyopia and the optical changes in the human crystalline lens with age. Vision Res. 1998; 38(2):209-29.
3. Applegate RA, Thibos LN, Hilmantel G. Optics of aberroscopy and super vision. J Cataract Refract Surg. 2001; 27(7):1093-107.
4. Smith G, Cox MJ, Calver R, Garner LF. The spherical aberration of the crystalline lens of the human eye. Vision Res. 2001;41(2):235-43.
5. Miller JM, Anwaruddin R, Straub J, Schwiegerling J. Higher order aberrations in normal, dilated, intraocular lens, and laser in situ keratomileusis corneas. J Refract Surg. 2002;18(5): S579-83.
6. Johanson B, Sundelin S, Wikberg-Matsson A, Unsbo P, Behndig A. visual and optcal performance of the akreos adapt advanced optics and tecnis Z9000 intraocular lenses: Swedish multicenter study. J Cataract Refract Surg. 2007; 33(9):1565-72.
7. Caporossi A, Martone G, Casprini F, Rapisarda L. Prospective randomized study of clinical performance of 3 aspheric and 2 spherical intraocular lenses in 250 eyes. 2007;23(7):639-48.
8. Rocha KM. Aberrações ópticas em olhos pseudofácios e com catarata (tese). São Paulo: Universidade Federal de São Paulo; 2007.
9. Packer M, Fine IH, Hoffman RS, Piers PA. Prospective randomized trial of an anterior surface modified prolate intraocular lens. J Refract Surg. 2002;18(6):692-6.
10. Applegate RA. Limits to vision: can we do better than nature? J Refract Surg. 2000; 16(5): S547-51.
11. Pereira WG, Zacharias CR. Otimização da asfericidade de superfícies refratoras conicoidais [dissertação]. Guaratinguetá(SP): Universidade Estadual Paulista; 2006
12. Guillon M, Lydon DP, Wilson C. Corneal topography: A clinical model. Ophthal Physiol Opt. 1986; 6(1):47-56.
13. Lam A, Douthwaite W. Measurement of posterior corneal asphericity on Hong Kong Chinese: A pilot study. Ophthal Physiol Opt. 1997; 17(4): 348-56.
14. Nio YK, Jansonius NM, Fidler V, Geraghty E, Norrby S, Kooijman AC. Spherical and irregular aberrations are important for the optimal performance of the human eye. Ophthalmic Physiol Opt. 2002; 22(2):103-12.
15. Cheng H, Barnett JK, Vilupuru AS, Marsack JD, Kasthurirangan S, Applegate RA, et al. A population study on changes in wave aberrations with accommodation. J Vis. 2004;4(4):272-80.
16. Wang L, Koch DD. Custom optimization of intraocular lens asphericity. J Cataract Refract Surg. 2007; 33(10):1713-20.
17. Beiko G. Aspheric IOLs: matching corneal and IOL wavefront. In: Chang DF, editor. Mastering refractive IOLs: the art and science. Thorofare, NJ: Slack; 2008. p. 278-81.

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Correlation between increase in margin-crease distance and patient satisfaction after upper blepharoplasty

Correlação entre o aumento da distância margem-sulco e satisfação do paciente após blefaroplastia superior

Eduardo Damous Feijó[1], Adriana Ribeiro de Almeida[1], Rayssa Léda1, Fábio Ramos Caiado[1], Ana Carla de Souza Nery[2], Roberto Murillo Limongi[3]

ABSTRACT

Objective: *To quantitatively and qualitatively evaluate postoperative outcomes and patient satisfaction after upper blepharoplasty and to correlate the findings with changes between preoperative and postoperative eyelid measurements using a digital imaging system. Methods: A total of 60 eyelids in 30 patients with dermatochalasis who were treated in the ambulatory center of the Department of Oculoplastic Surgery at the Anápolis Ophthalmology Hospital were evaluated. Patients ranged from 40 to 80 years of age. Photographs were taken before the upper blepharoplasty procedure and 90 days after as well. The images were transferred to the ImageJ 1.34n program. The parameters analyzed were palpebral fissure height in primary position and margin-crease distance. The correlations between these measurements and patient satisfaction 90 days after surgery were evaluated.* ***Results:*** *This study revealed an increase in the margin-crease distance after upper blepharoplasty and a high positive correlation (0.64) between the increase in this height and the level of satisfaction that the patients attributed to the surgery. There was no statistically significant difference between preoperative and postoperative palpebral fissure heights.* ***Conclusion:*** *The margin-crease distance may serve as a quantitative measurement of a good cosmetic and functional outcome, since it has been found to be strong correlated with patient satisfaction.*

Keywords: *Eyelids/surgery; Eyelid disease/surgery; Blepharoplasty/methods; Treatment outcome; Image processing, computer-assisted; Patient satisfaction*

RESUMO

Objetivo: Avaliar de maneira quantitativa e qualitativa o resultado pós-operatório e a satisfação de pacientes submetidos à blefaroplastia superior e correlacionar com as medidas palpebrais antes e após a cirurgia utilizando o sistema de imagem digital. **Métodos:** Foram avaliadas 60 pálpebras de 30 pacientes com dermatocálase atendidos no ambulatório de Plástica Ocular do Hospital Oftalmológico de Anápolis, com idade entre 40 e 80 anos. Foram realizadas fotografias antes e 90 dias após blefaroplastia superior. Essas imagens foram transferidas para o programa Image J 1.34n e analisados os parâmetros de altura da fenda palpebral em posição primária do olhar e distância margem-sulco palpebral. Foram avaliadas as correlações dessas medidas com a satisfação do paciente após 90 dias de pós-operatório. **Resultados:** O estudo mostrou um aumento da distância margem-sulco palpebral após blefaroplastia superior e uma correlação fortemente positiva (0,64) entre o aumento dessa medida e a nota de avaliação atribuída pelo paciente à cirurgia. Não houve diferença estatisticamente significante na altura da fenda palpebral antes e após a cirurgia. Conclusão: A utilização da medida da distância margem-sulco pode servir como parâmetro quantitativo de um bom resultado estético e funcional, apresentando uma forte correlação com a satisfação dos pacientes no pós-operatório.

Descritores: Pálpebras/cirurgia; Doenças palpebrais/cirurgia; Blefaroplastia/métodos; Resultado do tratamento; Processamento de imagem assistida por computador; Satisfação do paciente

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Introduction

Dermatochalasis is a pathology that commonly affects middle-aged and elderly individuals. It is defined as an excess of skin on the upper eyelid, on the lower eyelid, or on both lids, and it may include an excess of fat and hypertrophic muscle tissue [1].

Advanced loss in elasticity and weakening in muscle tissue are characteristics of the periocular aging process, which results in eyelid flaccidity. Intrinsic and extrinsic aging mechanisms are involved in this process. They include alcohol consumption, chronic exposure to sunlight, smoking, and diet [2,3].

Individuals who exhibit dermatochalasis of the superior eyelid may experience symptoms such as blurred vision, tearing, visual fatigue and discomfort, reductions in the superior and peripheral fields of vision, corneal astigmatism, and migraines due to the use of the surrounding muscles to attempt to raise the eyelids [1,2,4]. Pseudoptosis may be induced by the increase in periorbital tissue weight [2].

Blepharoplasty is the procedure of choice for correcting dermatochalasis. It consists of the excision of the excess skin using a cutaneous incision that involves the anterior lamella of the eyelid. Depending on each case and on patient anatomy, orbicular muscle tissue and fat pads may also be excised or repositioned [1,4,5,6]. A complete ophthalmologic exam must be performed in the preoperative assessment so that limitations in visual acuity and to the visual field can be documented, as well as pathologies such as dry eye and any others for which the procedure is contraindicated. Eyebrow position and any association with blepharoptosis should be determined. In cases of superior dermatochalasis associated with eyelid ptosis or brow ptosis, it is important that all aspects be corrected [7,8].

Though ophthalmologists commonly perform this procedure, there is no standardization or consensus for evaluating the severity of superior dermatochalasis. Evaluations are subjective and depend on each examiner's observations. Measurements are typically taken using rulers and compasses. With the advancement of digital photography and software to analyze these photos, more precise measurement scales can be used to compare surgical outcomes and to correlate them with the success of a procedure (or lack thereof), as well as with patient satisfaction with the results[7,9,10].

The objective of this study is to quantitatively and qualitatively evaluate postoperative outcomes and patient satisfaction after upper blepharoplasty and to correlate these results with the measurements taken using preoperative and postoperative digital photography.

Methods

A prospective interventional case series study was performed between January and June 2015 in an ophthalmology teaching hospital. The sample was composed of 30 patients who had upper dermatochalasis and who were treated in the Oculoplastic Surgery ambulatory center of the aforementioned hospital. These patients agreed to participate in the study and signed the Informed Consent Form (ICF), which had been previously approved by the institution's Ethics Committee. The study was performed in accordance with the Helsinki Declaration.

The inclusion criteria were treatment in the Oculoplastic Surgery ambulatory center, age between 40 and 80 years, cosmetic or functional indication for the upper blepharoplasty procedure, and agreement to participate in the study (which was determined after patients signed the ICF).

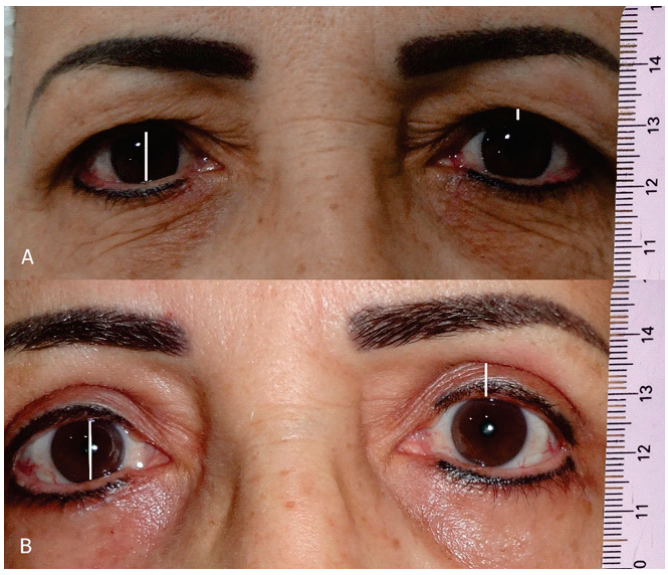


Figure 1: A: Digital measurement of palpebral fissure height (right eye), measurement of the margin-crease distance (left eye), and millimeter ruler attached to the slit lamp
B: Margin-crease distance measurement reflecting a postoperative increase (left eye).

The exclusion criteria were age younger than 40 years or older than 80 years, a history of facial trauma, eyelid ptosis, ectropion, entropion, hyperthyroidism, the presence of a clinical contraindication for performing the procedure, and the use of blood thinners or antiplatelet agents.

The digital photographs were obtained through the use of a Sony W50 digital camera and analyzed in the ImageJ 1.34n program, which converts the measurements taken with a ruler into pixels, thus creating a pixel per milliliter (mm) scale.

The patients were seated with their heads positioned in a Haag-Streit slit lamp BQ 900® so that the measurements could be taken. Millimeter rulers were attached vertically to the lateral support of the slit lamp in order to standardize the measurements. Each patient was instructed to remain in primary position while the measurements were taken (Figure 1).

As mentioned previously, there is no consensus regarding dermatochalasis severity. Therefore, the authors measured the distance between the superior lid margin and the superior lid crease, as suggested by Frantz et al.[8] at the level of the center of the lid (margin-crease distance) in primary position.

Next, palpebral fissure height was measured (defined as the distance from the superior lid margin to the inferior lid margin, passing through the center of the pupil) and the margin-crease distance (defined as the distance from the superior lid margin to the lid crease along the pupillary line) before and 90 days after blepharoplasty.

In each patient, preoperative superior dermatochalasis was determined to be either mild (margin-crease distance of 2 mm or greater), moderate, (margin-crease distance of 0.1 to 1.9 mm), or severe (0 or negative distance). We considered dermatochalasis to be severe in cases in which the skin touched the lash line or surpassed it (negative distance), as shown in figure 1.

All of the surgeries were performed by ophthalmology residents in training; all were directly supervised by the same oculoplastic surgeon. The amount of skin to be excised had been

outlined prior to the procedure. The patients were sedated using midazolam intravenously, and local anesthesia was then applied (2% lidocaine and 0.75% bupivacaine, both with epinephrine).

The cutaneous incision of the superior lid was made using a #15 blade along the previously outlined markings in order to remove the excess skin, subcutaneous tissue, and preseptal orbicularis muscle using an EMAI brand electronic scalpel, model number BP 150. When necessary, meticulous hemostasis was performed and medial fat pads were removed. The surgical wound was closed using nylon 6-0 suture with two to three simple suture followed by a running suture. Finally, antibiotic ointment and a bandage were applied for 24 hours. The sutures were removed seven days after surgery.

The data on patient satisfaction was collected using qualitative questionnaires applied in the immediate postoperative period and 90 days after the blepharoplasty. Patients were questioned regarding their reason for undergoing the procedure (cosmetic, functional, or both); the extent of postoperative pain (measured on a scale of 0 to 10, in which 0 reflected a lack of pain, 1 to 3 reflected mild pain, 4 to 5 reflected moderate pain, 7 to 9 reflected intense pain, and 10 reflected the most pain ever experienced).

In terms of satisfaction with the final outcome of the procedure, the patients were instructed to give a subjective score of 0 to 10, in which 0 meant "completely unsatisfied" and 10 reflected "extremely satisfied" and the patients were also asked if they would undergo the procedure again.

Patients were also asked for their subjective assessments of scarring on a scale of 0 to 3 (0: invisible; 1: minimally visible; 2: moderately visible; and 3: highly visible).

The statistical analysis was performed using the SPSS software. The normality of the data was evaluated using the Kolmogorov-Smirnov test. Student's t-test was used to compare the average preoperative and postoperative palpebral fissure heights, as well as the average preoperative and postoperative margin-crease distances. Pearson's correlation coefficient was used to evaluate the correlation between the final margin-crease distance and patient satisfaction scores.

In this study, results with a 95% confidence interval were considered statistically significant ($p<0.05$).

When Student's t-test was applied to compare the average preoperative palpebral fissure height (8.5 mm; SD: 0.91) to average postoperative palpebral fissure height (8.6 mm; SD: 0.85), no statistically significant distance was found (p=0.44). However, the average preoperative margin-crease distance was 1.4 mm (SD: 1.19), while the average postoperative margin-crease distance was 3.8 mm (SD: 0.49). The p value was 0.02, which reflects statistical significance (Table 2).

Results

A total of 60 upper blepharoplasties were performed on 30 patients. The population's average age was 54.8 years (range 41-74 years of age); 88% were female. Forty-four percent of patients presented no preexisting comorbidities, 48% had systemic hypertension, 15% had hypothyroidism, and 12% had diabetes.

When asked about their reasons for undergoing the surgery, 32% of the patients reported only cosmetic reasons, 33% reported only functional reasons, and 35% reported both cosmetic and functional reasons. The questionnaire also found that 96% of the patients would undergo the surgery again (4% would not).

In the assessment of superior dermatochalasis, 9 patients (30%) were found to have mild dermatochalasis, 11 patients (36%) were found to have moderate dermatochalasis, and 10 patients (34%) were found to have severe dermatochalasis. In this study, no cases of asymmetry were found, meaning there were no cases in which the patient exhibited different dermatochalasis intensities in each eye (Table 1).

Table 1
Patient profiles

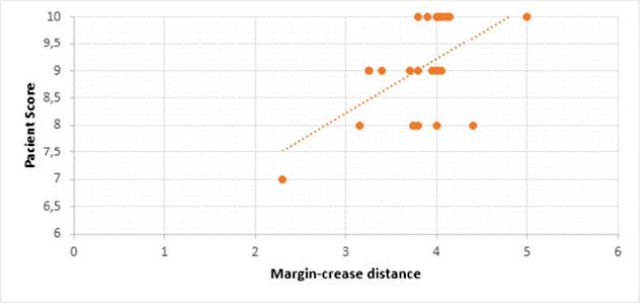
Gender	88% female
Age	54.8 years (41-74)
Comorbidities	48% SH*
Reason for procedure	68% cosmetic
Intensity of dermatochalasis	70% moderate/severe
Would they perform the procedure again?	96% yes

*SH: Systemic hypertension

Table 2
Digital eyelid measurements in millimeters (mm) (mean and range)

	Preoperative mean	Postoperative mean	p value
Palpebral fissure height	8.5 (7 – 10)	8.6 (7.1 –10)	0.44
Margin-crease distance	1.4 (0 – 3.8)	3.8 (2.3 – 5)	0.02

Graph 1
Correlation between higher margin-crease distance and patient satisfaction score (all patients)



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The study also found a strong positive correlation (0.64) between the margin-crease distance and patient satisfaction score, the average of which was 9.04 out of 10 (7-10; SD: 0.88) (Graph 1). Among subjects less than 60 years of age, the positive correlation was 0.64 (strong) and among subjects greater than 60 years of age, the positive correlation was 0.33 (weak).

The average score patients gave to pain was 2.5 out of 10 (1-5; SD: 1.10). When asked about scarring, 22 patients (73%)

DERMATOCALASE QUESTIONNAIRE

NAME:_____
SEX: ( ) M ( ) F
AGE: _____
PERSONAL BACKGROUND:
( ) HAS ( ) DM ( ) HYPETIREOIDISM ( ) HIPERTIR ( ) OTHERS _____

VISUAL SYMPTOMS: ( ) "WEIGHT" PALPEBRAL ( ) ALTERATIONS OF CV
( ) PHOTOFOBIA ( ) TEARS
( ) OTHERS_____
MOTIVATION FOR SURGERY
( ) AESTHETICS ( ) FUNCTIONAL ( ) BOTH

CLINICAL EXAMINATION - MEASURED WITH IMAGE J
LENGTH SPINDLE PRÉ: RE: DISTANCE MARGIN SULCO PRE: RE:
LE: LE:
POST LENGTH SPINDLE: RE: DISTANCE MARGIN SULCO POST: RE:
LE: LE:

POSTOPERATIVE PAIN SCALE OF 0 TO 10 =>

SUBJECTIVE EVALUATION OF THE SCAR: 0 A 3 => _____
(0: invisible, 1: minimally visible, 2: moderately visible and 3: very visible.)

FINAL NOTE OF SUBJECTIVE SURGERY - 0 TO 10 =>
(0 totally dissatisfied and 10 extremely satisfied)

WOULD THE PROCEDURE AGAIN? ( ) YES ( ) NO

subjectively rated their scarring as invisible or minimally visible, and 8 patients (27%) rated their scarring as moderately visible. None of the patients exhibited highly visible scarring, according to their own assessments

Discussion

Upper blepharoplasty is one of the most commom aesthetic procedures performed in the United States and Brazil[1,11]. Aesthetics improvements can be made with a short operation that can be performed under intravenous sedation. This procedure offers many benefits to patients and which most of the times results in high patient satisfaction. In our study, there was a higher percentage of female patients (88%), and patients averaged approximately 55 years of age. This data is compatible with the higher interest among this patient profile for cosmetic procedures, whether surgical or not. Regardless of cosmetic benefits, most of the times functional issues are present in patients who wish to undergo upper blepharoplasty. Common complaints before surgery include a feeling of excess weight above the eyes, a decreased superior and peripheral visual field, and asthenopia. [9,10]. These findings are consistent with those published by Lessa et al.[11]. Dermatochalasis is also associated with a loss in the peripheral visual field, which further affects patients' quality of life [12].

To achieve the digital measurements, a digital image must be produced, which means attributing spatial values (x, y) and luminance values to the points (pixels) that form the image [13]. Once available in digital form, the image can be processed by programs that mathematically manipulate the pixels. The use of digital processing allows for more refined quantitative analyses of the oculoplastic parameters that may be of clinical or surgical importance and which may be correlated with qualitative analyses of surgical outcomes[7]. These parameters are traditionally measured using rulers and compasses, a method which may result in differences between examiners. The digitalization and computerized analysis of these measurements offer a more precise result and eliminate examiner bias.

In our study, the increase in postoperative palpebral fissure height was not statistically significant, a finding which was also reported by Starck et al.[14]. Schellini et al.[7] found significant changes in palpebral fissure measurements before and after upper blepharoplasty, a result which may be explained by the presence of many patients with mechanical ptosis due to severe dermatochalasis in their study. The average postoperative palpebral fissure measurement in our study was 8.6 mm. Cruz et al.[13] analyzed palpebral fissure height in 70 eyes and found a mean value of 9.02

mm, consistent with our findings.

Our study found a significant increase in the preoperative and postoperative measurement of margin-crease distance. The preoperative distance was 1.4 mm, while the postoperative distance was 3.8 mm ($p < 0.02$). Statistically significant increases have also been reported by Schellini et al.,[7] Starck et al.[14] and Lessa et al.[11]. An analysis of this data shows that our finding was expected, given the fact that the excision of the skin above the preseptal orbicularis muscle has the effect of aesthetic placement of the supratarsal crease, since it is no longer covered due to superior dermatochalasis.

Though many studies have analyzed preoperative and postoperative measurements involved in upper blepharoplasties, we are unaware of any studies that correlate postoperative measurements with the extent of patient satisfaction. In what may be considered a factor in a good outcome for upper blepharoplasty, a quantitative increase in margin-crease distance in primary position, which exposes pretarsal skin (hollow upper eyelid sulcus) and, particularly among women, allows for the use of cosmetic products in this region, was found to be subjectively correlated with greater patient satisfaction in this study. Another important quantitative criterion is a lack of a decrease in palpebral fissure, since this decrease may lead to a certain degree of blepharoptosis, an outcome which is not desired after upper blepharoplasty.

The majority of oculoplastic surgeons have been concerned with volume preservation in upper blepharoplasty. However, in this study, the strong positive correlation between higher margin--crease distance and patient satisfaction, shows that, in patient evaluation, the hollow upper eyelid sulcus has been preferred to full upper eyelid sulcus. Bielory et al.[15] found that the preference for hollow or full upper eyelid sulcus could be accounted based on age. In their study, subjects greater than 45 years of age preferred a hollow upper eyelid sulcus (higher margin-crease distance) over a full eyelid[15]. In another study, Hwang et al.[16], showed the effect of "single" versus "double" eyelids on the perceived attractiveness of Chinese woman and considered the presence of a medium upper eyelid crease to be the most significantly attractive eyelid shape. These findings are consistent with our study, that showed patient preferences to higher margin-crease distance.

Qualitative criteria include invisible or minimally visible scarring in a good location (coinciding, in most cases, with the original eyelid crease), decreased sensations of excess weight above the eyes and of asthenopia[17-19], improved superior and peripheral visual fields[20-24], and an associated absence of complications such as lagophthalmos and dry eye. These criteria are associated with an ideal outcome.

In our study, we found a strong positive correlation between greater margin-crease distance and patient satisfaction (determined by the score attributed by the patient to the final outcome of the procedure). We conclude that this measurement may serve as a quantitative parameter of a good cosmetic and functional outcome, particularly in teaching hospitals where medical residents need clinical parameters to evaluate their results. This measurement may be beneficial in cases of careful surgical indication and the correct use of the surgical technique.

References

1. De Angelis DD, Carter SR, Seiff SR. Dermatochalasis. Review. Int Ophthalmol Clin. 200242(2):89-102.
2. Paixão MP, Miot, HA, Machado, CD. Avaliação do impacto da blefaroplastia superior na qualidade de vida utilizando questionário padronizado (Qblefaro): estudo piloto. An Bras Dermatol. 2008;83(1): 32-7.
3. Putterman AM. Blefaroplastia superior. In: Cirurgia oculoplástica estética. Rio de Janeiro: Elsevier; 2009; p. 114.
4. Battu VK, Meyer DR, Wobig JL. Improvement in subjective visual function and quality of life outcome measures after blepharoptosis surgery. Am J Ophthalmol 1996;121(6):677-86.
5. Fagien S. Eyebrow analysis after blepharoplasty in patients with brow ptosis. Ophthal Plast Reconstr Surg. 1992;8(3):210-4.
6. Federici TJ, Meyer DR, Lininger LL. Correlation of the vision-related functional impairment associated with blepharoptosis and the impact of blepharoptosis surgery. Ophthalmology. 1999;106(9):1705-12.
7. Schelinni AS, Pretti RC, Yamamoto RK, Padovani CR, Padovan CR. Eyelid measures before and after upper blepharoplasty – quantitative evaluation. Arq Bras Oftalmol. 2005; 68(1):85-8.
8. Frantz KA. Avaliação da topografia corneana e correlação com a intensidade da dermatocálase antes e após blefaroplastia superior [dissertação]. Goiânia (GO): Universidade Federal de Goiás; 2013.
9. Shore JW, Bergin DJ, Garrett SN. Results of blepharoptosis surgery with early postoperative adjustment. Ophthalmology. 1990;97(11):1502-11.
10. Cahill KV, Burns JA, Weber PA. The effect of blepharoptosis on the field of vision. Ophthal Plast Reconstr Surg. 1987;3(3):121-5.
11. Lessa SF, Elena EH, Araujo MR, Pitangy I. Modificações anatômicas da fenda palpebral após blefaroplastia. Rev Bras Cir. 1997;87(4):179-88.
12. Hacker HD, Hollsten DA. Investigation of automated perimetry in the evaluation of patients for upper lid blepharoplasty. Ophthal Plast Reconstr Surg. 1992;8(4):250-5.
13. Cruz AA, Baccega A. Análise bidimensional computadorizada da fenda palpebral. Arq Bras Oftalmol. 2001;64(1):13-9.
14. Starck WJ, Griffin JE, Epker BN. Objective evaluation of the eyelids and eyebrows after blepharoplasty. J Oral Maxillofac Surg. 1996;54(3):297-302; discussion 302-3.
15. Bielory BP, Schwarcz RM. (New York Medical College). Hollow or full upper eyelid sulcus, which do patients prefer?. (Apresentado ao 46º ASOPRS Annual Fall Scientific Symposium).
16. Hwang HS, Spiegel, JH. The effect of "single" vs "double" eyelids on the perceived attractiveness of Chinese woman. Aesthet Surg J. 2013;34(3):374-81.
17. Small RG, Meyer DR. Eyelid metrics. Ophthal Plast Reconstr Surg. 2004;20(4): 266-7.
18. Meyer DR, Stern JH, Jarvis JM, Lininger LL. Evaluating the visual field effects of blepharoptosis using automated static perimetry. Ophthalmology. 1993;100(5):651-9.
19. Meyer DR, Rheeman CH. Downgaze eyelid position in patients with blepharoptosis. Ophthalmology. 1995;102(10):1517-23.
20. Olson JJ, Putterman A. Loss of vertical palpebral fissure height on downgaze in acquired blepharoptosis. Arch Ophthalmol. 1995;113(10):1293-7.
21. Damasceno RW, Avgitidou G, Belfort R Jr, Dantas PE, Holbach LM, Heindl LM. Eyelid aging: pathophysiology and clinical management. Arq Bras Oftalmol. 2015;78(5):328-31.
22. Atalay K, Gurez C, Kirgiz A, Serefoglu Cabuk K. Does severity of dermatochalasis in aging affect corneal biomechanical properties? Clin Interv Aging. 2016;11:659-64.
23. Cahill KV, Bradley EA, Meyer DR, Custer PL, Holck DE, Marcet MM, Mawn LA. Functional indications for upper eyelid ptosis and blepharoplasty surgery: a report by the American Academy of Ophthalmology. Ophthalmology. 2011;118(12):2510-7.
24. Simsek IB, Yilmaz B, Yildiz S, Artunay O. Effect of upper eyelid blepharoplasty on vision and corneal tomographic changes measured by pentacam. Orbit. 2015;34(5):263-7.

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Asthenopia in bankers: identification and analysis of risk factors

Astenopia em bancários: identificação e análise dos fatores de risco

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ABSTRACT

Objective: *To evaluate the prevalence of asthenopia in a cohort of bank employees and identify possible associated risk factors.* ***Methods:*** *Cross-sectional study based on information supplied by bankers in response to a standardized electronic questionnaire.*
Results: *The questionnaire was responded by 945 bankers. The frequency of asthenopic symptoms was positively associated with female gender, age over 50 years, and reading or using the computer >6 hours a day.* ***Conclusion:*** *Asthenopic symptoms were found to be significantly associated with gender, age and time spent reading. The most frequently reported symptoms were headache and sore eyes.*

Keywords: *Work environment; Asthenopia/etiology; Occupational disease; Risk factors*

RESUMO

Objetivo: Avaliar a presença de astenopia em bancários e identificar possíveis fatores de risco associados. **Metodos:** Estudo transversal realizado por meio de informações obtidas em um questionário padronizado, aplicado eletronicamente à trabalhadores da categoria de bancários. **Resultados:** Responderam ao questionário 945 trabalhadores. Observou-se que a frequência dos sintomas de astenopia foi maior nos grupos que declararam usar computador ou ler por mais de 6 horas por dia. As queixas de astenopia foram significativamente maiores nos trabalhadores com mais de 50 anos e do sexo feminino. **Conclusão:** Este trabalho identificou uma associação positiva de queixas de astenopia em bancários em relação ao tempo de leitura, sexo e idade. Dentre os sintomas oculares associados à astenopia, foi encontrada uma maior prevalência de dor de cabeça e dor nos olhos.

Descritores: Ambiente de trabalho; Astenopia/etiologia; Doenças ocupacionais; Fatores de risco

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Introduction

Over the past decades, much attention has been given worldwide to the notion of sustainable development and the need for a harmonious interaction between society, technology and the environment.[1] Work processes have changed profoundly as a result of growing urbanization, the emergence of new industrial sectors and the automation, mechanization and informatization of work processes. This has led to changes in the profile of occupational diseases and, consequently, in occupational medical care.[2]

Not surprisingly, asthenopic symptoms have become highly prevalent.[3-5] According to the Dictionary of Visual Science, the term "asthenopia" covers a range of subjective symptoms of discomfort caused by excessive use of the eyes.[6] Symptoms include eye fatigue, ocular discomfort, headache, irritation, itchy or sore eyes, photophobia, blurry vision, diplopia, lachrymation, dry eyes and foreign body sensation.[7]

Asthenopia produces a significant negative impact on visual well-being and productivity in the workplace.[8] Mocci et al. reported an asthenopia prevalence of 31.9% in 385 bankers in Italy, 13.6% of whom were considered severe.[9]

As shown by Hennessey et al.[10], Levine et al.[11] and Iribarren et al.[12], the administration of questionnaires is an efficient way of obtaining reliable information on asthenopic symptoms in specific risk groups. The purpose of the present study was to evaluate the prevalence of asthenopia in a cohort of bankers working at computer terminals and identify possible associated risk factors.

Methods

In this cross-sectional study, information was collected by administering a standardized electronic questionnaire to a cohort of bankers working at a public bank in Espírito Santo (Southeastern Brazil). The choice of this profession for the study was due to bank employees' exposure to prolonged near work when reading or using the computer. Through a partnership between the researchers and the bank's service of occupational safety and health, the respondents were prompted to answer the questionnaire when logging into their individual computer terminals at work. In addition, an extensive review of the literature was performed.

The collected data was initially submitted to descriptive analysis. Absolute and relative frequencies were calculated for qualitative variables. The homogeneity between proportions was verified with the chi-square test or Fishers' exact test. Since the assumption of normality was rejected, group comparisons with regard to the daily number of hours of near work were made with the non-parametric Kruskal-Wallis test. Multiple comparisons were performed with Dunn's test. The level of statistical significance was set at 5% ($p<0.05$).

This project was approved by Research Ethics Committee under number 19763713.0.0000.5071; Hospital Universitário Cassiano Antônio de Moraes, Espírito Santo, Vitória, Brazil.

Results

The questionnaire was responded by 945 (54.7% women) of the banks' 2,400 employees. The respondents were distributed in the following age groups: < 21 years (0.4%), 21-35 years (37.4%), 36-50 years (32.5%), and >50 years (29.7%).

The frequency distribution of time spent on reading and in front of the computer on an average weekday and on weekends is shown in Figures 1 and 2, respectively.

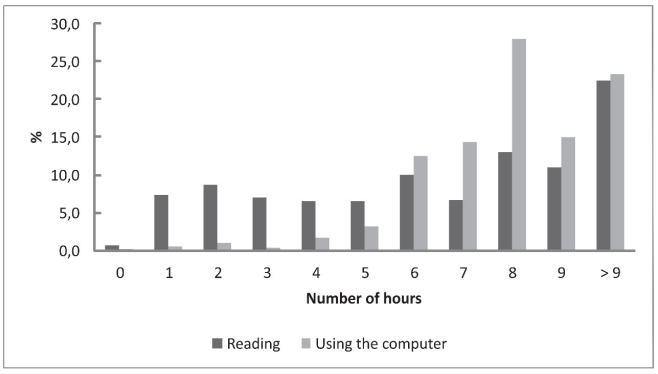

Figure 1. Frequency distribution of time (hours) spent on reading and using the computer on an average weekday as reported by 945 bank employees.

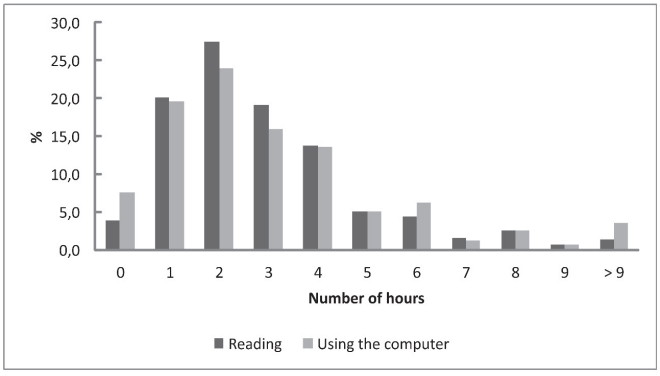

Figure 2. Frequency distribution of time (hours) spent on reading and using the computer on weekends as reported by 945 bank employees

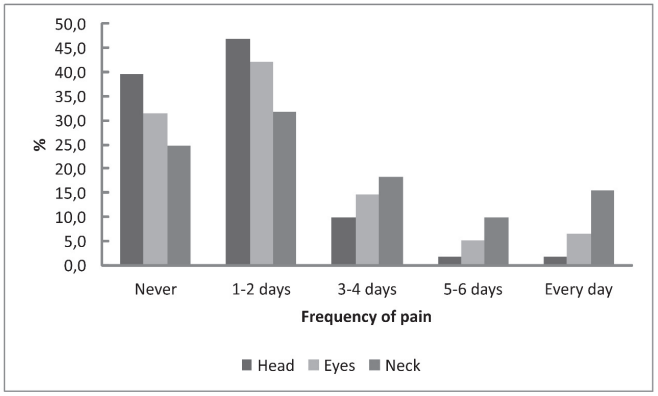

Figure 3. Frequency distribution of headache, sore eyes and neck pain (number of days per week) as reported by 945 bank employees.

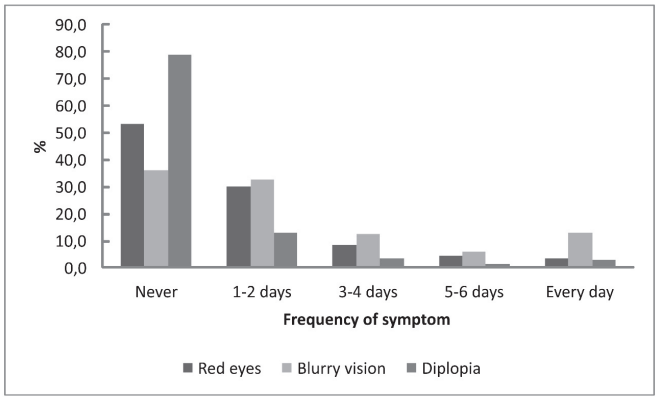

Figure 4. Frequency distribution of red eyes, blurry vision and diplopia (number of days per week) as reported by 945 bank employees.

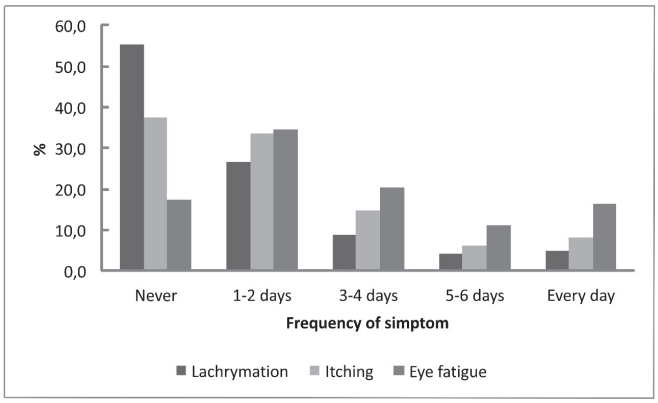

Figure 5. Frequency distribution of lachrymation, itching and eye fatigue (number of days per week) as reported by 945 bank employees.

The predominant frequency of headache, sore eyes and neck pain was 1-2 days per week (Figure 3). The frequency distribution of red eyes, blurry vision and diplopia (Figure 4) and lachrymation, itching and eye fatigue (Figure 5) was also determined.

Age over 50 years was positively associated with red eyes, blurry vision and lachrymation. A larger percentage reported red eyes 5-6 or 7 days a week ($p=0.0180$) and blurry vision every day ($p<0.0001$) in this age group than in any other age group. Likewise, lachrymation 3-4, 5-6 or 7 days a week was also more frequent in subjects over 50 years of age ($p=0.0095$). Eye fatigue and neck pain 5-6 or 7 days a week was more prevalent in subjects aged 35-50 years ($p=0.0157$) and >50 years ($p=0.0004$), compared to subjects under 35. On the other hand, no association was found between age and headache ($p=0.6780$), sore eyes ($p=0.1473$), diplopia ($p=0.3436$) or itching ($p=0.1186$).

Time and gender-related differences were also observed. Thus, sore eyes 1-2 days a week was more prevalent among women ($p<0.0001$). Likewise, blurry vision every day ($p=0.0007$), diplopia every day ($p=0.0499$), itching every day ($p<0.0001$), eye fatigue every day ($p<0.0001$) and neck pain every day ($p<0.0001$) was more frequently reported by women than by men.

Subjects reading more than 6 hours a day on weekdays were significantly more likely to have headache every day ($p=0.007$), sore eyes ≥3 days a week ($p<0.001$), blurry vision ≥5 days a week ($p=0.005$), eye fatigue ≥5 days a week ($p=0.002$) and neck pain ≥5 days a week ($p<0.001$). On the other hand, headache was the only significantly more frequent asthenopic symptom reported by subjects reading more than 6 hours a day on weekends ($p<0.001$). In addition, less than 6 hours of daily work at a computer terminal was associated with a greater percentage of subjects reporting no headache ($p<0.001$).

The frequency of red eyes, diplopia, itching and lachrymation was not significantly associated with time spent on reading and in front of the computer on weekdays and weekends.

Discussion

In clinical practice, excessive near work is generally believed to cause asthenopia and accommodative disorders. [13-14] This association has been recognized for over two centuries. Thus, in 1713 epidemiologists reported that prolonged near work produces "weakness of vision", including myopia and changes in "the tonus of the membranes and fibers of the eye". [15] This has since been confirmed by craftspeople, office workers and students who have experienced blurry vision, eye fatigue and headache after prolonged work.

With the advent of video technology and personal computers, interest in the relation between asthenopia and near vision was rekindled. In fact, ocular manifestations are the most common health problems reported by computer users.[16-18] According to Hayes et al., 64-90% of computer operators have at some point experienced asthenopic symptoms (eye fatigue, headache, ocular discomfort, dry eye, diplopia, blurry vision) after prolonged exposure.[19] These symptoms may be due to other factors or near vision abnormalities, including poor workplace organization, insufficient lubrication of the corneal surface and inadequate correction of refractive errors.[20] In addition, symptoms may stem from psychological factors, such as dissatisfaction on the job, low self-esteem and group conflicts.[9]

In this study, we found asthenopia to be more frequent among female and older bank employees, matching the findings of Mocci et al. [9] Likewise Rocha et al.[21] evaluated the incidence of eye fatigue among systems analysts in São Paulo and identified a positive association between eye fatigue and female gender. However, Bhanderi et al. [22] found no such association.

Hanne et al.[23] and Agarwal et al. [24] observed a significant difference in the prevalence of asthenopia between subjects working at computer terminals <6 versus >6 hours a day. Likewise Kanitkar et al. [25] found a direct correlation between time spent at computer terminals and ocular symptoms, and greater duration of computer use resulted in longer-lasting complaints of asthenopia, even after discontinuation of use. Many of the bankers in our cohort (27.9%) spent over eight hours a day using the computer on weekdays, and a significant association was found between the prevalence of headache and >6 hours a day working at a computer terminal. Other studies found no correlation between prolonged near work and asthenopia in bank employees. [9,22]

It should be kept in mind that neck pain in employees over 50 years of age may also be due to inadequate correction of presbyopia. Undercorrected presbyopes require greater cervical extension to obtain maximum benefit from multifocal lenses. This association may be confirmed in other study, following ophthalmological examination and, if necessary, prescription of glasses. The banks' occupational safety and health service is advised to provide annual preventive ophthalmological examinations for employees exposed to eye strain from prolonged near work.

In this study we identified a positive association between asthenopic symptoms and gender, age and time spent reading in a cohort of bank employees in Southeastern Brazil. The most

frequently reported symptoms were headache and sore eyes.

References

1. Paoli P, Parent-Thirion A. Working conditions in the acceding and candidate countries. Luxembourg: European Communities; 2003. p. 67-78.
2. Ustinavi'ien' R, Obelenis V, Ereminas D. Occupational health problems in modern work environment. Medicina (Kaunas). 2004;40(9):897-904.
3. American Optometric Association. Care of the patient with accommodative and vergence dysfunction. Optometric clinical practice guideline. St Louis: American Optometric Association; 2006.
4. Mazow ML, France TD, Finjkelman S, Frank J, Jenkins P. Acute accommodative and convergence insufficiency. Trans Am Ophthalmol Soc. 1989;87: 158-68; discussion 168-73.
5. Sauter S, Champman LJ, Knutson SJ. Improving VDT work: causes and control of health concerns in VDT use. Madison: University of Wisconsin; 1984.
6. Cline D, Hofstetter HW, Griffin JR. Dictionary of visual science. 4th ed. Radnor, Pa: Chilton; 1989.
7. Sheedy JE, Hayes J, Engle J. Is all asthenopia the same? Optom Vis Sci. 2003;80(11):732-9.
8. Daum KM, Clore KA, Simms SS, Vesely JW, Wilczek DD, Spittle BM, Good GW. Productivity associated with visual status of computer users. Optometry. 2004;75(1):33-47.
9. Mocci F, Serra A, Corrias GA. Psychological factors and visual fatigue in working with video display terminals. Occup Environ Med. 2001;58(4):267-71.
10. Hennessey D, Iosue RA, Rouse MW. Relation of symptoms to accommodative infacility of school-aged children. Am J Optom Physiol Opt. 1984;61(3):177-83.
11. Levine S, Ciuffreda KJ, Selenow A, Flax N. Clinical assessment of accommodative ability in symptomatic and asymptomatic individuals. J Am Optom Assoc. 1985 ;56(4):286-90.
12. Iribarren R, Fornaciari A, Hung GH. Effect of cumulative nearwork on accommodative facility and asthenopia. Int Ophthalmol. 2001;24(4):205-12.
13. Rosenfield M, Gilmartin B. Myopia and nearwork. Oxford, Boston: Butterworth-Heinemann;1998.
14. Ong E, Ciuffreda KJ. Accommodation, nearwork, and myopia. Santa Ana, CA: OEP Foundation Press; 1997.
15. Owens DA, Wolf-Kelly K. Near work, visual fatigue, and variations of oculomotor tonus. Invest Ophthalmol Vis Sci. 1987;28(4):743-9.
16. Collins MJ, Brown B, Bowman KJ. Visual discomfort and VDTs. National Occupational Health and Safety Commission; 1988. p.1-37.
17. Costanza MA. Visual and ocular symptoms related to the use of video display terminals. J Behav Optom. 1994;5(2):31-6.
18. Dain SJ, McCarthy AK, Chan-Ling T. Symptoms in VDU operators. Am J Optom Physiol Opt. 1988;65:162-7.
19. Hayes JR, Sheedy JE, Stelmack JA, Heaney CA. Computer use, symptoms, and quality of life. Optom Vis Sci 2007;84:739-745.
20. Rossignol AM, Morse EP, Summers VM, Pagnotto LD. Visual display terminal use and reported health symptoms among Massachusetts clerical workers. J Occup Med. 1987;29(2):112-8.
21. Rocha LE, Debert-Ribeiro M. Working conditions, visual fatigue and mental health among systems analysts in São Paulo, Brazil. Occup Environ Med. 2004;61(1):24-32.
22. Bhanderi DJ, Choudhary S, Doshi VG. A community-based study of asthenopia in computer operators. Indian J Ophthalmol. 2008;56(1):51-5.
23. Hanne W, Brewitt H. [Changes in visual function caused by work at a data display terminal]. Ophthalmologe. 1994;91(1):107-12. German.
24. Agarwal S, Goel D, Sharma A. Evaluation of the factors which Contribute to the Ocular Complaints in Computer Users. J Clin Diagn Res. 2013;7(2):331-5.
25. Kanitkar K, Carlson AN, Richard Y. Ocular problems associated with computer use: The ever-increasing hours spent in front of video display terminals have led to a corresponding increase in visual and physical ills. Rev Ophthalmol. 2005;12:4. Available from: https://www.reviewofophthalmology.com/article/ocular-problems-associated-with-computer-use

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Evaluation of knowledge of physicians with specialty in medical clinic and surgical clinic about the process of corneas donation

Avaliação do conhecimento de médicos com especialidade em clínica médica e clínica cirúrgica sobre o processo de doação de córneas

Leonardo Padilha da Rosa[1], Luiza Ventura[2], Sasckia Kadishari Medeiros Duarte[2], Augusto Adam Netto[3]

ABSTRACT

Objective: *This study aims to evaluate the knowledge of physicians trained in Internal medicine and General surgery specialties about cornea donation process clinic, as well as to assess the confidence by these professionals in this process and, if there is uncertainty, the reasons for this.* ***Methods:*** *The research is based on data collected through a questionnaire with ten multiple choice questions about the process of cornea donation, in which two questions are about confidence in the donation process. The sample consists of 60 physicians of University Hospital HU-UFSC selected for convenience and non-probability.* ***Results:*** *Respondents had a mean score of 72.2%. Regarding confidence in the donation of corneas, 41 (68.66%) feel confident in the donation process and 19 (31.33%) did not reveal safety for this condition. From the total of respondents who revealed insecurity in cornea donation process, 13 of these indicated as a contributing factor little information on the subject in college. Some relevant themes on the subject are insufficient and 31.66% of the interviewees proved insecure against a situation involving the corneal donation.* ***Conclusion:*** *This finds suggest the need to improve the level of information transmitted during the undergraduate course about the process of corneal donation in order to raise awareness, improve knowledge and promote confidence when facing a potential donor.*

Keywords: *Corneal transplantation; Medical education; Eye banks; Knowledge; Ophthalmology/education; Surveys and questionnaires*

RESUMO

Objetivo: Este trabalho tem como objetivo avaliar o conhecimento de médicos com formação nas especialidades de clínica médica e cirúrgica acerca do processo de doação de córneas, bem como avaliar a segurança por parte desses profissionais neste processo e, se há insegurança, os motivos para tal. **Métodos:** A pesquisa se baseia na coleta de dados por meio de um questionário com dez perguntas de múltipla escolha sobre o processo de doação de córneas, sendo duas perguntas sobre segurança no processo de doação. A amostra consiste em 60 profissionais médicos do Hospital Universitário HU-UFSC selecionados por conveniência e não probabilística. **Resultados:** Os entrevistados obtiveram uma média de acertos de 72,2%. Em relação à segurança no processo de doação de córneas, 41 (68,66%) referem se sentir seguros quanto ao mesmo e 19 (31,33%) revelam não ter segurança para essa condição. Do total de entrevistados que revelaram insegurança no processo de doação de córneas, 13 apontaram como fator contribuinte pouca informação sobre o assunto na faculdade. Alguns temas relevantes a respeito do assunto se mostraram insuficientes e 31,66% dos entrevistados se revelaram inseguros frente a uma situação que envolva doação de córneas. **Conclusão:** Esses achados sugerem a necessidade de melhorar o nível de informação transmitida durante o curso de graduação acerca do processo de doação de córneas, a fim de conscientizar, melhorar o conhecimento e promover segurança frente a um potencial doador.

Descritores: Transplante de córnea; Educação médica; Bancos de olhos; Conhecimento; Oftalmologia/educação; Inquéritos e questionários

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Introduction

Over the last 10 years corneal transplant has grown in Brazil. The numbers ranged from 8,713 in 2005 to 13,036 in 2014 and 6,585 between January and June 2015. Santa Catarina ranks seventh in total number of corneal transplants, with 326 transplants in the first quarter of 2015. Despite the increase in the number of donations, the total number of waiting patients in Brazil was 10,386 in June 2015[1].

Currently, the lack of donations and contraindications are not the only problems for the procedure[2], and the difficulty in identifying potential donors and the difficulty in obtaining the consent of the relatives are important obstacles for the non--implementation of the transplant process. This fact raises the importance of investigating doctors' knowledge regarding the process of corneal transplant. [3]

It is known that doctors in face of a potential donor, despite being in favor of the donation process, in most cases do not approach the relatives of the donor for authorization to remove the corneas. A study on the knowledge and opinion of intensivist physicians at Complexo Hospitalar das Clínicas of Fundação de Apoio à Universidade de São Paulo - FUSP/SP showed that about 80% of physicians never requested corneal removal, mainly due to forgetting to request the donation to the family members and lack of knowledge on how to proceed with a potential donor.[4] In addition, in relation to the families of the donors, the lack of knowledge about donation, literacy and socioeconomic status do not influence the donation process. In this case, the relation and the information provided by the physician or by the team are the central point for the success of the transplant, even in the face of family members with no prior knowledge about donation.[5]

Most deaths from brain death occur due to head trauma, stroke and brain tumor, which characterize medical emergencies. These conditions are often met by physicians with expertise in internal medicine and surgery, revealing the first professional to get in contact with a potential donor.[6] Due to that, physicians and hospital trained teams are the key to success of organ transplant procedures.

Thus, the present study aims to evaluate the knowledge of physicians trained in internal medicine and surgery in relation to the process of cornea donation at Hospital Universitário Professor Polydoro Ernani de São Thiago, in Florianópolis. The goal is also to evaluate the safety of these professionals with respect to cornea donation and, in case of unsafety, the reasons for that.

Methods

The study is transversal, observational, descriptive, and with primary data collection. The population evaluated consists of doctors with expertise in internal medicine and surgery at Hospital Universitário Professor Polydoro Ernani de São Thiago, in Florianópolis, Santa Catarina, in the year of 2014.

The research was based on data collection with an adapted questionnaire and pre-formulated by other authors in an article published in Arquivos Brasileiros de Oftalmologia[2]. The questionnaire (Appendix A) contains information of name, age, gender and education/residence. In addition, it has ten multiple-choice questions about the process of cornea donation. Of these, there are two questions about safety in the donation process, in which one of them may have more than one answer or be answered as an open question. The topics approached were: age limit of the donor, maximum time to remove corneas, conditions for donation, contraindications, and legal aspects of the transplant. The questionnaire was answered directly by the physician, with no intervention or explanation on the subject. Physicians who refused to participate in the study or who did not conclude residence in internal medicine and surgery were excluded. Blank and/or erased questions were considered incorrect.

The physicians were invited to participate in the study in their work environment, and those who accepted were briefly exposed the subject, objectives, and methods of the study. It was also explained the commitment of the researchers to follow the ethical precepts, to keep secrecy and anonymity, and to only disclose data after their consent. Data collection began after approval of the research project within the institution and at the national level, by the authorization of the research under the terms of Resolution CNS 466-12 and by Conselho Nacional de Ética em Pesquisa (CONEP). As the physician agreed, he was requested to sign the Free and Informed Consent.

The sample selected consists of 60 professionals, chosen for convenience and non-probabilistic. The reason for this is the difficulty to calculate the probabilistic sample in this case, since due to the lack of studies in this sense there is no data available regarding the expectations of correct or wrong answer to the questions presented in the questionnaire of this research. Although the superiority of the probabilistic sample is unquestionable, there are situations in which a well-conducted non-probabilistic sample can produce satisfactory results with greater agility and lower cost.[7]

The data derived from the questionnaires was stored in spreadsheets of the program Microsoft Excel® 2010, with the guarantee of anonymity to the participants.

Results

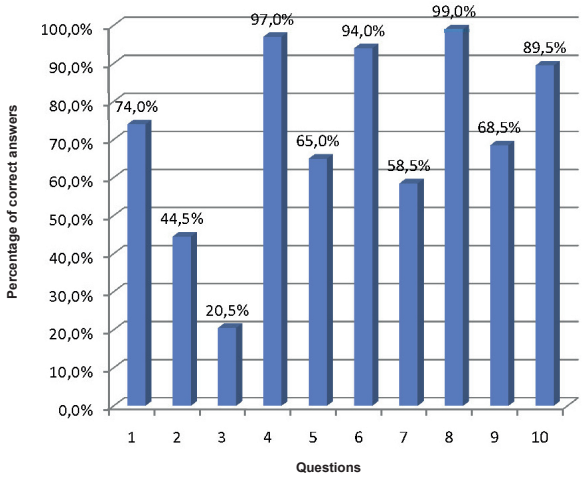
A total of 60 physicians were interviewed, of which 42 (70%) were trained in internal medicine, and 18 (30%) in surgery. The mean age was 40 years (26-62), with 37 (61.66%) males and 23 (38.33%) females. The average accuracy of the questionnaire was 72.2% among the physicians interviewed. The percentage of correct answer for each question is represented in figure 1.

If we consider the total number of interviewees, only 2 questions were identified with a percentage of correct ness of less than 50% (conditions for corneal removal and maximum time for corneal removal), 2 questions with a percentage from 50% to 70% (transplant contraindications and cornea care), and the remaining 6 questions above 70% (age limit of the donor, visually impaired persons who may donate, corpse perceptible deformity, need for the same eye color, family authorization for donation, and possibility to donate only the corneas). Table 1 presents the comparison of correct answer per question among experts in internal medicine and surgery.

Regarding safety in the cornea donation process, 41 interviewees (68.33%) reported feeling safe about the donation process, and (19) 31.66% reported not feeling safe for this condition. Of the latter, 13 (68.5%) reported as contributor factor little information about the subject during college, 4 (21%) had little contact with potential donors, and only 2 (10.5%) showed lack of interest on the subject.

Discussion

There is a relative difference between the number of potential donors and the number of donations carried out. A study at



1) Donor age limit
2) Maximum time to remove the corneas
3) Conditions to remove the corneas
4) Visually impaired can donate
5) Care with the corneas
6) Deformity perceived in the corpse
7) Contraindications of transplant
8) Need for the same eye color
9) Authorization for donation
10) Possibility to donate only the corneas

Figure 1. Average percentage of correct answers to questions of the adapted questionnaire

Table 1

Comparison of the percentage of correct answers between Internal Medicine and Surgery professionals

Questions	Internal Medicine %	Surgery %
1) Donor age limit	76	72
2) Maximum time to remove corneas	45	44
3) Conditions for the cornea removal	24	17
4) Persons with visual impairments can donate	100	94
5) Care with the corneas	52	78
6) Perceptible body deformity of the corpse	88	100
7) Transplant contraindications	45	72
8) Need for the same eye color	98	100
9) Family authorization for the donation	81	56
10) Possibility of donating only corneas	90	89

Hospital Universitário de Curitiba with 64 relatives of potential dead corneas donors interviewed demonstrated that 60 of these (93.75%) had not been approached regarding donation at the time of death, and 33 (53,3%) would have allowed the transplant.(8) Given this, we can estimate that the lack of increased donations may be a reflection of physicians' lack of preparation to identify potential donors, approach the family, and communicate the transplant coordination.(9)

In the study presented here, the overall average of correct answers among physicians was 72.2%. If we analyze the questions separately, only 23% of the interviewees answered the question regarding conditions for cornea removal, followed by 47% correct answers in the question that addresses the maximum time limit for cornea removal. On this regard, corneas and bone tissue can be removed within 6 hours after unrecoverable cardiorespiratory arrest. Unlike donation of organs with a diagnosis of brain death, in which cardiac activity is maintained, the donor with absence of heart beat may have brain death or irrecoverable brain damage associated, but in the latter, still not meeting criteria for brain death. Most of the interviewees stated that corneas could only be removed after diagnosis of brain death, that is, they did not consider corneal removal within 6 hours after cardiorespiratory arrest.(9,10) This shows another advantage of corneas over others organs, and the importance of such knowledge to facilitate the donation process.

In the question addressing infectious causes as one of the factors for contraindication to transplant, only 53% of interviewees answered it correctly. A study carried out at Hospital São Paulo to evaluate the reason for discarding corneas revealed that of the 518 eyeballs with a contraindication to be preserved 224 (43.24%) had an infectious agent in the cause of death of their donors. This is the main variable for transplant contraindication in the study. After removal, 28 (8.83%) corneas were discarded because they presented positive serology for markers that contraindicated tissue use.(11) If we take this fact into account, we have the most important reason to know in order to exclude one potential donor, and analyzing the question only about half had knowledge on that subject.

The age limit of the donor could become another impediment to the transplant process. A prospective study with a double blind controlled clinical trial which investigated the safety and efficacy of older donor tissue compared to young donor tissue demonstrated that if endothelial cell counts are satisfactory and storage is performed correctly, the age of the donor does not interfere with the success of the procedure.(12) Thus, about 77% of the interviewees answered the question about this subject, in which the donor's age did not influence the process, but only the condition of the corneas and their post-removal care.

The question about perceptible deformation in the corpse after eye enucleation is liable to criminal penalties, that is, failure to recompose the corpse and give it a proper appearance to be buried, or failure to deliver or delay its delivery to the family is provided for in Article 19 of Law No. 9,434 of 1997.(13) The rate of correct answer for this question reached 92% of the interviewees, which is very important, since one of the main causes of non-authorization of the family for the donation process is the fear of mutilation of the corpse.(14)

When we address questions about visually impaired people and the need to have the same eye color to be a cornea donor, we have a rate of 98% correct answer for both questions. Despite the small the number of interviewees who did not know about

said conditions, this subject is related simply to the anatomy of the eyeball, that is, a subject addressed in the academic formation during the graduation period. However, when these two questions were applied to medicine students divided into two groups (one who had already studied ophthalmology and other who hadn't), the results showed a greater number of correct answers among those who had already studied the subject for the question about the need to have the same eye color for the transplant. When analyzing the visual impairments in the donation process, there are no statistical differences between the groups.[2]

Regarding family authorization, it was from Law No. 10.211 of 2001 that the authorization of the spouse or relative of legal age, extended to the second degree to decide about the transplant after death, was necessary. It is also provided in article 2 of the same law that the manifestations of will related to the postmortem removal of tissues and organs mentioned in the civil identity card and the national driver's license lose their validity.[15] The question addressing this issue had 73% of correct answers, but about 27% answered that the patient should leave an authorization in life to be a cornea donor. The wrong answers in this question may be related to a law change, because since 2001 the informed consent is in force in Brazil, that is, the decision to donate organs is made by the closest relatives of the potential donor, not by the patient's decision in life, even if expressed in identity documents.[15] In the question about the possibility of donating only corneas, about 90% were aware of this condition. In a study about the intention to donate organs after brain death, of the 136 individuals interviewed, 72% were favorable both to donating their own organs and to donating organs from first-degree relatives. [16] Thus, family authorization is mandatory for organ donation from a cadaver donor.

When we discuss the theme of safety for donation, 68.33% of interviewees felt safe to engage in a cornea donation process. A study carried out with intensivist physicians revealed that 64% felt capable of clearing the doubts of donors involved in the transplant, and 57% of the interviewees had already made a request involving the process of cornea donation.[17] In our study, of the 31,66% physicians interviewed [19] feeling insecure, 13 pointed out that this topic was not discussed in college, 4 had no contact with potential donors, and only 2 had no interest on the subject. Although part of the respondents feel safe regarding the donation process, we can deduce that there is a deficiency on the subject at medical schools. In another study with intensivist physicians, about 80% of interviewees had never participated in a donation process. The reasons for this would be forgetting to address the family and lack of knowledge that grant conditions to deal with a potential donor.[4]

Although there is a high rate of correct answers to some questions, there is a low average of correct answers on key topics about the cornea transplant process. This confirms the need to improve the discussion in medical education to promote knowledge and safety in face of a donation situation. It has been shown that a high positive response (71.5%) can be obtained from the donor family when a trained and motivated group manages the post-mortem cornea donation request. This acceptance was mainly facilitated by the awareness and motivation of the employees of the hospital and the doctor's experience on the subject after the death of the donor.[18]

Conclusion

Although this study has obtained an average of satisfactory correct answers in the questionnaire about the cornea donation process, some relevant topics on the subject proved insufficient, and one third of the interviewees has proved insecure facing a situation involving cornea donation. The main reason of this insecurity would be the lack of information during college. This fact implies the need to discuss the subject in the ophthalmology course during graduation, in order to raise awareness, improve knowledge and give safety when facing a potential donor. This way, we will have the bases to increase the number of cornea transplants.

References

1. Associação Brasileira de Transplantes de Órgãos (ABTO). Dados numéricos da doação de órgãos e transplantes realizados por estado e instituição no período: janeiro / junho 2015. Registro Brasileiro de Transplante. [citado 2016 junho 30]; 21(2):13-16. Disponível em: http://www.abto.org.br/abtov03/Upload/file/RBT/2015/rbt2015-1sem-lib2907.pdf
2. Espindola RF, Rodrigues BA, Penteado LT, Tan Ho G, Gozzan JA, Freitas JA. Conhecimento de estudante de medicina sobre o processo de doação de córnea. Arq Bras Oftalmol. 2007;70(4)581-4.
3. Muraine M, Toubeau D, Menguy E, Brasseur G.The analysing the various obstacles to cornea postmortem procurement. Br J Ophthalmol.2002;86(8):864-8.
4. Alves MR, Crestana FP, Kanatani R, Cresta FB, Kara-jose N. Doação de córneas: opinião e conhecimento de médicos intensivistas do Complexo Hospital das Clinicas da Faculdade de Medicina da Universidade de São Paulo. Rev Med. 1997;76(6):315-9.
5. Tandon R, Verma K, Vanathi M, Pandey RM, Vajpayee RB. Factors affecting eye donation from postmortem cases in a tertiary care hospital. Clin Sci. 2004;23(6): 597-601.
6. Schein AE. Avaliação do conhecimento de médicos intensivistas de Porto Alegre sobre morte encefálica [dissertação]. Porto Alegre: FAMED; 2006.
7. Curwin J, Slater R. Quantitative Methods for Business Decisions. 3a ed. Virginia: Chapman & Hall; 1991.
8. Issaho DC, Tenorio MB, Moreira H. Principais variáveis envolvidas na não-doação de córneas de potenciais doadores em um hospital universitário de Curitiba. Arq Bras Oftalmol. 2009; 72(4): 509-14.
9. Boni RC, Net M, Arranz AR, et al. Doador sem batimentos cardíacos. In: Garcia VD, Abud MF, Neumann, JJ. Transplante de órgãos e tecidos. 2a ed. São Paulo: Segmento Farma; 2006. p.103-6.
10. Chaib E. Non heart-beating donors in England. Clinics.2008;63(1):121-34.
11. Santos CG, Pacini K M, Adan CB, Sato EH. Motivos do descarte de córneas captadas pelo banco de olhos do Hospital São Paulo em dois anos. Rev Bras Oftalmol. 2010; 69 (1):18-21.
12. Mannis MJ, Holland EJ, Beck RW, Belin MW, Goldberg MA, Gal RL, et al. Clinical profile and early surgical complications in the Cornea Donor Study. Cornea. 2006;25(2):164-70.
13. Brasil. Lei nº 9.434, de 4 de Fevereiro de 1997. Dispõe sobre a remoção de órgãos, tecidos e partes do corpo humano para fins de transplante e tratamento e dá outras providências. [citado 2014 Out 12]. Disponível em:http://www.planalto.gov.br/ccivil_03/leis/l9434.htm.
14. Giana GD, Caregnato RC. Doação de órgãos e tecidos para transplante: recusa das famílias. Texto Contexto Enferm. 2010; 19(4):728-35.
15. Brasil. Lei nº 10.211, de 23 de março de 2001. Altera dispositivo da Lei nº 9.434, de 4 de fevereiro de 1997, que dispõe sobre a remoção de órgãos, tecidos e partes do corpo humano para fins de transplante e tratamento [citado 2014 Out 12]. Disponível em: http://www.planalto.gov.br/ccivil_03/leis/Mensagem_Veto/2001/Mv252-01.htm

16. Teixeira RK, Gonçalves TB, Silva JA. A intenção de doar órgãos é influenciada pelo conhecimento populacional sobre morte encefálica? Rev Bras Ter Intensiva. 2012; 24 (3):258-62.
17. Rodrigues AM, Sato E. Entendimento dos médicos intensivistas sobre o processo de doação de córneas. Arq Bras Oftalmol. 2003; 66(1):29-32.
18. Muraine MM, Menguy EM, Martin JM, Sabatier P, Watt L, Brasseur G. The interview with the donor's family before postmortem cornea procurement. Cornea. 2000; 19(1):12-6.

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Appendix A

Questionnaire

Universidade Federal de Santa Catarina
Health Sciences Center
Graduation Course in Medicine

Study: Evaluation of knowledge of physicians with specialty in medical clinic and surgical clinic about the process of corneas donation.
This questionnaire seeks to obtain information about the epidemiological profile of the interviewee, such as sex, gender, education/residence, as well as to evaluate their knowledge regarding the cornea donation process through 10 multiple choice questions on the subject. Each question contains only one correct answer and, if erased, it will be considered wrong. There are two questions about safety in the donation process, in which one of them may have more than one answer or be answered as an open question.

Number of the interviewee: _____
Name: _____
Name of interviewer: _____

Gender of the interviewee — **Gender** ( )
(1) Male
(2) Female

Age of the interviewee — **Age** ( )

Education/Residence — **Education**

Qual o limite de idade para ser doador de córneas? — **Limit** ( )
(1) 20 years
(2) 40 years
(3) 60 years
(4) There is no limit

What is the maximum time for the corneas to be removed from a donor? — **Time** ( )
(1) 1h
(2) 2h
(3) 6h
(4) 24h
(5) There is no maximum time

What are the conditions under which the corneas can be removed for donation? — **Removal** ( )
(1) In living donor
(2) When the donor is in a coma
(3) They may be removed in case of cardiorespiratory arresta
(4) Only in case of brain death

Can a visually impaired (eg.: myopia, hyperopia, astigmatism) be a donor? — **Impaired** ( )
(1) Yes
(2) No

When a donor dies, what care is needed to keep the corneas proper for transplant? — **Care** ( )
(1) Keep the eyelids closed
(2) Keep the eyelids open and covered with gauze soaked in saline solution
(3) No need for special corneal care

Is there noticeable deformation of the corpse after corneal removal? — **Removal** ( )
(1) Yes
(2) No

Which of these diseases contraindicate cornea donation? (1) Myocardial infarction (2) Diabetes mellitus (3) Arterial hypertension (4) Infectious diseases (5) No disease makes donation impossible	**Contraindication** ( )
Does the donor's eye color need to be the same as the recipient's? (1) Yes (2) No, but they must have similar shades (3) No	**Eye color** ( )
How can I be a cornea donor? (1) Inform my family of my desire, as authorization depends on it? (2) Written authorization of the donor in a document registered at a notary's office or in a driver's license (3) Authorization is not required because removal is imperceptible by the family	**Donor** ( )
Can I be a donor exclusively for corneas, and not other organs and tissues? (1) Yes (2) No, because when you are a donor all tissues and organs that can be transplanted are removed.	**Exclusively** ( )
Do you feel safe in proceeding with a cornea donation process? (1) Yes (2) No	**Procced** ( )
If you are insecure, which of the factors contribute to this? (More than one item can be marked).. (1) Little contact with potential donors (2) Little information on the subject in College (3) Lack of interest by the subject. Other, which?	**Insecuritya** ( )

Frequency and ethiological frequency of congenital cataract associated with microphthalmia and postoperative visual results.

Frequência da microftalmia associada à catarata congênita, sua frequência etiológica e o resultado visual pós-cirúrgico

Silvia Prado Smit Kitadai[1], Mauro Nishi[2]

ABSTRACT

Objective: *To determine the frequency of microphthalmia associated with congenital cataract and its etiological frequency. Compare the result of visual acuity in aphakic microphthalmus eyes, with the visual acuity result obtained in non microphthalmus eyes.* ***Methods:*** *Retrospective study of 76 patients with microphthalmia and congenital cataract, selected after analysis of 1050 medical records of patients seen in congenital cataract clinic of UNIFESP. All patients underwent complete ophthalmologic examination and microphthalmia determined by ultrasound biometry. Investigations were made to clarify the etiological cause. The postoperative visual outcome of Group I (with microphthalmia) was faced with the visual results obtained in Group II (control group without microphthalmia).* ***Results:*** *The anteroposterior diameter of microphthalmus eyes ranged from 13 to 21 mm. The etiological frequency of microphthalmia and congenital cataract was distributed as follows: infectious diseases (55.3%), idiopathic (26.3%), colobomas (7.9%), hereditary (6.6%), persistent hyperplastic vitreous (2.6%) and linked to the Lenz's syndrome (1.3%). The visual acuity in aphakic eyes that reached better view and or equal to 20/200 was 68.3%.* ***Conclusion:*** *The frequency of microphthalmia associated with congenital cataract was 7.23%. The etiological occurred more frequently in infectious disease (55.3%). The aphakics eyes with microphthalmia tend to have worse visual acuity results than the eyes without microphthalmia. If we consider the visual results same and above 20/200 as successful in this search, aphakic eyes with microphthalmia that hit these indices are 68.3%.*

Keywords: *Cataract/congenital; Congenital abnormalities; Aphakics , postcataract; Microphthalmus*

RESUMO

Objetivo: Determinar a frequência da microftalmia associada à catarata congênita e sua frequência etiológica. Comparar o resultado visual após a cirurgia da catarata congênita em olhos microftálmicos, com o resultado visual obtido em olhos não microftálmicos. **Método:** Estudo retrospectivo de 76 pacientes portadores de microftalmia e catarata congênita, selecionados após análise de 1050 prontuários dos pacientes atendidos no ambulatório de catarata congênita da UNIFESP. A microftalmia foi determinada pela ecobiometria ultrassonica. Exames oculares e complementares foram feitos para esclarecer a causa etiológica. O resultado visual pós- operatório do Grupo I (com microftalmia) foi confrontado com o resultado visual obtido no Grupo II (sem microftalmia). **Resultados:** O diâmetro ântero-posterior dos olhos microftálmicos variou de 13 à 21 mm. A frequência etiológica da catarata congênita associada aos olhos microftálmicos foi assim distribuída: doenças infecciosas (55,3%); seguidos de idiopáticas (26,3%), colobomas (7,9%), hereditárias (6,6%), persistência do vítreo primário hiperplásico (2,6%) e associada à síndrome de Lenz (1,3%) .A frequência da microftalmia foi de 7,23 %. 68,3% de olhos afácicos microftálmicos atingiram visão melhor e ou igual à 20/200. **Conclusão:** A frequência da microftalmia associada à catarata congênita foi de 7,23%. A maior frequência etiológica ocorreu nas doenças infecciosas (55,3%), Embora os olhos microftálmicos tenham tendência para piores resultados visuais quando comparados aos não microftálmicos, nesta pesquisa os olhos microftálmicos afácicos que atingiram visão melhor ou igual a 20/200 foram de 68,3%.

Descritores: Catarata/congênito; Anormalidades congênitas; Afacia pós- catarata; Microftalmia

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Introduction

Microphthalmia is a congenital malformation in which the volume of the ocular bulb is reduced. A microphthalmic eye is one whose axial diameter is less than 16 mm in the newborn.[1]

It can be classified according to the appearance of the ocular bulb. We call simple microphthalmia those eyes that are anatomically normal, except for the reduced antero-posterior diameter with high hypermetropia, and complex microphthalmia those eyes that, in addition to the reduced diameter, present either anterior segment malformation or anomalies in the posterior segment.[2-4]

Although all microphthalmos originate in embryonic life, they can differ in the time of onset in the embryogenesis, generating distinct anomalies between the affected eyes. Thus, we have three possibilities for the onset of microphthalmia during ocular formation. The first possibility arises when crystalline malformation occurs. The presence of the crystalline is a determinant factor for ocular growth in embryogenesis, and factors interfering in its formation can generate microphthalmic eyes early in pregnancy. A second possibility of microphthalmia onset is at the time of embryonic fissure closure, which is incomplete and causes coloboma to interfere with ocular growth. Finally, the third possibility of microphthalmia onset would be the persistence of the primary hyperplastic vitreous that occurs at later embryonic time.[5-8]

It is known that visual deprivation during the first months of the child's life caused by the presence of congenital cataract leads to an amblyopia of difficult reversion if not operated during the critical period of the development of the fixation reflex. When congenital cataract is associated to microphthalmia the treatment becomes even more difficult, discouraging many ophthalmologists to invest surgically in the visual recovery. [9]

This study aims to determine the frequency of microphthalmia associated to congenital cataract and its etiological frequency, and to evaluate the outcome of visual acuity after congenital cataract surgery in these microphthalmic eyes.

Methods

The patients included in this retrospective study came from Ambulatório de Catarata Congênita of Universidade Federal de São Paulo (UNIFESP). From December 1989 to December 1998, 1050 children were treated, and 76 of them had congenital cataract associated to unilateral or bilateral microphthalmia. Within this group of 76 patients, 38 children could not be operated because they had very small eyes, colobomas compromising the macula, and inoperable retinal detachment. However, the other 38 children (60 eyes) were operated on and composed Group I of this study. Group II control consisted of 31 children (51 eyes) of the same ambulatory who had unilateral or bilateral congenital cataract, but without microphthalmia or other ocular conditions. Group control underwent the same surgical techniques, had free visual axis and a minimum follow-up of 3 years.

All patients underwent complete ophthalmologic examination, as well as measurement of antero-posterior diameter by biometry (A-scan ultrasound echobiometry, Humphrey Ultrasound biometre model 820, Humphrey Instruments, USA). An average reading was obtained after 3 readings of the antero-posterior diameter of the eye, and compared with the Sampaolesi axial length frame for normal children.[10,11]

Microphthalmic eyes were those whose measurement was two standard deviations below the normal range for the age. The horizontal diameter of the cornea was measured by a millimeter ruler.

All children underwent preoperative exams and investigation of the possible etiological causes of cataract and microphthalmia, including serologies, metabolic exams and genetic search.

The surgical techniques used in the microphthalmic eyes were extra capsular facectomy without intraocular lens implantation and with small primary posterior capsuloctomy without anterior vitrectomy in 55 eyes, and lensectomy with anterior vitrectomy without intraocular lens implant in 5 eyes. Group II control underwent lensectomy without prior vitrectomy and without intraocular lens implant.

In the postoperative period, antibiotic and corticoid eyedrops, cyclopentolate, and dorzolamide hydrochloride hypotensive eyedrops were used for one month after surgery. In bilateral cataracts, eyeglasses were prescribed in the first week after surgery, and for monoculars gelatinous contact lens, daily use of diameter 10.5 mm in 3 options of base curves, ranging from 38.00 to 48.00 diopters (Solótica, São Paul), or eyeglasses to wear during the period of occlusive treatment. The visual acuity was evaluated with the best optical correction on Teller cards for nonverbal children, and on the Snellen table for verbal children. The longest segment was 10 years, and the shortest segment was 8 months.

The statistical methods applied were:

- Analysis of variance by Kruskal-Wallis stations to compare the values of the antero-posterior diameter of the eyes between the different etiologies. This analysis was supplemented, where necessary, by the multiple comparison test.

-Chi-square test or Fisher's exact test to compare Group I and Group II

-Non-parametric test for "k" Kruskal-Wallis independent samples supplemented, where necessary, by the multiple comparison test to evaluate possible differences in visual acuity in each one of Groups I and II in different etiologies, age group and laterality

Non-parametric test for two independent Mann-Whitney samples to compare Groups I and II for age and laterality in each etiology.

The level of rejection for the null hypothesis was always set at a value less than or equal to 0.05%.

Results

Of the 1,050 patients seen at the congenital cataract ambulatory of UNIFESP- Universidade Federal de São Paulo, 76 presented complex microphthalmia. The frequency of microphthalmia associated to congenital cataract was 7.23%.

Of the 76 patients with this condition, 40 (52.6%) were males and 36 (47.4%) were female.

Thirty-nine patients had microphthalmia and bilateral congenital cataract (78 eyes), and 37 unilateral patients, with a total of 115 eyes.

The horizontal diameter of the cornea ranged from 5 to 10 mm: 15 eyes (13%) from 5 to 6 mm; 62 eyes (54%) from 7 to 8 mm, and 38 eyes (33%) from 9 to 10 mm. The antero-posterior diameter of the ocular bulb of these same eyes ranged from 13 to 21 mm, with the following distribution: 3 eyes (2.7%) from 13 to 14 mm; 53 eyes (46%) from 15 to 17 mm; 49 eyes (42.6%) from

18 to 19 mm, and 10 eyes (8.7%) from 20 to 21 mm.

The frequency of etiological diagnoses of patients with microphthalmia and congenital cataract was: infectious diseases with 42 (55.3%) cases; 20 (26.3%) idiopathic cases; 6 cases (7.9%) associated to coloboma; heredity with 5 (6.6%) cases; persistence of the primary hyperplastic vitreous with 2 (2.6%) cases, and associated to syndromes with 1 (1.3%) case. The descending order of the average of antero-posterior diameters (mm) of the microphthalmic eyes was: hereditary 18.80; persistence of the primary hyperplastic vitreous 18.74; colobomas 18.08; idiopathies 18.05; Lenz's syndrome 17.82; rubella 17.77; toxoplasmosis 17.26, and cytomegalovirus 15.30.

Table 1 shows the antero-posterior diameters of microphthalmic eyes separated by etiology; the statistical analysis showed

Table 1

Values of the antero-posterior diameter (in millimeters) of the eyes with microphthalmia and congenital cataract in different etiologies

Rubella	Toxoplasmosis	Hereditary	Colobomas	Idiopathic	CMV	PVPH	Lenz Sind.
Average							
17,77	17,26	18,81	18,08	18,05	15,30	18,74	17,82

Analysis of variance by Kruskal-Wallis stations
(Rubella x Toxoplasmosis x Hereditary x Coloboma x Idiopathic x CMV x PVPH x Syndrome)

H calc=14.27* H crit.= 14.07

Multiple comparisons

CMV lower hered and PHPV

CMV- Citomegalovirus PHPV - Persistent hyperplastic primary vitreous

Table 2

Frequency of patients with microphthalmia and congenital cataract (Group I) and congenital cataract without microphthalmia (Group II), according to the etiology. In parentheses the percentage of participation of each Group

Etiologies	Group I		Group II		Total	
	N	%	N	%	N	%
Rubella	17	(44,73)	8	(25,80)	25	(36,23)
Toxoplasmosis	6	(15,78)	0	(0,0)	6	(8,70)
Syndrome	1	(2,63)	1	(3,23)	2	(2,90)
Hereditary	4	(10,53)	6	(19,35)	10	(14,49)
Idiopathic	10	(26,32)	16	(51,61)	26	(37,68)
Total	**38**	**(100,0)**	**31**	**(100,00)**	**69**	**(100,0)**

Table 3

Frequency of patients with microphthalmia and congenital cataract (Group I) and congenital cataract without microphthalmia (Group II), according to the morphological types of cataract. In parentheses the percentage of participation of morphological types in each Group

Morphological types of cataract	Group I		Group II	
	N	%	N	%
Lamellar	10	(16,67)	8	(15,69)
Nuclear	10	(16,67)	6	(11,76)
Polar	4	(6,67)	4	(7,84)
Total	36	(60,00)	33	(64,71)
Total of eyes	**60**	**(100,00)**	**51**	**(100,00)**

Chi-square test

X^2 calc=0,63 N. S. X^2 critical= 7,82

that the average of the antero-posterior diameter of the eyes with cytomegalovirus (15.30 mm) was significantly lower than the average of the hereditary microphthalmia (18.80 mm) and the eyes with persistence of the primary hyperplastic vitreous (18.74 mm).

Tables 2, 3 and 4 present the characteristics of patients with microphthalmia and congenital cataract (Group I), comparing them to those with congenital cataract without microphthalmia (Group II), according to the etiology, morphological type of congenital cataract, and the type of strabismus, respectively.

Table 5 compares Groups I and II that underwent congenital cataract surgery according to the antero-posterior diameter of the eye and the horizontal diameter of the cornea. In Group I, the antero-posterior diameter was significantly lower (average 18.18 mm) than the eyes in Group II (average 21.80 mm). The horizontal diameter of the corneas of the operated microphthalmic eyes was also statistically smaller (average 8.15 mm) than the non-microphalic eyes (average 10.31 mm).

Table 6 shows the results of the bilateral aphakic eyes of the Group I versus Group II operated until the fourth month of life in the different etiologies. Similar results were obtained between the two Groups for rubella, heredity and idiopathic etiology. Group II

Table 4

Frequency of patients with microphthalmia and congenital cataract (Group I) and congenital cataract without microphthalmia (Group II), according to the types of strabismus. In parentheses the percentage of participation of types of strabismus in each Group

Types of strabismus	Group I		Group II	
	N	%	N	%
Esotropia	20	(52,63)	9	(29,03)
Exotropia	10	(26,31)	9	(29,03)
Centered reflection	8	(21,05)	13	(41,93)
Total of cases	**38**	**(100,00)**	**31**	**(100,00)**

Chi square test

X^2 calc= 4,75 N. S. X^2 critical=5,99

Table 5

Antero-posterior (AP) diameter of the eye and horizontal (H) diameter of the cornea (in millimeters) of patients with microphthalmia and congenital cataract (Group I) and with congenital cataract without microphthalmia (Group II)

Diameter	AP of the eye (mm)		H diameter of the Cornea (mm)	
	Group I	Group II	Group I	Group II
Average	18,18	21,80	8,15	10,31

Mann- Whitney Test

AP Diameter of the eye
Z calc= 6,492*

Horizontal diameter of the cornea
z calc= 9,155*

Table 6

Comparison of the average visual acuities of microphthalmic, bilateral aphakic eyes (Group I) and non-microphthalmic eyes (Group II) operated until the fourth month of age in different etiologies

	Group I	Group II	Mann Whitney VC	U	SIG.
Rubella	20/166	20/97	8,0	14,0	NS
Hereditary	20/305	20/315	0,0	4,0	NS
Idiopathic	20/186	20/78	2,0	3,0	NS
Syndrome	20/2000	20/85	0,0*	0,0	*

VC= value calculated U= critical value SIG.= significance NS= non-significant

presented a significantly better result in Down's Syndrome than in Lenz's syndrome, which was microphalic. There is a tendency for the best visual result of rubella patients in Group II when compared to Group I, suggesting a worse visual result in microphthalmic eyes. This trend was also observed in the idiopathic etiology, as a worse visual result of Group I (microphthalmic) was observed compared to Group II (non-microphthalmic).

Table 7, compares the results of the visual acuities of microphthalmic eyes in Group I and non-microphthalmic in Group II bilaterally operated until the fourth month of age, showing statistically similar visual results. Heritable etiologies and the other etiologies could not be compared due to the small number of the sample.

Table 8 presents the visual results of aphasic eyes in Group I versus Group II operated after 4 months of age. Due to the very large variability of results, they could not be analyzed. Regarding rubella, Group II (non-microphthalmic) showed a tendency to present better results than Group I (microphthalmic).

Table 9 presents the percentage of apophysic microphalic eyes in the various etiologies that reached visual acuity greater or equal to 20/200, and which was considered as a good result of visual acuity in these microphthalmic eyes. The greatest number of good results occurred in rubella (82.7%). In hereditary, the index was (75%), in idiopathic (58.3%), and in toxoplasmosis (44.4%).

Discussion

It is believed that the frequency of microphthalmia associated to congenital cataract (7.23%) found in this study is due to Ambulatório de Catarata Congênita of UNIFESP be a specialty and reference service for treatment. To date, no data on the incidence and/or prevalence of microphthalmia associated to congenital cataract has been known in other medical services

Table 7

Comparison of the average visual acuities of microphthalmic, bilateral aphakic eyes (Group I) versus non-microphthalmic eyes (Group II) operated until the fourth month of age in different etiologies

	Group I	Group II	Mann VC	Whitney U	SIG.
Rubéola	20/145	20/180	17,0	36,0	NS
Hereditária	20/92	20/173	5,0	10,0	NS

VC= value calculated U= critical value SIG.= significance NS= non-significant

Table 8

Comparison of the average visual acuities of microphthalmic, unilateral aphakic eyes (Group I) versus non-microphthalmic eyes (Group II) in patients operated until the fourth month of age in different etiologies

	Group I	Group II	Mann VC	Whitney U	SIG.
Rubella	20/2598	20/72	0,0	0,5	NS
Idiopathic	20/350	20/778	4,0	14,0	NS

VC= value calculated U= critical value SIG.= significance NS= non-significant

Table 9

Percentage (%) of aphakic microphalic eyes that reached visual acuity greater or equal to 20/200 in the various etiologies

Etiologies	Nº of patients	Nº of eyes operated	Nº of eyes with vision >20/200	% in each etiology
Rubella	17	29	24	82,7
Toxoplasmosis	6	9	4	44,4
Hereditaries	4	8	6	75,0
Idiopathics	10	12	7	58,3
Syndrome	1	2	0	0
Total	38	60	41	68,3

in Brazil. In this investigation, infectious diseases present a very high frequency (55.3%) in the etiology of congenital cataract associated to microphthalmia, unlike developed countries such as the United States, where the frequency of congenital cataract with microphthalmia is mainly due to heritable causes.[12-14]

The difference between microphthalmic eyes with involvement of the posterior segment or the anterior segment gives distinct characteristics that will interfere with the conduct, the choice of the surgical technique and the visual recovery. Therefore, it is very important to know the etiologic cause of microphthalmia and the degree of involvement of other ocular structures.

Tables 2 and 3 show Groups I (with microphthalmia) and II (without microphthalmia) regarding the etiologies and morphological type of the congenital cataract. Note that in both groups there was a greater number of total cataracts that are more amblyopic, which would determine a worse visual result.[15]

Diagnosing microphthalmia only by the presence of microcornea or high hyperopia is a mistake that confuses the definition itself. The ocular echobiomentry is important to make the differential diagnosis between microcornea and microphthalmia, because the presence of microcornea is not necessarily accompanied by microphthalmia, and the eye may have a normal antero-posterior diameter or even increased for the age group. Table 4 presents the measurements of the horizontal diameters of the corneas of the eyes of Groups I and II, and it shows that the average of the corneas of the microphthalmic eyes was 2.16 mm, smaller than the average of the non-microphthalmic ones. The average antero-posterior diameter of the microphthalmic eyes was 3.62 mm, smaller than the non-microphalic ones. These data are consistent with the literature, in which the antero-posterior diameter of the microphthalmic eye is on average 3.1 ± 0.7 mm smaller than that of the non-microphthalmic eye.[3,4]

Microphthalmic eyes with congenital cataracts are usually accompanied by microcorneas, probably because in the embryogenesis the crystalline early induces the formation of the anterior epithelium of the cornea. The delay or malformation of the crystalline, in addition to causing the onset of the cataract, induces the formation of microcorneas and the development of sclera in place of the cornea (sclerocornea).[5]

As the incidence of microphthalmia in the population is low, from 0.22/1000 to 1/2,000 live births, and the incidence of microphthalmia associated to congenital cataract (although unknown) should be even lower, it is difficult to have prospective studies.[14,16]

For this reason, this 10-year retrospective study was performed, and although the number of complex microphthalmic eyes was sufficient to verify certain aspects such as the etiological frequency, the antero-posterior diameter of the eye, and the horizontal diameter of the cornea, it was difficult to statistically evaluate the visual result, because there was reduction of the sample when the operated eyes were separated in the several variables that interfere in the final visual acuity after the surgery of congenital cataract.[17]

Another aspect that interfered in the visual result was the fact that children with microphthalmia whose cataracts with a greater chance of a better postoperative visual prognosis arrived after the 4 months of age at the specialized service because they were discouraged to have the congenital cataract surgery of the microphthalmic eye. We know that after 4 months, especially in unilateral cases, the recovery of amblyopia becomes difficult due to the closing of the critical period for the development of the fixation reflex.[18-24]

Table 6, 7 and 8 present the average visual acuities obtained in the different etiologies and regarding laterality in Groups I and Groups II before and after the 4 months of age. Due to the small sample of unilateral cases, it was difficult to statistically evaluate the visual outcome.

It is known that children with bilateral total congenital cataracts who only perceive the existence of light have serious limitations to their development and condition of life. In this study, children with microphthalmia and congenital cataracts who had a postoperative visual result equal to or better than 20/200 in both eyes were considered successful because they had a radical change in their quality of life. They became independent in the activities of their daily tasks and had a satisfactory development, being able to study with simple adaptations to overcome their visual limitations, like sitting in the first row of the class, using pencils and pens with thick tips, and having their lessons with bigger letters. Some have benefited from close additions of more than +3.00 DE.

Table 9 shows the operated microphthalmic eyes, and the majority (68.3%) had a visual result equal to or better than 20/200. Even in monocular cases with 20/200, the child gained visual field.

We emphasize that the microphthalmic eyes are not all of the same nature, and those eyes presenting the anterior segment compromised, i.e., with microcornea, cataract and aniridia, are distinct from the eyes with microphthalmia by alterations in the posterior segment, such as colobomas and persistence of the primary hyperplastic vitreous. Therefore, we must evaluate the surgical limitations of congenital cataract in microphthalmic eyes and their possibilities of visual recovery.

Conclusion

The frequency of microphthalmia associated to congenital cataract was 7.23% in the ambulatory of congenital cataract of UNIFESP, with infectious diseases being the most frequent etiology. Although the microphthalmic eyes operated of congenital cataract tend to have worse visual acuity results than non-microphalic eyes, and if we consider visual results equal to and above 20/200 as successful, in the present study the aphthic microphalic eyes reaching these indices in the various etiologies were 68.3%.

References

1. Larsen JS. The sagital growth of the eye II. Ultrasonic measurement of the axial length of the eye from birth to puberty. Acta Ophthalmol (Copenh). 1971;49(3):427-40.
2. Bateman JB. Microphthalmos. Int Ophthalmol Clin. 1984;24(1):87-107.
3. Weiss AH, Koussef BG, Ross EA, Longbotton J. Complex microphthalmos. Arch Ophthalmol. 1989;107(11):1619-24.
4. Weiss AH, Koussef BG, Ross EA, Longbotton J. Simple microphthalmos. Arch Ophthalmol. 1989;107(11):1625-30.
5. Coulombre AJ, Coulombre JL. Mechanisms of ocular development. Int Ophthalmol Clin. 1975;15(1):7-18.
6. Capella JA, Kanfan HE, Lill FJ, Cooper G. Hereditary cataracts and microphthalmia. Am J Ophthalmol. 1963;56:454-8.
7. Fujika K, Nakajima A, Yasuda N. Genetic analysis of microphthalmos. Ophthalmol Pediatr Genet. 1982;1:139-49.
8. Mann I. The developmental abnormalities of the eye. Philadelphia: JB Lippincott; 1957. p.60,94,113,235,315.
9. Arieta CE, Kara-José N. Catarata congênita: dificuldades no tratamento. Arq Bras Oftalmol. 1990;50(3):116-9.
10. Sampaolesi R. Ultrasonidos en oftalmologia. Buenos Aires: Editora Medica Panamericana; 1984. 503p.

11. Betinjane AJ, Carvalho CA. Variações da biometria ultra-sonográfica, em olhos normais nos primeiros 50 meses de idade. Arq Bras Oftalmol. 1983;46(4):96-9.
12. Kitadai SPS, Bonomo PP. Catarata congênita frequência etiológica. Arq Bras Oftalmol. 1992; 57(6):404-6.
13. Elder MJ. Actiology of severe visual impairment and blindness in microphthalmos. Br J Ophthalmol. 1994;78(5):332-4.
14. Lambert N, Strebel P, Orenstein W, Icenogle J, Poland GA. Rubella. Lancet. 2015;385(9984):2297–2307.
15. Maina K, Lakshmi N. Microphthalmia and microcornea: in congenital cytomegalovirus. Indian J Ophthalmol. 2009;57(4):323.
16. Greenwald MJ. Visual development in infancy and childhood. Pediatr Clin North Am. 1983;30(6):977-93.
17. Singh YP, Gupta SL, Jain IS, Gupta A, Bhakoo ON. Congenital ocular abnormalities of the new born. J Pediatr Ophthalmol Strabismus. 1980;17(3):162-5.
18. Parks MM Johnson DA, Geed GW. Long-term visual results and complications in children with aphakia. Ophthalmology. 1993;100(6):826-40; discussion 840-1.
19. Rajavi Z, Mokhtari S, Sabbaghi, H, Yaseri M. Long-term visual outcome of congenital cataract at a tertiary referral center from 2004 to 2014. J Curr Ophthalmol. 2015;27(3-4):103-9.
20. Hoyt CS, Nickel B. Aphakic cystoid macular edema: occurrence in infants and children after transpupillary lensectomy and anterior vitrectomy. Arch Ophthalmol. 1982;100(5):746-9
21. Karr DJ, Scott WE. Visual acuity results following treatment of persistent hyperplastic primary vitreous. Arch Ophthalmol. 1986;104(5):662-7.
22. Motono M, Tartarella MB, Zin A, Macedo R, Kitadai SP. Resultados de lensectomia em catarata infantil. Arq Bras Oftalmol. 1998;61(6):662-4.
23. Olsen TW, Summers CG, Knobloch WH. Predicting visual acuity in children with colobomas involving the optic nerve. J Pediatr Ophthalmol Strabismus. 1996;33(1):47-51.
24. Khokhar S, Gupta S, Tewari R, Agarwal R, Gogia V, Sinha G, AgarwalT. ccleral tunnel phacoemulsification: approach for eyes with severe microcornea. Indian J Ophthalmol. 2016;64(4):320–2.

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"Transorbitario" foreign body after ATV accident

Corpo estranho "transorbitário" após acidente com quadriciclo

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Abstract

This report aims to show an unusual case of "transorbitário" wooden foreign body causing visual loss due to optic nerve damage on the side contralateral penetration of foreign matter.

Keywords: *Eye foreign bodies; Eye injuries; Wounds, nonpenetrating*

Resumo

O presente relato tem o objetivo de mostrar um caso incomum de corpo estranho de madeira "transorbitário" que causou perda visual por lesão do nervo óptico do lado contralateral a penetração do corpo estranho.

Descritores: Corpos estranhos no olho; Traumatismos oculares; Ferimentos não penetrantes

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Introduction

Eye complaints correspond 2-7 % of all emergency room visits in hospitals[1]. In general, result of ocular trauma which affects mainly males between 16 and 45 years of age , followed by children whose injuries usually occur in the domestic environment [2].

The eyeball occupies only one quarter of the volume of the orbital cavity, so it tends to accommodate fragments that can be retained in the tissues[3]. In most cases, the diagnosis can be done by direct observation, which allows relatively easy removal[4]. But when undetected may use imaging tests, such as conventional X-rays, ultrasound , CT and MRI as auxiliary methods[5] .

This report aims to show an unusual case of orbital foreign body, resulting from scrap wood.

Case report

Female patient, 17y, brown, student, attended the emergency department of the Botucatu Medical School - São Paulo, with a history of ocular trauma after all-terrain vehicle (ATV) collision with tree; she used helmet, but with open visor. Initially evaluated by General Surgery, she was in lucid, cooperative and no motor deficit. Ophthalmologic examination revealed visual acuity of no light perception in the left eye and the right eye examination was not possible due to foreign body presence of wood in this topography. The fragment was in front of the right eyelids, transfixing the medial orbit, making the eyelid opening on the right impossible. The left eye had 2+ conjunctival edema, especially in the temporal region, transparent cornea, anterior chamber formed, iris in mydriasis, no light reaction (Figure 1). Computed tomography showed foreign body with input path in the lower medial portion of the right orbit that crossed ethmoid cells and end in the posterior region of the left orbit. It was associated with proptosis, lateral deviation with compression of the muscle belly of the medial rectus and retrobulbar portion of the optic nerve to the left. Eyeballs with form and contours bilaterally preserved (Figure 2). The patient was referred to the operating room under general anesthesia being operated in conjunction with the otolaryngology, being removed the foreign body, bicanalicular intubation with Sylastic, reintegration of medial canthal tendon right and suturing the eyelids. It was also performed orbital decompression by endonasal left through opening papyraceous, targeting the treatment of orbital postoperative edema and proptosis (Figure 3).

The patient was discharged and followed as an outpatient, with visual acuity without correction, 20/20 right eye and absence without light perception in the left eye . The fundoscopic evaluation of the right eye was consistent with normality, while the left eye showed pale in the macular region , with reddish coloration of the fovea and loss of foveal depression (Figure 4).

Figure 1. The left eye had 2+ conjunctival edema, especially in the temporal region, transparent cornea, anterior chamber formed, iris in mydriasis, no light reaction

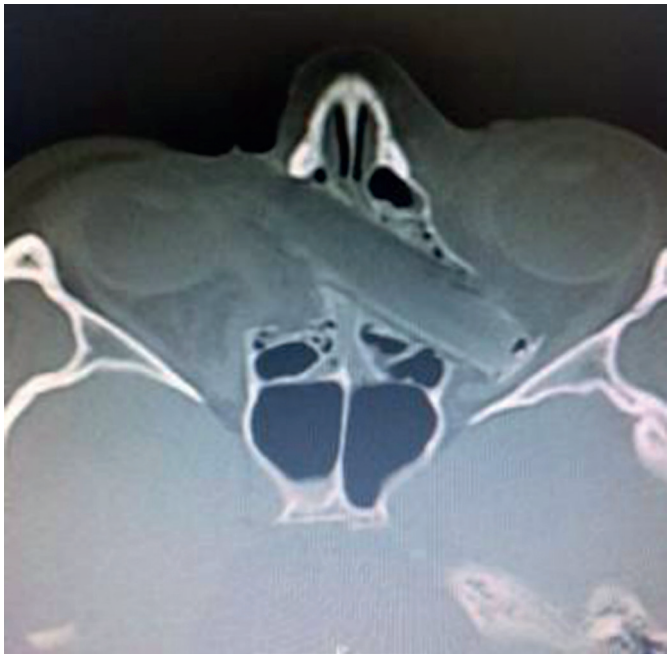

Figure 2. Computed tomography showed foreign body with input path in the lower medial portion of the right orbit that crossed ethmoid cells and end in the posterior region of the left orbit.

Discussion

The authors aimed to report an unusual case of "transorbitário" ocular trauma with scrap wood in a female adolescent, unlike the vast majority of affected patients, known men and young adults[2].

In the assessment of visual acuity, the patient had initially no light perception left. Knowing that the sight is directly correlated with the mechanism of injury and severity of lesions, indicative of the final visual prognosis[6] can be deduced from the evaluation of visual acuity the magnitude of the trauma.

Regarding the foreign body orbit composition, scrap wood, as found in this case is among the most frequent, together with the metal and glass particles [7]. Removal of organic foreign body must be made so identified, since the wooden piece, for their organic nature and porous surface acts as a medium for microbial agents, which can cause chronic orbital infections, abscesses and fistulas [8]. The orbital decompression in traumatic optic neuropathy is controversial in the literature, and should be evaluated case by case basis [9,10].

There was full of left eye vision loss, but given the conditions involved in the accident, it can be considered that the patient had a favorable evolution, most likely by the short time between trauma and treatment carried out, reducing the chance of infections and minor injuries.

The authors also draw attention to the need for evaluation of

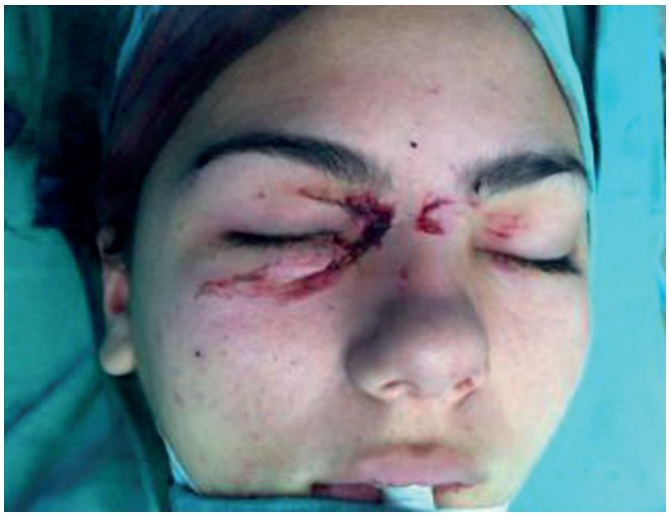

Figure 3. Removed the foreign body, bicanalicular intubation with Sylastic, reintegration of medial canthal tendon right and suturing the eyelids. It was also performed orbital decompression by endonasal left through opening papyraceous.

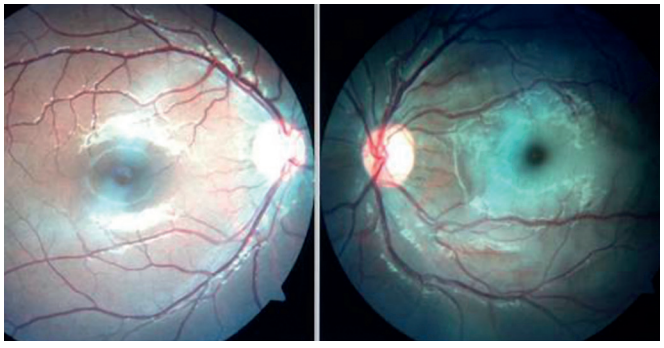

Figure 4. The fundoscopic evaluation of the right eye was consistent with normality , while the left eye showed pale in the macular region, with reddish coloration of the fovea and loss of foveal depression.

the causes and circumstances that lead to reduced visual capacity by factors that can be prevented, such as missing or incorrect use of protective equipment, in this case the helmet.

References

1. Araújo AA, Almeida DV, Araújo VM, Góes MR. Urgência oftalmológica: corpo estranho ocular ainda como principal causa. Arq Bras Oftalmol. 2002; 65(2): 223-7.
2. Liu D, Al Shail E. Retained orbital wooden foreign body: a surgical technique and rationale. Ophthalmology. 2002; 109(2):393-9.
3. Layaun SE , Schor P, Rodrigues ML. Perfil da demanda de um serviço de oftalmologia em uma unidade de emergência. Rev Bras Oftalmol. 1992; 51(3):171-3.
4. Green BF, Kraft SP, Carter KD, Buncic JR, Nerad JA, Armstrong D. Intraorbital wood detection by magnetic resonance imaging. Ophthalmology. 1990; 97(5): 608-11.
5. Boncoeur-Martel MP, Adenis JP, Rulfi JY, Robert PY, Dupuy JP, Maubon A. CT appearances of chronically retained wooden intraorbital foreign bodies. Neuroradiology. 2001; 43(2):165-8.
6. Pieramici DJ, Sternberg P Jr, Faberg Tm Sr, Bridges WZ Jr, Capone A Jr, Cardillo JA, et al. A system for classifying mechanical injuries of the eye (globe). The Ocular Trauma Classification Group. Am J Ophthalmol. 1997; 123(6):820-831.
7. Bullock JD, Warwar RE, Bartley GB, Waller RR, Henderson JW. Unusual orbital foreign bodies. Ophthal Plast Reconstr Surg. 1999;15(1):44-51.
8. Ho VT, McGuckin JF Jr, Smergel EM. Intraorbital wooden foreign body: CT and MR appearance. AJNR Am J Neuroradiol. 1996;17(1):134-6..
9. Levin LA, Beck RW, Joseph MP, Seiff S, Kraker R. The treatment of traumatic optic neuropathy: the International Optic Nerve Trauma Study Group. Ophthalmology. 1999 , 106(7):1268-77.
10. Yu Wai Man P, Griffiths PG. Surgery for traumatic optic neuropathy. Cochrane Database Syst Rev. 2005;19(4):CD005024.

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Optical coherence tomography and congenital retinoschisis: three case reports

Tomografia de coerência óptica e retinosquise congênita: relato de três casos

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Abstract

Congenital retinoschisis is an X-linked recessive inherited disease. It causes the splitting of the retina's neurosensory layers from the remaining of the sensory retina, presenting itself as a "stellate" or "bicycle-wheel" maculopathy, vitreous hemorrhage and retinal detachment. We report three cases of congenital retinoschisis, two of them brothers. optical coherence tomography was used when evaluating the cases. It was impossible to differentiate retinoschisis from retinal detachment in one of the cases through optical coherence tomography due to lack of patient collaboration. We then performed laser photocoagulation to mark and follow-up the affected area.

Keywords: *Retinoschisis; Retinoschisis/congenital; Maculopathy; Retina/pathology; Retinal detachment; Case reports*

Resumo

A retinosquise congênita é uma doença autossômica recessiva ligada ao X. Resulta em separação da camada de fibras nervosas do restante da retina sensorial, e manifesta-se como maculopatia estriada, hemorragias vítreas e descolamento de retina. Relatamos três casos de retinosquise congênita, sendo dois deles irmãos. Utilizou-se a tomografia de coerência óptica na avaliação dos casos. Em um, não foi possível efetuar o diagnóstico diferencial com descolamento de retina através da tomografia de coerência óptica, devido a não cooperação no exame, optando-se pela realização de fotocoagulação com laser para demarcação e seguimento da área.

Descritores: Retinosquise; Retinosquise/congênito; Maculopatia; Retina/patologia; Descolamento de retina; Relatos de casos

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Introduction

Congenital Retinoschisis is an X-linked recessive inherited disorder. It is defined by the splitting of the retina's neurosensory layers from the remaining of the sensory retina, being the most common cause of juvenile macular degeneration in men.[1-3] Affected patients may present strabismus, nystagmus, peripheral retinoschisis, vitreous hemorrhage, vitreous membranes, retinal detachment (RD), "stellate" or "bicycle-wheel" maculopathy. Optical coherence tomography (OCT) helps in the evaluation and differential diagnosis between congenital retinoschisis and RD. Treatment is based on management of complications. Congenital retinoschisis has an unpredictable prognosis, being reported cases of regression, stabilization and late progression.

Case Reports

Case 1

PBO, male, 11 years old, presented a diminished visual acuity in both eyes (oculus uterque - OU). Visual acuity was 20/200 in the right eye (OD) and 20/70 in the left eye (OS). Slit lamp biomicroscopy revealed peripheral retinoschisis in the inferotemporal quadrant reaching the inferotemporal vascular arcade and a pseudohole aspect maculoschisis OD (Figure 1). It also revealed small maculoschisis and peripheral vitreous membranes OS. (Figure 2)

OCT showed cysts on the macular area, which coalesced to a bigger cyst in the foveal area OD (Figure 3) and a symmetrical presentation OS. These findings were consistent with Bilateral Macular Retinoschisis (BMR)

Photocoagulation of the posterior edge of the right eye's Retinoschisis was performed to mark and follow-up the affected area. A control-OCT, performed one year later, showed no alterations. It was impossible to identify the marked area due to lack of patient cooperation. Ophthalmoscopy follow-up revealed no disease progression.

Case 2

EHCA, male, 23 years old, presented a diminished peripheral visual field and low visual acuity OD. Best corrected visual acuity (BCVA) levels of 20/200 OD and 20/30 OS. Ophthalmoscopy revealed vitreous membranes OU. Campimetry showed nonspecific alterations. OCT revealed BMR of symmetrical aspect OU. (Figure 4)

Case 3

LHCA, male, 15 years old, case 2 patient's brother, presented a diminished visual acuity OU. BVCA of 20/25 OU. Ophthalmoscopy revealed vitreous membranes, altered fovea appearance and beaten-bronze appearance of the macula. OCT showed BMR

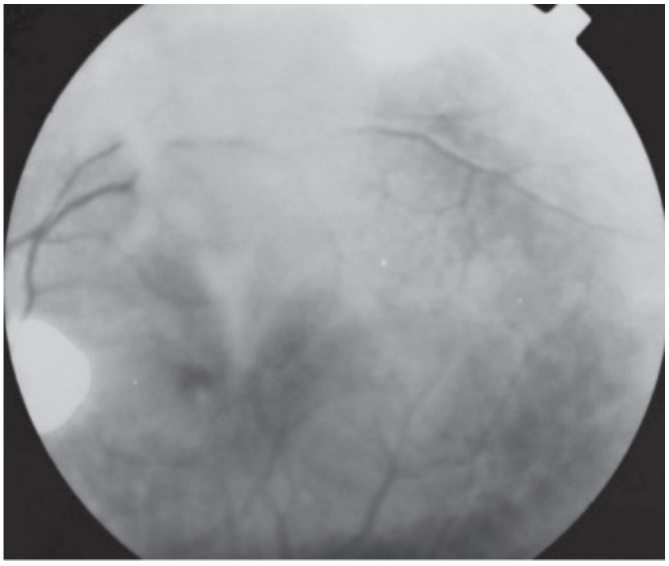

Figure 1 - Fundography OD: Peripheral retinoschisis on the inferotemporal quadrant reaching the inferotemporal vascular arcade and maculoschisis with a pseudohole aspect

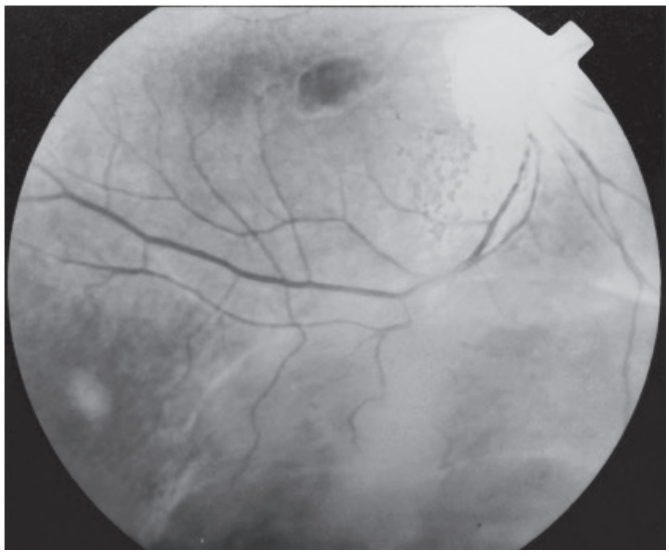

Figure 2 - Fundography OS: Maculoschisis and peripheral vitreous membranes

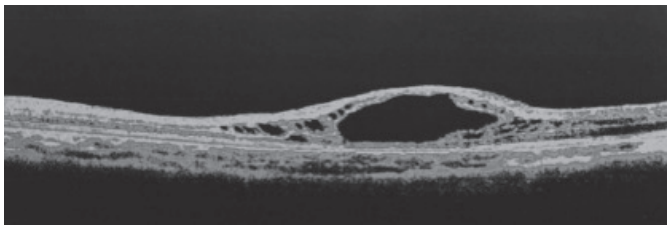

Figure 3 - OCT OD: Various cysts in the macular area situated on the inner nuclear and plexiform layers that suggest coalescence to a bigger macular cyst at the foveal area

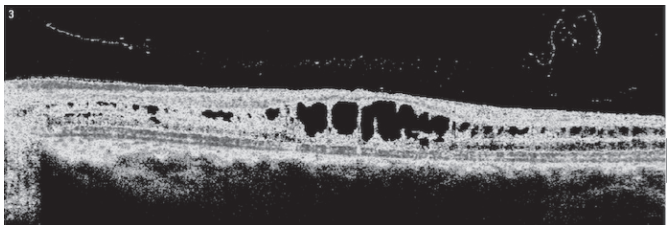

Figure 4 - OCT OS: Macular retinoschisis

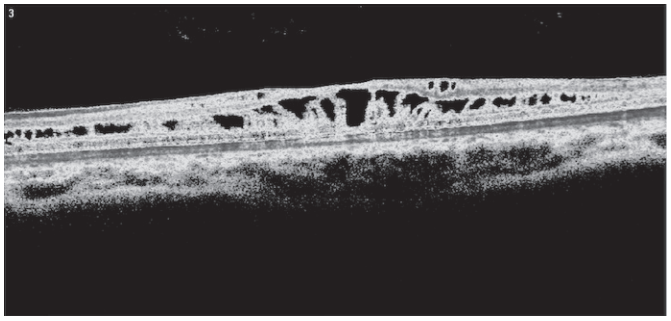

Figure 5 - OCT OS: Macular retinoschisis

of symmetrical aspect OU. (Figure 5)

Discussion

Congenital Retinoschisis is a rare, bilateral, asymmetric X-linked inherited disorder that presents itself on the first decade of life.[1,2] It affects primarily young males.[4,5]

The estimated prevalence of the disease is 1:5000-25000 individuals[6]. The anomaly was identified in the Xp22 chromosome's gene XLRS1, causing more than 130 mutations. Therefore, there are many diverse clinical manifestations, even in the same family. The translated protein (retinoschisin) is related to the adherence of the cells during the retinal development.[4-7] The disorder results on the splitting of the retina's neurosensory layers from the remaining of the sensory retina. [1,8]

The patients can exhibit strabismus, nystagmus or diminished visual acuity due to the maculopathy. The disease presents itself as a foveoschisis with macular edema and bicycle wheel-like cystoid spaces, the latter being a typical finding of the pathology. [9-11] Some other observed signs are peripheral retinoschisis - mostly on the inferotemporal quadrant - and oval holes on the retinoschisis' inner layer, which originate vitreous veils. [1,2,6]

The diagnosis is made by indirect binocular ophthalmoscopy. OCT can be of aid on the diagnosis of atypias and advanced stages of the disease, in which the late phenomena can make the diagnosis difficult. The OCT identifies different phases of the disorder: (a) isolated foveoschisis, (b) foveoschisis associated with lamellar cysts without a peripheral ophthalmoscopic disease, (c) foveoschisis associated to lamellar cysts and peripheral disease, and (d) foveoschisis associated to peripheral disease in the absence of lamellar cysts. [4,6,11]

Retinal detachment, pigmentary retinitis, Eales disease, sickle cell retinopathy, retinopathy of prematurity and Goldmann-Favre vitreoretinal degeneration and the Stellate non familial retinoschisis[12] are differential diagnosis of Congenital Retinoschisis.

The pathology's progression is fast during the first years of life, stabilizing around early adulthood. It may improve or worsen during the fifth decade of life, due to macular degeneration. Its possible complications are RD and vitreous and intra-schisis hemorrhage.

Treatment consists on the management of complications. Pars plana vitrectomy is recommended for persistent vitreous hemorrhage or RD, aiming to close the retinal fractures of the peripheral retinoschisis external layers. Laser photocoagulation or vitrectomy are indicated in cases of recurrent or non absorbing vitreous hemorrhage in patients with severe low visual acuity due to this cause. [1,2,10] Carbonic anhydrase inhibitors may be effective for cystic foveal lesions. 10

This series of cases indicate the importance of OCT. Due to the early age of onset and consequent lack of cooperation, its execution may be difficult. It may have little value on peripheral retinoschisis, but it remains a useful tool to differentiate between retinoschisis and RDs that may harm the macula.

References

1. Ryan SJ. Retina: basic science and inherited retinal disease. 4th ed. Philadelphia: Mosby; 2006. Vol. 1
2. Vilela MA, Colossi CG. Retinosquises. Rev Bras Oftalmol. 2011; 70(2):125-32.
3. Caye LM, Barbosa PH, et al. Uso da dorzolamida tópica em paciente portador de retinosquise juvenil ligada ao X. Rev Bras Oftalmol. 2010; 69(2):129-131.
4. Forsius H, Vainio-Mattila B, Eriksson A. X-linked hereditary retinoschisis. Br J Ophthalmol. 1962;46(11):678-81.
5. Sauer CG, Gehrig A, Warneke-Wittstock R, Marquardt A, Ewing CC, et al. Positional cloning of the gene associated withX-linked juvenile retinoschisis. Nat Genet. 1997;17(2):164-70.
6. Bastos AL, Freitas BP, Villas Boas O, Ramiro AC. Uso da dorzolamida tópica em pacientes com retinosquise juvenil ligada ao X. Arq Bras Oftalmol. 2008; 71(2): 286-90.
7. Kanski JJ, Bowling B. Clinical ophthalmology: a systematic approach. 7th ed. Edinburgh: Elsevier Saunders; 2011.
8. Nelson textbook of pediatrics. 19th ed. Philadelphia, PA; Elsevier/ Saunders; c2011. Disorders of the eye. Part 29.
9. Hofling-Lima AL, Moeller CT, Freitas D, Martins EN. Manual de condutas em Oftalmologia. São Paulo: Atheneu; 2008.
10. Audo I, ,lder GE, Moore A T. Inherited stationary disorders of the retina. In: Puech B, De Laey J-J, Holder GE, editors. Inherited chorioretinal dystrophies. A textbook and atlas. 2014.p. 77-98
11. Apushikin MA, Fishman GA. Use of dorzolamide for patients with X-linked retinoschisis. Retina. Retina. 2006; 26(7):741-5. Erratum in: Retina. 2007;27(1):128.
12. Ober MD, Freund KB, Shah M, Ahmed S, Mahmoud TH, Aaberg TM Jr, Zacks DN, GaoH, Mukkamala K, Desai U, Packo KH, Yannuzzi LA. Stellate nonhereditary idiopathic foveomacular retinoschisis. Ophthalmology. 2014;121(7):1406-13.

Acute exsudative polymorphous vitelliform maculopathy: a case report

Maculopatia viteliforme polimorfa exudativa aguda: um relato de caso

Geórgia de Freitas Neves[1], André Luís Carvalho de Moura Bastos[2]

Abstract

Acute exudative polymorphous vitelliform maculopathy is an extremely rare retinal disorder, that has been considered as a form of paraneoplasic retinopathy, found in patients with a underlying primary tumor. Symptoms of acute exudative polymorphous vitelliform maculopathy include preceding headache followed by acute onset of vision loss. The fundus of a patient with this condition typically demonstrates bilateral, subretinal white-yellow deposits in the macular region. The report of a rare disease which has a strong association with underlying neoplasia is extremely relevant whereas it helps better comprehend its genuine history, possible complicacy and prognosis.

Keywords: *Macula lutea/pathology; Retina/pathology; Neoplasms/diagnosis; Low vision; Case reports*

Resumo

A maculopatia viteliforme polimorfa exsudativa aguda é um distúrbio retiniano extremamente raro, que tem sido considerado como uma forma de retinopatia paraneoplásica, encontrada em pacientes com um tumor primário subjacente. Os sintomas de maculopatia viteliforme polimorfa exsudativa aguda incluem dor de cabeça precedente seguida de perda aguda da visão. O fundo de olho de um paciente com essa condição demonstra geralmente depósitos bilaterais, branco-amarelados na região macular. O relato de uma doença rara e que tem uma forte associação com neoplasia oculta é de extrema relevância, pois ajuda a conhecer melhor a sua historia natural, possíveis complicações e prognóstico.

Descritores: Macula lutea/patologia; Retina/patologia; Neoplasias/diagnóstico; Baixa visão; Relatos de casos

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Introduction

Acute exudative polymorphous viteliform maculopathy (AEPVM) is a rare retinal disease, which was first described in 1988 by Gass et al.[1] So far, about 20 cases were described in the world literature[2]. The first cases reported were of two white men who had a sudden onset of headache and visual loss associated to various creamy-white sub-retinian injuries and serous retinal detachment in macular areas of both eyes[1].

The etiology of the disease has not been clarified yet. However, it is considered that the changes are resulting from a paraneoplastic retinopathy found in patients with some hidden primary neoplasm.

The present study aims to report a case of acute exudative polymorphous viteliform maculopathy in order to facilitate the identification and better understanding of the disease.

Case report

A 19-year-old patient complaining of sudden low visual acuity in the right eye for about 20 days, with no personal and family history of disease, as well as previous ophthalmologic changes. The patient reported frequent headaches and denied prodromes of viral diseases. Visual acuity with correction was of counting fingers in the right eye, and 20/20 in left eye one. The anterior segment did not have changes. The aplanation tonometry was 12 mmHg in the right eye and 13 mmHg in the left eye.

The fundus exam showed a regmatogenic retinal detachment in the right eye, with rupture involving the inferior temporal region associated to a yellowish and round subfoveal lesion. In the macular region of the left eye, yellowish sub-retinal lesions with a viteliform appearance were seen, similar to those of the right eye, but in greater quantity (Figure 1).

In the autofluorescence examination (Figure 2), a hyper-autofluorescence of the regions corresponding to the sub-retinal accumulation of yellowish material was observed in both eyes, bordered by areas of hypo-autofluorescence.

The fluorescein angiography (Figure 3) showed marked hyperfluorescence in the central areas of the maculae in both eyes, corresponding to serous retinal detachment and exudative deposit. No areas of contrast leakage were observed.

Optical coherence tomography (OCT) of the right eye revealed intra retinal cysts associated to retinal detachment. The OCT of the left eye (Figure 4) showed serous detachment of the neuroepithelium, with subretinal rounded deposits.

The retinal detachment found in the right eye was treated by posterior vitrectomy via pars plana, using perfluorocarbon, endolaser and octafluoropropane C3F8 gas. About 2 months after surgery, the visual acuity in this eye was 20/100, and the retina was completely glued.

Discussion

The article reports a case of AEPVM in a 19-year-old young man, without previous comorbidities. The findings of the case coincide with the alterations already described for the disease, of small and numerous bilateral yellowish lesions affecting the retinal pigment epithelium (RPE), causing serous retinal detachment[3-5]The low visual acuity identified in the right eye of the patient was related to a regmatogenic retinal detachment, which had no relation to the presently diagnosed AEPVM.

The pathophysiology of the disease is still the subject of speculation. It is presumed that the individual who develops AEPVM has a primary malignancy that has not yet been diagnosed due to the absence of signs and symptoms. The most common primary neoplasia reported in patients with AEPVM is cutaneous or choroidal melanoma. However, the condition has been documented in patients with other types of neoplasms,

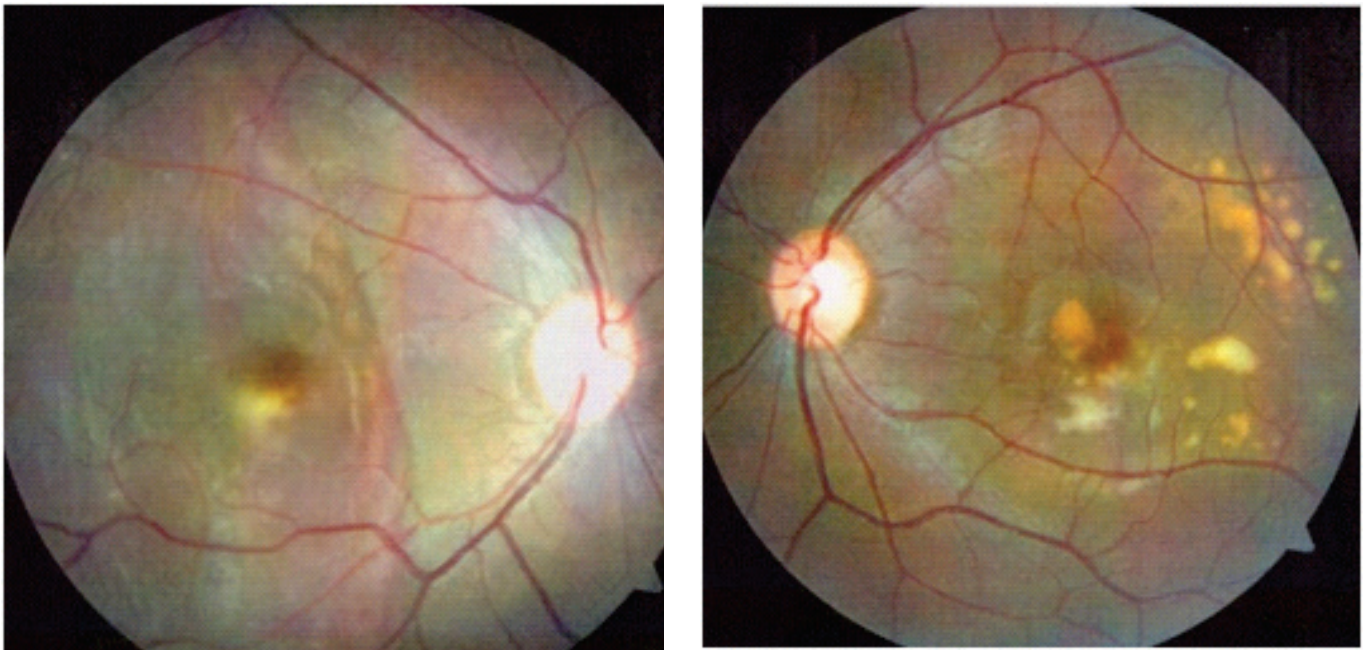

Figure 1. Retinographies: right eye shows extensive regmatogenic retinal detachment and a yellowish subfoveal rounded lesion. In the left eye, there are multiple yellowish lesions in the macular region.

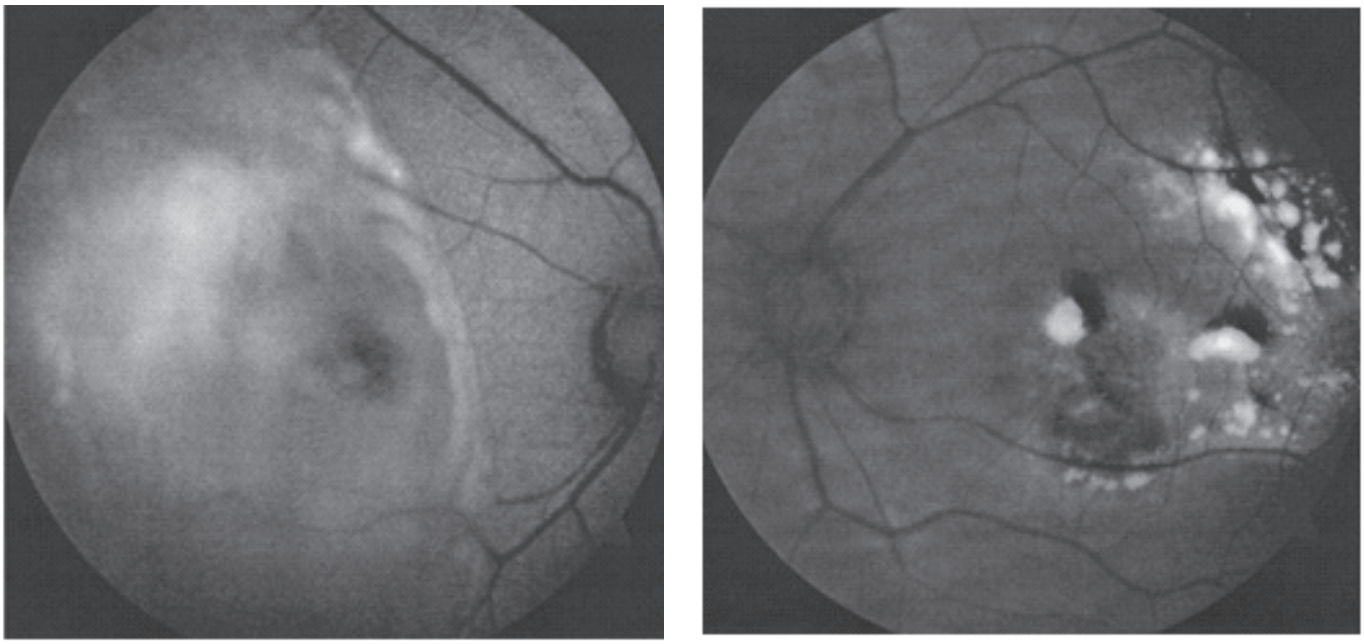

Figure 2. Autofluorescence: hyper-autofluorescence in the areas corresponding to the subfoveal yellowish lesions, bordered by areas of hypo-autofluorescence, in both eyes

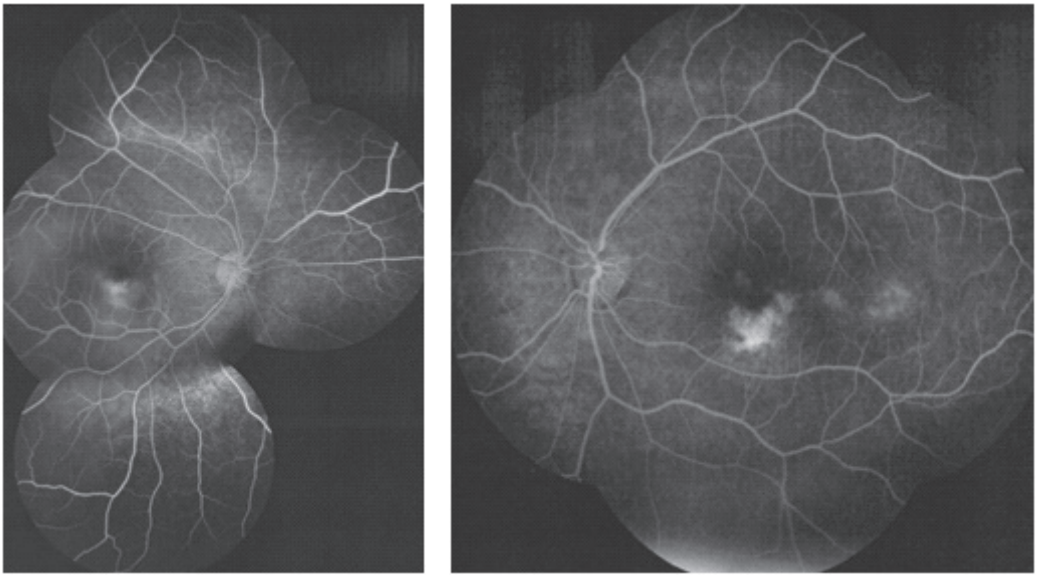

Figure 3. Angiofluoresceinography: subfoveal hyperfluorescent areas in both eyes

such as carcinomas[6].

There is considerable suspicion that RPE is the main structure affected in this condition, and its dysfunction could explain the overload of lipofucsin seen in autofluorescence[7]. The hypothesis is that a cross-reaction occurs between the autoantibodies produced against primary neoplasia and antigens of the RPE cells, and that the yellowish pigment is an EPR product and/or layer of damaged photoreceptors[8].

Autoimmune etiology was considered due to the detection of anti-peroxiredoxin 3 autoantibodies (PRDX3) in the serum of a patient during the acute phase of the disease (9). Symptoms of upper airway infection similar to influenza and headache have been reported prior to the manifestations of the ocular symptoms, and some studies suggest that there may be some viral trigger for the development of AEPVM[6]. Experiments in rats detected viral antigens and autoantibodies against RPE following coronavirus infection, and associated the findings to retinopathy [6].

The hypothesis of inflammatory pathology was also raised, since some patients presented a favorable response to the treatment with steroidal anti-inflammatory drugs[1]. However, treatment with corticosteroids is still controversial, since visual acuity tries to improve with or without treatment in a few weeks or months[6].

The natural history of the disease has not been fully elucidated yet, as the cases described are few, and some of them end up succumbing in a short time due to the aggressiveness of the primary disease, as occurred in a study in which 2 of the 5 patients being followed died in less than 5 months[9].

The most defended hypothesis is that AEPVM is a pa-

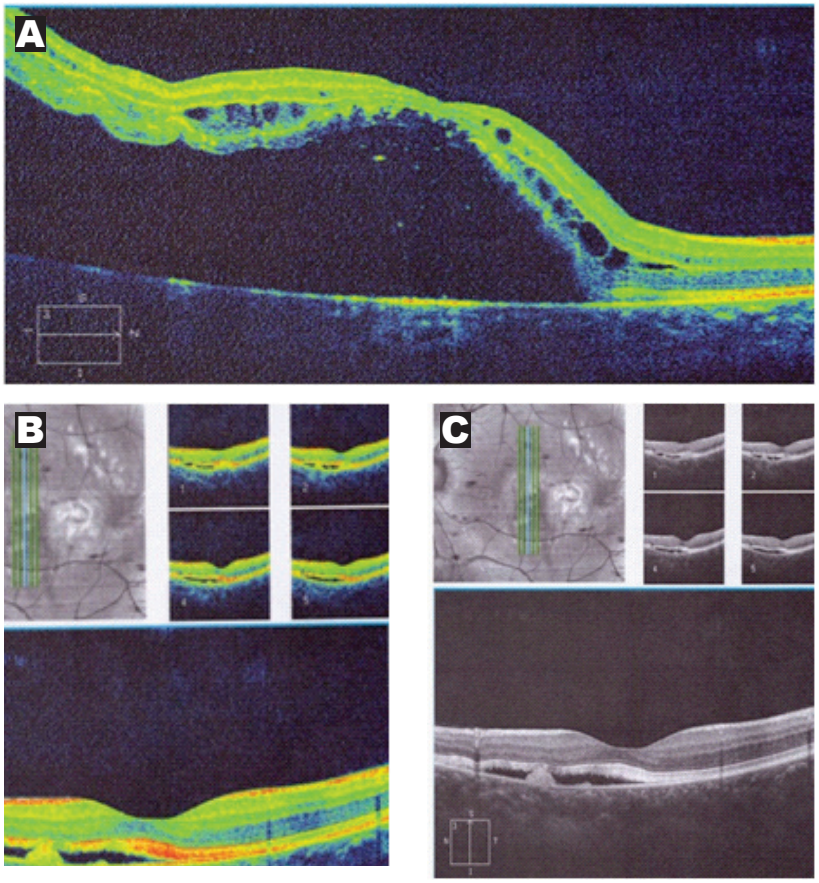

Figure 4. Optical Coherence Tomography (OCT): (A) Retinal detachment in the right eye associated to intra-retinal cysts. (B-C) Serous retinal detachment with deposits and accumulation of subretinal fluid in the left eye.

raneoplastic retinopathy and thus, in the case of AEPVM, it is mandatory to perform a screening for occult primary neoplasias. The mean time between onset of AEPVM lesions and the diagnosis of primary neoplasm is generally 42 months (10).

In the case described, tests were performed for cancer screening, but no findings were found for this disease. The young man had no lesion suggestive of malignancy, and also he was black, which is usually a protective factor for skin cancer. However, even if the probability is minimal, screening should be performed.

In summary, AEPVM is a rare disorder, with few cases described in the literature published, whose etiology and pathogenesis are not well known, but may represent the first manifestation of a neoplasm. Considering this, a thorough and extensive propaedeutics should be performed to search for any underlying cancer, and thus start as soon as possible the appropriate treatment.

References

1. Gass JD, Chuang EL, Granek H. Acute exudative polymorphous vitelliform maculopathy. Trans Am Ophthalmol Soc. 1988; 86:354-66.
2. Massaro et al. Acute exudative polymorphous vitelliform maculopathy. Eur J Ophthalmol. 2015; 25(5): e91-e94.
3. Chan CK, Gass FJ, Lin SG. Acute exudative polymorphous vitelliform maculopathy syndrome. Retina. 2003;23(4):453–62.
4. Spaide R. Autofluorescence from the outer retina and subretinal space: hypothesis and review. Retina. 2008;28(1):5–35.
5. Vaclavik V, Ooi KG, Bird AC Robson AG, Holder GE, Webster AR. Autofluorescence findings in acute exudative polymorphous vitelliform maculopathy. Arch Ophthalmol. 2007;125(2):274–7.
6. Modi, Kunjal K, Roth, Daniel B., Green, Stuart N. Acute Exudative Polymorphous Vitelliform Maculopathy in Young Man: a case report. Retinal Cases Brief Rep. 2014; 8(3):200-4.
7. Wiklund A, Peebo BB. Acute exudative polymorphous vitelliform maculopathy in young woman: presymptomatic findings and 21-month follow-up. Retinal Cases Brief Rep. 2013; 7(2):123–7.
8. Gass JD. Acute idiopathic exudative polymorphous vitelliform maculopathy. In: Gass JDM, ed. Stereoscopic Atlas of Macular Diseases: Diagnosis and Treatment. 5th ed. St Louis, MO: CV Mosby. 1997, Vol. 2, p.168–9.
9. Koreen L, He SX, Johnson MW, Hackel RE, Khan NW, Heckenlively JR. Anti-retinal pigment epithelium antibodies in acute exudative polymorphous vitelliform maculopathy: a new hypothesis about disease pathogenesis. Arch Ophthalmol. 2011;129(1):23-9.
10. Al-Dahmash SA, Shields CL, Bianciotto CG, et al. Acute exudative paraneoplastic polymorphous vitelliform maculopathy in five cases. Ophthalmic Surg Lasers Imaging. 2012; 43(5): 366-73.

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Choroidopathy in systemic lupus erythematosus

Coroidopatia no lúpus eritematoso sistêmico

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Abstract

Systemic lupus erythematosus (SLE) is an autoimmune disease in which can affect the eye in different ways. Lupus choroidopathy is rare and include retinal pigment epithelium (RPE) detachment and/or serous retinal detachment and pigment epitheliopathy. Most cases are associated with systemic disease activity and can be considered a factor of gravity and need for intense immunosuppression. Usually has good visual prognosis with proper treatment of SLE, although some cases may have irreversible damage to the outer retina and RPE. We describe a case of choroidopathy secondary to SLE during its multisystem activity with good clinical outcome after treatment with systemic immunosuppression.

Keywords: *Systemic lupus erythematosus; Retinal detachment; Retinal pigment epithelium; Choroid; Fluorescein angiography; Case reports*

Resumo

O Lúpus Eritematoso sistêmico (LES) é uma doença autoimune que pode afetar o olho de diversas formas. A coroidopatia lúpica é rara e apresenta-se com descolamento seroso de retina, descolamento do epitélio pigmentar da retina (EPR) e epiteliopatia pigmentar. A maioria dos casos está associada à atividade sistêmica da doença, podendo ser considerada um fator de gravidade e necessidade de imunossupressão intensa. Geralmente apresenta bom prognóstico visual com o tratamento adequado do LES, apesar de alguns casos evoluírem com danos irreversíveis na retina externa e EPR. Descrevemos um caso de coroidopatia secundaria ao LES com atividade multisistêmica com boa evolução após tratamento clínico com imunossupressão sistêmica.

Descritores: Lúpus eritematoso sistêmico; Descolamento de retina; Epítelio pigmentado da retina; Coróide; Angiofluoresceinografia; Relatos de caso

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Introduction

Systemic lupus erythematosus (SLE) is an autoimmune disease which can affect many organs, including the eyes.[1,2] Ocular involvement occurs in about 30% of cases and may affect eyelids, cornea, retina and also the optic nerve.[2,3] Choroidopathy with neurosensory retinal detachment is rare and usually occurs in patients with severe or hypertensive disease.[4] Although lupus choroidopathy usually present with good prognosis, irreversible vision loss can occur.[2] We present a case of SLE choroidopathy (a rare manifestation), that developed serous retinal detachment (RSD) and pigmentary changes of the retinal pigment epithelium (RPE). A good communication between the ophthalmologist and the rheumatologist; quickly, appropriate and intensive systemic treatment were conditions for a good prognosis.

Case report

Female, 22 year-old, in hospital treatment for SLE in cutaneous, articular, renal, hematologic and neurologic unset; complained about low visual acuity (VA): counting fingers in both eyes (OU). Negatives serology, FAN (homogeneous nuclear pattern 1/1280), rheumatoid factor, anti-DNA (1/320), ANCA, anti-Ro and anti-La antibodies positive, full complement and C2 decreased, increased ESR and CRP. The patient was treated with intravenous high-dose corticosteroids and cyclophosphamide, with systemic and ocular disease improvement. After discharge, presented VA was 20/200 in the right eye (OD) and 20/50 in the left eye (OS), normal biomicroscopy and intraocular pressure OU. The fundus exam showed mild hyperemic and swollen optic disc, SRD in periphery, hyper and hypopigmentation areas of the RPE and vascular attenuation OU. (Figure 1 A and B) Fluorescein angiography showed areas of hyper and hypofluorescence by RPE mottling and areas of poor peripheral perfusion OU and hyperfluorescence by leakage in the optical disc in left eye. After systemic treatment (oral corticosteroids at 1 mg/kg/day and immunosuppression with monthly cyclophosphamide pulses) there was ocular improvement. Fundoscopy showed normal disk, regression of SRD and of poor perfusion areas and accentuated RPE hyper and hipopigmentations. (Figure A and B). VA improved to 20/25 OU after 8 months. Currently the patient is in use of azathioprine 150mg/kg/day for systemic control.

Discussion

Systemic lupus erythematosus (SLE) is a multisystem chronic inflammatory disease of unknown cause and usually affect young women.[11,2] Tissues and cells are affected by autoantibodies and pathogenic immune complexes causing vasculitis, occlusion of small vessels and multiple organ dysfunction. Ocular involvement occurs in about a third of cases involving lid (mucocutaneous disease), keratoconjunctivitis sicca, retinal vascular disease and affecting the optic nerve.[2,3]

Lupus choroidopathy with exudative retinal detachment

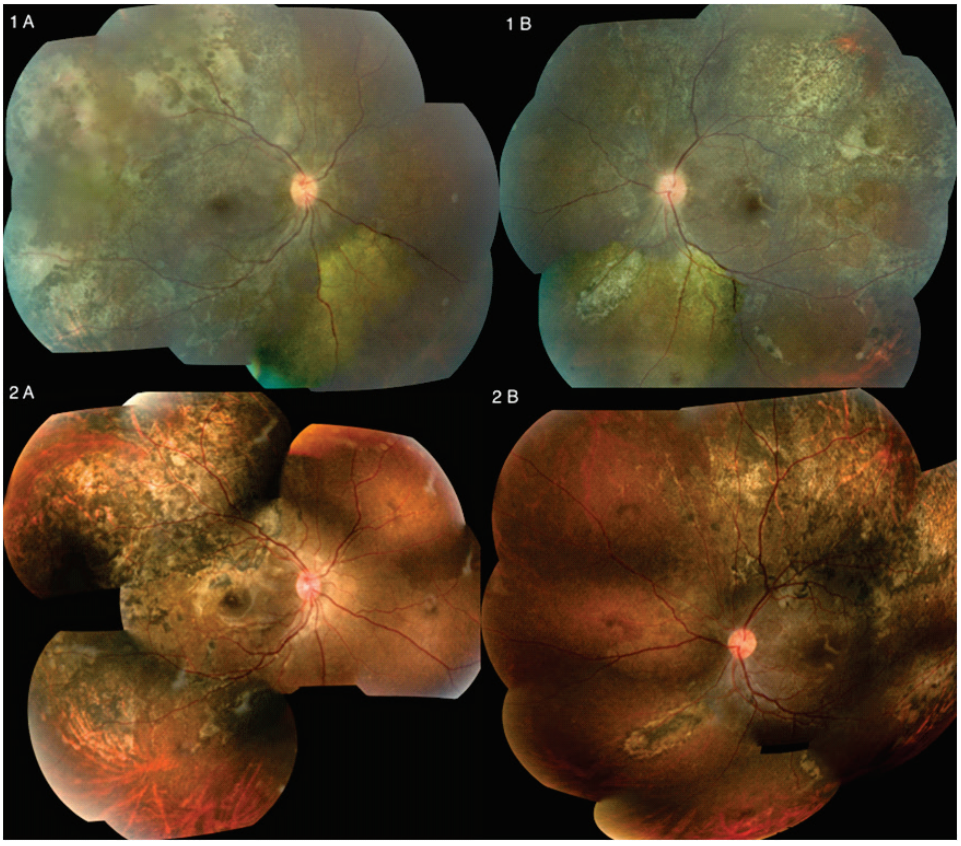

Figure 1 A and B. Retinography of the right and left eye respectively showing mild hyperemic optic disc, serous retinal detachment in the periphery, hyper and hypopigmentation areas of RPE and vascular attenuation.
Figure 2 A and B. Retinography of the right and left eye respectively showing normal optic disk, accentuated hyper and hypopigmentation areas of the RPE and normal vessels

is a rare ocular manifestation, with less than 40 cases reported in scientific literature until 2012.[2] Affects mainly women, 68% bilateral and may be associated with lupus retinopathy.[5,6] The pathogenesis is multifactorial, although uncontrolled hypertension, immune complex deposits in the choriocapillaris and anti-retinal pigment epithelium antibodies may contribute to its development.[2] Our patient started ocular unset during acute phase of SLE at 22 years of age, with involvement of different organs. She initially presented cutaneous, articular, renal, hematologic and neurologic activity including hypertension, therefore, featuring important risk factors for lupus choroidopathy development. The most common clinical manifestations of lupus choroidopathy include exudative retinal detachment (36%), RPE detachment (32%) and retinal pigment epitheliopathy (21%).[6] In our case, there was not retinal pigment epithelium detachment, however the other main manifestations were present. Initially, the serous retinal detachment was bigger, but it disappeared during systemic treatment and the associated retinal pigment epitheliopathy became easier to be seen. Choroidal ischemia may also be present, manifesting as subretinianal hypopigmented spots and ischemia areas on fluorescein angiography.[6]

Imaging tests are important for evaluation and monitoring choroid and retina diseases secondary to SLE.[6] Fluorescein angiography helps to identify optic nerve inflammation, retinal vascular disease, retinal ischemia, macular edema and search of subclinical signs. In our case, fluorescein angiography was important to verify RPE lesions, poor peripheral perfusion areas and its improvement after treatment. Green indocyanine evaluates the choroidal vasculature and can identify choroidopathy not seen in angiofluoresceinographic examination.[6] Optical coherence tomography allows non-invasive structural, intra and subretinal fluid and detachment of the retinal pigment epithelium evaluation.[6,7]

Lupus choroidopathy is usually seen in patients with active disease, especially central nervous system vasculitis, nephropathy and uncontrolled blood pressure. It has been considered as a systemic disease activity score.[2,5,8] The presence of choroidopathy is an indication of the need for aggressive and prolonged immunosuppression.[2,8] Our case accords to the scientific literature, showing severe systemic involvement during lupus choroidopathy manifestation, as well as the importance of intensive immunosuppressive treatment. Ocular therapy such as focal laser photocoagulation or photo-dynamic therapy (PDT), may be instituted when there is insufficient systemic diseases control and poor resolution for lupus coroidopathy with immunosuppression therapy, particularly in acute phase.[9] Late ocular interventions may not improve significantly vision due to prior damage to the RPE and photoreceptors, despite intra and subretinal fluid improvement.[9] As in most cases, there was resolution of the lupus choroidopathy with immediate and appropriate systemic treatment in our patient, who developed good visual acuity despite persistent and significant pigment changes in fundus OU.

Conclusion

Retinopathy and choroidopathy are SLE manifestations, especially during its active phase. Lupus choroidopathy is an indicator of severity and the patient may present poor ocular and systemic prognosis if not correctly treated. Therefore, good communication between the ophthalmologist and the rheumatologist is indispensable for the management and treatment of these patients.

References

1. Klejnberg T, Moraes Junior HV. Alterações oculares nos pacientes portadores de lúpus eritematoso sistêmico em acompanhamento ambulatorial. Arq Bras Oftalmol. 2006;69(2):233-7.
2. Palejwala NV, Walia HS, Yeh S. Ocular manifestations of systemic lupus erythematosus: a review of the literature. Autoimmune Dis. 2012;2012:290898.doi:10.1155/2012/290898.
3. EL-Shereef RR, Mohamed AS, Hamdy L. Ocular manifestation of systemic lupus erythematosus. Rheumatol Int. 2013;33(6):1637–42.
4. Gharbiya M, Bozzoni-Pantaleoni F, Augello F, Balacco-Gabrieli C. Indocyanine green angiographic findings in systemic lupus erythematosus choroidopathy. Am J Ophthalmol. 2002;134(2):286-90.
5. Edouard S, Douat J, Sailler L, Arlet P, Astudillo L. Bilateral choroidopathy in systemic lupus erythematosus. Lupus. 2011; 20(11):1209–10.
6. Silpa-archa S, Lee JJ, Foster CS. Ocular manifestations in systemic lupus erythematosus. Br J Ophthalmol. 2016;100(1):135-41.
7. Ozturk B, Bozkurt B, Karademir Z, Kerimoglu H. Follow-up of lupus choroidopathy with optical coherence tomography. Lupus. 2011;20(10):1076–8.
8. Nguyen QD, Uy HS, Akpek EK, Harper SL, Zacks DN, Foster CS. Choroidopathy of systemic lupus erythematosus. Lupus. 2000;9(4):288-98.
9. Cho HY, Nasir HH, Sobrin L. Focal laser photocoagulation and photodynamic therapy for lupus choroidopathy. Lupus. 2014;23(4):412–6.

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Phakic posterior chamber intraocular lenses

Lentes intraoculares fácicas de câmara posterior

Mara Barreto Theiss[1], Marcony R. Santhiago[1,2,3,4]

ABSTRACT

The objective of this article was to gather studies that report results available in the scientific literature, considering the predictability, safety, efficacy, and stability of posterior chamber phakic intraocular lenses. And report the documented complications for these lenses.

Keywords: *Intraocular lenses; Phakic intraocular lenses; Refractive errors; Crystalline; Refractive surgical procedures; Postoperative complications*

RESUMO

O objetivo deste artigo foi reunir estudos que reportam resultados disponíveis na literatura científica, considerando a previsibilidade, segurança, eficácia, e estabilidade das lentes intraoculares fácicas de câmara posterior. E relatar as complicações documentadas para estas lentes. A revisão criteriosa dos estudos publicados na literatura ate o momento revelam resultado satisfatórios quanto à eficácia, elevada previsibilidade, estabilidade e segurança do implante de lente intraocular de câmara posterior, para correção das miopia, hipermetropia e astigmatismo.

Descritores: Lentes intraoculares; Lentes intraoculares fácicas; Erros de refração; Cristalino: Procedimentos cirúrgicos refrativos; Complicações pós operatórias

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Introduction

Phakic posterior chamber lenses are indicated for patients with moderate and high ametropias, patients with contraindications for photoablative surgeries, and those who do not have ideal optical correction with glasses and contact lenses.[1] Implantation of these lenses allows the maintenance of the crystalline function until the replacement is indicated, with the phakic posterior chamber lens being easily removed in these situations.

Advantages attributed to the implant of these lenses are: a larger amplitude of correctable ametropia, stable refraction, minimally invasive surgery, stability in visual quality, high efficiency, rapid visual recovery, preservation of accommodation and reversibility.[2]

The treatment of high ametropias with photoablative procedures (excimer laser) requires the removal of large amount of corneal tissue, increasing the risk of ectasis[3-6], changes the corneal asphericity, and introduces reduced predictability and stability due to intense changes of the corneal biomechanics and induction of aberrations.[7]

As the implant of phakic lenses or the exchange of crystalline for refractive purposes are techniques requiring the opening of the ocular globe, the present risks inherent to such procedure, such as: retinal detachment, cystoid macular edema, glaucoma and endophthalmitis.[8]

The Visible Implantable Collamer Lens (ICL; STAAR SURGICAL) is currently the only phakic posterior chamber lens approved by the FDA[2] and available in Brazil for the treatment of myopia, astigmatism[1] and hypermetropia[9].

The ICL is a foldable posterior chamber lens made of a biocompatible material called collamer, composed of hydrophilic collagen, a material that does not generate inflammatory response. (Figure 1) And it has ultraviolet protection. This lens is positioned behind the iris, in front of the anterior capsule of the lens, and with the haptics resting on the ciliary sulcus.[10]

Recently, a new type of Visian ICL was developed: the Visian ICL V4c with central flow technology. A central peritoneum called KS-AquaPORT has been added to the ICL optical center to improve the circulation of the aqueous humor in the eye and reduce the risk of cataract formation. This new construction eliminates the need for peripheral preoperative iridotomy or even intraoperative peripheral iridectomy, which simplifies the surgical procedure and significantly reduces the complications associated with iridotomy, such as hyphema, inflammation and vitreous detachment or retina regmatogenic.[11-12]

There are some published studies that have evaluated the distance between the ICL / crystalline using ultrasound biomicroscopy[13], equipment with Scheimpflug technology[14] and optical coherence tomography (OCT). [15] The new Spectralis OCT (Heidelberg Engineering, Heidelberg, Germany) with an anterior segment module provides anterior chamber image acquisition and provides high-resolution measurements of the distance between the posterior ICL surface and the anterior surface of the crystalline. This distance known as the vault is an important point, and is related to some complications induced by the ICL, as pupillary block[16] and cataract[17]. In the post-operative the vault of ICL must be between 250 and 750 μm (Figure 2).

There are continuing concerns about the risk of late-onset cataract formation, probably resulting from direct physical contact between the ICL and the crystalline, and interruptions in the aqueous flow that interfere with lens nutrition causing metabolic disturbances in the crystalline.[18] Visian ICL V4c with central flow was developed to soften these disadvantages.

Phakic posterior chamber lenses have the additional advantage over anterior chamber lenses of a reduced chance of endothelial touch, as well as not causing pupil ovalization and requiring a smaller incision, which reduces the risk of iatrogenic astigmatism.

Efficacy

Salera et al. in their study to correct hypermetropia concluded that the efficacy of the procedure can be verified by the observation that 61.3% of the eyes presented visual acuity without postoperative correction of 20/40 or better (before the surgery this value was 12, 8%), whereas before surgery 87.1% had this same visual acuity, but with correction. There was a statistically significant difference in the visual acuity without correction ($p<0.01$) before and after surgery. It was concluded that the phakic posterior chamber lens corrected hyperopia in this group studied.(19)

Rosen et al. found that 14 (56%) of the 25 eyes operated in

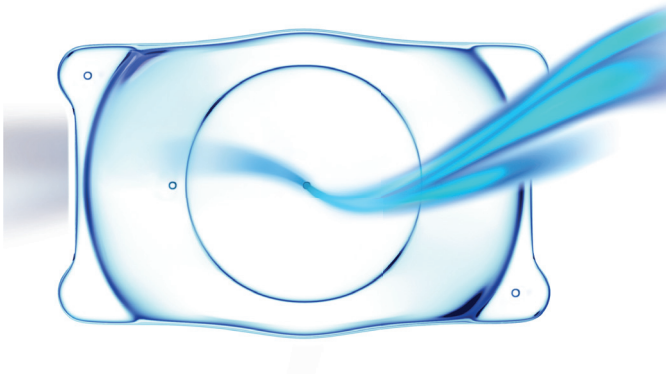

Figure 1 - New generation lens model ICL V4c: This new ICL model for myopia and myopic astigmatism (V4c) was developed to minimize complications of increased intraocular pressure by incorporating a 0.36mm artificial orifice in the center (KS-Aquaport / CentraFlow), potentially improving aqueous humor circulation and eliminating the need for peripheral laser iridotomy or intraoperative iridectomy

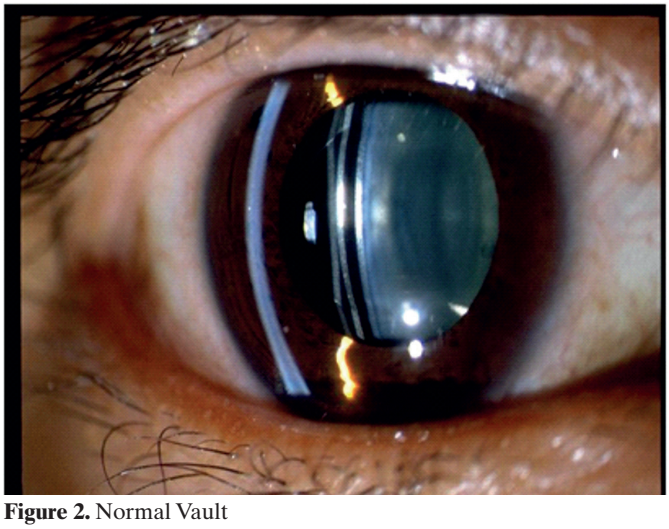

Figure 2. Normal Vault

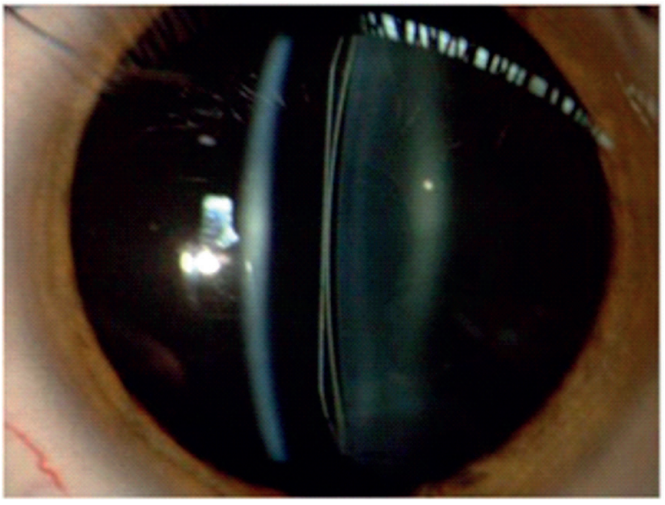

Figure 3. Reduced Vault

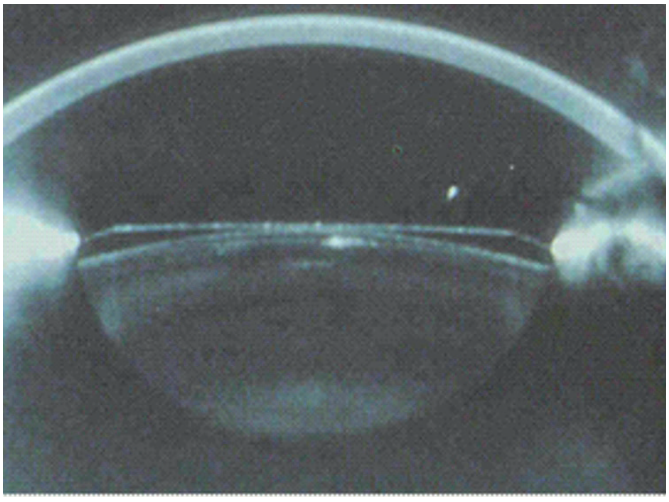

Figure 4. Reduced Vault

the hypermetropic group presented visual acuity without postoperative correction better than the best corrected visual acuity in the preoperative period. And in 12 (48%), the best corrected visual acuity of the preoperative period was equal to the uncorrected visual acuity in the postoperative period.[20]

Guimarães et al. showed in their study of myopia correction that the efficacy of the procedure can be easily verified by the observation that 70% of the eyes presented postoperative AVSC of 20/40 or better, whereas before surgery only 78% presented the same visual acuity, but with correction. This study shows that 11% of eyes presented preoperative visual acuity of 20/20 or better, 56% of eyes achieved the same visual acuity with correction after surgery, and 22% without correction. In this study, 68.8% (64 eyes) of eyes achieved a spherical equivalent within ± 1.00 R of emmetropia, and 41.9% (39 eyes) within ± 0.50 R of emmetropia in the last exam.[21]

Sanders et al. in their study of the treatment of myopia determined that the postoperative AVSC for the entire population studied was 20/20 or better in 59.3% of eyes and 20/40 or better in 94.7%; in the preoperative these values were 40.8% and 81.3%.[2]

Alfonso et al.[1] and Pesando et al.[6] showed 100% and 96% of the eyes respectively with ± 1.0 R of the desired correction.

Fernández et al. [20] showed 22.2% of eyes with ± 0,5R of the desired correction and 61.1% with ± 1.0R of the desired correction.

Safety

The analysis of visual acuity by loss and gain of sight lines is a good parameter to verify the safety of the procedure. In the study of Rosen et al.[20] no eye lost more than one line of best corrected visual acuity; 2 eyes (8%) lost one line of sight, 8 eyes (32%) gained 1 line of sight, 3 eyes (12%) gained 2 lines of sight, and 12 (48%) remained unchanged.

Guimarães et al.[21] compare in their study the pre- and post-operative corrected visual acuity in the last exam, having: 2 eyes (2.15%) lost two lines of sight, 2 eyes (2.15%) lost one line of sight, 18.28% of eyes (17 eyes) maintained preoperative visual acuity, whereas 33.3% (31 eyes) gained one line of sight, 27.96% (26 eyes) gained two lines, 11.83% (11 eyes) gained three lines, and 5.38% (5 eyes) gained more than three lines of sight.

Alfonso et al.[1] verified the safety rate (1.07 in 12 months); with no eye missing 1 or more lines of sight.

Pesando et al.[9] found that the best corrected visual acuity remained unchanged in 64.4% of eyes, improved one line of sight n 15.2%, improved 2 lines of sight in 8.3%, improved 3 lines of sight in 8.3%, and reduced 1 line of sight in 8.3%.

The work of Salera et al.[19] showed that: when compared to the pre- and postoperative visual acuity without correction, there was no loss of lines of sight in any of the cases, and 20 eyes (64.5%) gained more than three lines of sight. When compared to the visual acuity with pre- and postoperative correction, three eyes (9.7%) lost one line of sight, 19 eyes (61.3%) had the same visual acuity, six eyes (19.3%) gained one line of sight, and in three eyes (9.7%) there was gain of two lines of sight.

Fernández et al.[22] determined that 7 eyes (38.8%) gained 1 or more lines of sight, 55.5% kept the same visual acuity, and 1 eye (5.5%) lost more than 2 lines of sight. A recent systematic review showed that implanting phakic LIOs may be as safe as laser excimer ablations.[23]

Tychsen et al.[24] showed that the phakic posterior chamber LIO is also an option with satisfactory results in children with high myopia.

Stability

It is the ability to maintain a constant, stable, solid result. In all the aforementioned studies there is stability during the follow-up period.

We can mention: Rosen et al.[20] with six months of postoperative follow-up, Guimarães RQ et al.[2] with nine months of follow-up, Sanders DR et al.[3] with 3 years of postoperative follow-up.

Pesando et al.[6] found a good stability of refraction in 10 years of follow-up after surgery; this was the study with the longest follow-up among those reported.

As it does not depend on the cicatricial process of the eye for the refractive result, there are no significant variations of the result over time.

Complications

The most commonly reported complications for these lenses are lens opacities, IOP increase, pupillary block, loss of endothelial cells and pigment deposits on the anterior surface of the lens. Most

of the ICL-associated cataracts were reported as being anterior subcapsular. Phakic lens implants have a potential risk of intraocular complications such as endophthalmitis (0.0167%) and retinal detachment (3%), usually related to the axial length '30mm.[25]

The endothelial loss observed in the first year after ICL is 4.7% to 8.4%, and it continues with a rate of 2% to 3% per year in the first 3 years due to cellular remodeling; after that, it occurs due to natural loss.[24]

Acute pupillary block[2] and subsequent iridocorneal angle closure are considered primary causes of IOP elevation, often associated with inadequate preoperative iridotomy or excessive vault.[26]

Less than 260 µm Vault (reduced Vault - Figure 2/Figure 3) may induce more cataracts due to contact and mechanical trauma to the anterior capsule, as well as lead to aqueous flow disturbances (poor circulation) by interfering with the nutrition of the crystalline and causing metabolic disorders.[8,15]

The central or peripheral contact of the ICL with the crystalline may be responsible for the development of an anterior subcapsular cataract; eyes with insufficient vault (distance between the posterior surface of the lens and the anterior surface of the crystalline) are more predisposed to the secondary formation of cataract.[8,11,12,24]

The development of cataracts is more common in older patients and in patients with greater myopia; in addition, the incidence increases with the duration of the follow-up. [8,26,27]

A study carried out in Spain at Instituto Oftalmológico Férnadez-Vega showed the development of anterior and posterior subcapsular cataracts in 3 eyes, 1 eye developed anterior and nuclear subcapsular cataracts, and 17 eyes developed anterior subcapsular cataracts. In the eyes that developed cataract, the majority occurred due to peripheral contact in eyes with high myopia. The mean vault of the eyes that developed cataract was 103 ± 69µm (ranged from 40 to 270µm). In 15 eyes the vault was less than 100µm, and in 6 eyes the vault was between 100 and 270µm. And most eyes developed cataracts between the third and fourth year after LIO implant.[27]

Schmidinger et al.[11] reported a significant and continuous reduction of the central vault over the 10-year follow-up of patients with the ICMV4 model who developed cataract in the middle periphery due to the contact of the same with the anterior surface of the crystalline.

In Rosen et al.[20] 1 patient developed pupillary block and secondary glaucoma. Guimarães et al.[21] showed that 2 patients developed significant corneal edema in one of the eyes operated during the postoperative period, but the edema reverted quickly. However, significant endothelial loss was observed in both eyes (approximately 40%). In 2 eyes (2.15%) there was pupillary block on the first postoperative day, but it was reversed immediately upon diagnosis. Anterior subcapsular opacification was observed in 11 eyes (11.82%). In 5 of these eyes (5.3%) the opacifications were peripheral and asymptomatic. About 20% of the eyes had deposits of fine pigments in the lens without any subjective complaint of degradation of image quality.

United States Food and Drug Administration clinical trial[2] showed that the incidence of anterior subcapsular opacities was 2.1% within 1 year and 2.7% within 3 years after lens implant. They reported 2 retinal detachments, 5 eyes (0.9%) developed nuclear opacity, and of these 2 also developed posterior subcapsular opacity.

Alfonso et al.[1] in their study did not verify a chronic increase in the IOP or anterior subcapsular cataract during a 12-month follow-up.

Pesando et al.[9] reported 1 patient who developed pupillary block, 1 patient in which ICL was inadvertently placed upside down, but removed 1 day later and replaced in the correct position, 1 patient developed non-progressive paracentral subcapsular opacity, 1 patient developed anterior subcapsular cataract, 2 patients complained of halos and glare.

In Salera et al.[19], the most common complication was the presence of deposit of fine pigments on the anterior surface of the lens, found in 13 eyes (41.9%). But this finding was not associated to any subjective complaint of worsening of sight. The second most common complication was glare, reported by 3 patients (18.7%), without any biomicroscopic alterations justifying such a complaint. In one eye (3.2%), it was observed that the lens was partially captured by the iris, and its repositioning was indicated. In 1 eye (3.2%) the presence of spontaneous seidel was detected in the immediate postoperative period, where suture was performed. No lens opacification was seen.

Fernández et al.[22] demonstrated 2 eyes (11.1%) that developed pupillary block, 4 eyes (22.2%) presented deposits of pigments on the anterior surface of the lens, 1 eye (5.5%) developed anterior subcapsular opacification, 5 eyes (28%) developed transient ocular hypertension secondary to the use of corticoid eyedrops.

Conclusion

The careful review of the literature published so far has shown satisfactory results regarding the efficacy, high predictability, stability and safety of posterior chamber intraocular lens implantation for the correction of myopia, hyperopia and astigmatism.

References

1. Alfonso JF, Baamonde B, Madrid-Costa DR, Fernandes P, Jorge J, Montés-Micó R. Collagen copolymer toric posterior chambre phakic intraocular lenses to correct high myopic astigmatismo. J Cataract Refract Surg. 2010;36(8):1349-57.
2. Sanders DR, Doney K, Poco M. United States Food and Drug Administration clinical trial of the implantable collamer lens (ICL) for moderate to high myopia: three-year follow-up. Ophthalmology. 2004; 111(9):1683-92.
3. Santhiago MR, Smadja D, Gomes BF, Mello GR, Monteiro ML, Wilson SE, et al. Association between the percent tissue altered and post-laser in situ keratomileusis ectasia in eyes with normal preoperative topography. Am J Ophthalmol. 2014;158(1):87-95.
4. Santhiago MR, Wilson SE, Hallahan KM, Smadja D, Lin M, Ambrosio R Jr, et al. Changes in custom biomechanical variables after femtosecond laser in situ keratomileusis and photorefractive keratectomy for myopia. J Cataract Refract Surg. 2014;40(6):918-28.
5. Santhiago MR, Smadja D, Wilson SE, Randleman JB. Relative contribution of flap thickness and ablation depth to the percent tissue altered (PTA) in post-LASIK ectasia. J Cataract Refract Surg. 2015;41(11):2493-500.
6. Santhiago MR, Smadja D, Wilson SE, Krueger RR, Monteiro ML, Randleman JB. Role of percent tissue altered on ectasia after LASIK in eyes with suspicious topography. J Refract Surg. 2015;31(4):258-65.
7. Dada T, Sudan R, Sinha R, Ray M, Sethi H, Vajpayee RB. Results of laser in situ keratomileusis for myopia of -10 to -19 diopters with a Technolas 217 laser. J Refract Surg. 2003;19(1):44-7.
8. Rezende F, Bisol RR, Bisol T. Troca do cristalino com finalidade refrativa (TCR). Rev Bras Oftalmol. 2009; 68(3):180-7.

9. Pesando PM, Ghiringhello MP, Di Meglio G, Fanton G. Posterior chambre phakic intra-ocular lens (ICL) for hyperopia: ten year follow-up. J Cataract Refract Surg. 2007; 33(9):1579-84.
10. Lovisolo CF, Reinstein DZ. Phakic intraocular lenses. Surv Ophthalmol. 2005; 50(6):549-87.
11. Schmidinger G, Lackner B, Pieh S, Skorpik C. Long-term changes in posterior chamber phakic intraocular collamer lens vaulting in myopic patients. Ophthalmology. 2010; 117(8):1506-11.
12. Kumar N, Feyi-Waboso A. Intractable secondary glaucoma from hyphema following YAG iridotomy. Can J Ophthalmol. 2005;40(1):85-6.
13. Trindade F, Pereira F, Cronemberger S. Ultrasound biomicroscopic imaging of posterior chamber phakic intraocular lens. J Refract Surg. 1998;14(5):497-503
14. Lindland A, Heger H, Kugelberg M, Zetterstrom C. Vaulting of myopic and toric Implantable Collamer Lenses during accommodation measured with Visante optical coherence tomography. Ophthalmology. 2010;117(6):1245-50.
15. Alfonso JF, Lisa C, Palacios A, Fernandes P, Gonzelez-Meijome JM, Montes-Mico R. Objective vs subjective vault measurement after myopic implantable collamer lens implantation. Am J Ophthalmol. 2009;147(6):978-83.
16. Bylsma SS, Zalta AH, Foley E, Osher RH. Phakic posterior chamber intraocular lens pupillary block. J Cataract Refract Surg. 2002;28(12):2222-8.
17. Sanders DR. Anterior subcapsular opacities and cataracts 5 years after surgery in the Visian implantable collamer lens FDA trial. J Refract Surg. 2008;24(6):566-70.
18. Khalifa YM, Moshirfar M, Mifflin MD, Kamae K, Mamalis N, Werner L. Cataract development associated with collagen copolymer posterior chamber phakic intraocular lenses: clinicopathological correlation. J Cataract Refract Surg. 2010; 36(10):1768-74.
19. Salera CM, Servian EE, Guimarães MR, Castro RD, Guimarães RQ. Implante de lentes intra-oculares de câmara posterior em olhos fácicos para correção de hipermetropia. Arq Bras Oftalmol. 2003;66(6):823-9.
20. Rosen E, Gore C. Staar Collamer posterior chamber phakic intraocular lens to correct myopia and hyperopia. J Cataract Refract Surg. 1998;24(5):596-606.
21. Guimarães RQ, Castro R, Navarro MP, Guimarães MR. Lente fácica de câmara posterior para correção da miopia. Arq Bras Oftalmol. 2001;64(1):21-6.
22. Fernández AP, Jaramillo J, Vargas J, Jaramillo M, Jaramillo J, Galíndez A. Phakic posterior chambre intraocular lens for high myopia. J Cataract Refract Surg. 2004; 30(11):2277-83.
23. Barsam A, Allan BD. Excimer laser refractive surgery versus phakic intraocular lenses for the correction of moderate to high myopia. Cochrane Database Syst Rev. 2014 Jun 17;(6):CD007679
24. Tychsen L, Faron N, Hoekel J. Phakic intraocular collamer lens (Visian ICL) implantation for correction of myopia in spectacle-aversive special needs children. Am J Ophthalmol. 2007; 175(1):77-86.
25. Fernandes P, Gonzáles-Méijome JM, Madrid-Costa D, Ferrer-Blasco T, Jorge J, Montés-Micó R. Implantable collamer posterior chambre intraocular lenses: a review of potencial complications. J Refract Surg. 2011; 27(10):765-76.
26. Alfonso JF, Lisa C, Abdelhamid A, Fernandes P, Jorge J, Montés--Micó R. Three-year follow-up of subjective vault following myopic implantable collamer lens implantation. Graefes Arch Clin Exp Ophthalmol. 2010; 248(12):1827-35.
27. Alfonso JF, Lisa C, Fernández-Vega L, Almanzar D, Pérez-Vives C, Montés-Micó R. et al. Prevalence of cataract after collagen copolymer phakic intraocular lens implantation for myopia, hyperopia, and astigmatismo. J Cataract Refract Surg. 2015;41(4):800-5.

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Efficacy of Eyesi surgical simulator training in improving high-tension capsules capsulorhexis performance

Eficácia do treinamento com simulador cirúrgico Eyesi em melhorar a capsulorrexe em cápsulas de alta tensão

The article evaluating the training conducted with the Eyesi surgical cataract simulator has shown improvement in the performance of surgeons in training of capsulorrexis in capsules of high tension after repeated training, which increased the ability of the surgeon and their self-confidence.[1]

Models are used for over two millennia, according to historical records of the Roman era, when wooden swords covered with leather allowed military battle simulation. Currently, one of the best-known examples of the use of models is the flight simulator for teaching and training pilots.

Studies using simulation in the teaching of medicine show that students improve their performance and knowledge in the area studied. In addition, the teaching model has been modified in order not only to improve the use of the students, but also to ensure greater safety of patients.[2] The use of simulation techniques offers the opportunity to acquire various skills and the ability to repeat the procedure as many times as necessary until the subject is learnt. [3] High-cost models are typically more realistic to allow better training of students, but have more limited access, especially when it comes to medical residency services in developing countries. Such a problem can be partially overcome by developing simpler training models by the students themselves, which, although not capable of simulating it so accurately, increase their participation in the learning process, becoming another stage before training with real patients and reducing anxiety.

Low-cost models developed by the students themselves with the assistance of prefessors allow each student to have their own model to repeat the training as much as necessary, as well as offering the chance of eye anatomical learning during the building process.[4] Simulation-based education is an important investment that can assist in the education of safer physicians, which will be able to offer better assistance to the population, reducing the risks of the learning curve.

References

1. Bisol T, Bisol RAR, Rezende F. Efficacy of Eyesi® surgical simulator training in improving high-tension capsules capsulorhexis performance. Rev Bras Oftalmol. 2016;75(5): 375-9.
2. Quillen DA, Harper RA, Haik BG, Medical student education in ophthalmology: crises and opportunity. Ophthalmology. 2005; 112(11): 1867-8.
3. Stern GA. Teaching ophthalmology to primary care physicians.The Association of University Professors of Ophthalmology Education Committee. Arch Ophthalmol. 1995;113(6):722-4. Review.
4. Martins T, Costa AL, Helene O, Schor P, Martins R. Low-cost model for teaching ophthalmoscopy. Med Educ. 2015;49(5):528

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Response to the Letter to the Editor

Efficacy of Eyesi surgical simulator training in improving high--tension capsules capsulorhexis performance

We appreciate and agree with the comments regarding the article on the Eyesi surgery simulator, but we would like to add a few comments. For a surgeon to develop and be safe and confident, it is necessary to have theoretical knowledge, manual skills, and repetitive training, in order to improve their abilities and critical judgment for making decisions. Any teaching technique that can improve the surgeon's skills and training and that reduces their learning curve will certainly help reduce the risk of complications.

Student participation in the development of simulation models adds many positive factors to the teaching-learning process, and the cost has always been and will probably continue to be a problem to be faced in teaching services. However, it is unquestionable that modern technological advances now offer us tools such as the Surgical Simulator that add highly effective features to the surgical training process, and this is already documented in the scientific literature. Could one imagine that a decade or two ago the resident could train capsulorrhexis in a white cataract or a crystalline with zonular dehiscence in a simulation model? And have the opportunity to practice the emulsification of the nucleus at different levels of density? And practice the cortex aspiration in many situations of adherence to capsule? Today's technology offers us this opportunity. But, like everything else, it has a cost.

What we should probably discuss today would be the estimation of the cost-effectiveness of investing in a high-cost equipment such as the surgical simulator. Would it generate loss or savings?

We would need to estimate how many surgical complications and their consequences would be avoided (capsule rupture, need for anterior and posterior vitrectomy, intraocular lens fixation, secondary glaucoma, endothelial decompensation, corneal transplantation, long term eyedrops use, patient withdrawal from their professional activities, repercussions of visual impairment on the patient's activities, multiple ophthalmological appointments, etc.) to each surgeon who performed the training.

How many training surgeons can a Simulator equipment train?

In our 4-year simulator experience, each student spends an average of 14 hours of hands-on training to meet the standard curriculum of Eyesi Simulator for cataract. If we achieve an optimization of the daily occupation of the device from Monday to Friday, from 8:00am to 06:00pm, we will have 50 hours available weekly and 200 hours monthly, enough to train 14 students per month and 168 per year. In a study published in 2013 (McCannel CA, Reed DC, Goldman DR. Ophthalmic surgery simulator training improves resident performance of capsulorhexis in the operating room. Ophthalmology. 2013, Vols. 120(12):2456-61.) the reduction of complications related to problems in the manufacture of capsulorrhexis was 15 to 5% among the residents who took the training with the simulator. If a resident performs 100 surgeries in a year, there will be 10 complications less per resident per year. If we train 168 residents in the simulator per year, there will be 1680 complications avoided per year. If each complication has a direct and indirect aggregate cost of R$ 1,000.00, it will save R$ 1,680,000.00 per year. Wouldn't this savings alone financially justify the investment in the equipment?

In medical education, as well as in public health, if we do not prioritize investment in quality education and prevention with cost planning, society will continue to spend more on solving the problems caused rather than spend less investing in prevention.

It is up to us, physicians, professors, trainers of new surgeons, to disseminate new ideas and technologies that are here to improve the teaching-learning process, with the resources we have available, whether with low-cost simulation models or, hopefully, it will be a reality within to everyone with the use of all the benefits that a high-tech resource can offer.

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Instruções aos autores

A Revista Brasileira de Oftalmologia (Rev Bras Oftalmol.) - ISSN 0034-7280, publicação científica da Sociedade Brasileira de Oftalmologia, se propõe a divulgar artigos que contribuam para o aperfeiçoamento e o desenvolvimento da prática, da pesquisa e do ensino da Oftalmologia e de especialidades afins. Todos os manuscritos, após aprovação pelos Editores, serão avaliados por dois ou três revisores qualificados (peer review), sendo o anonimato garantido em todo o processo de julgamento. Os comentários dos revisores serão devolvidos aos autores para modificações no texto ou justificativa de sua conservação. Somente após aprovações finais dos revisores e editores, os manuscritos serão encaminhados para publicação. O manuscrito aceito para publicação passará a ser propriedade da Revista e não poderá ser editado, total ou parcialmente, por qualquer outro meio de divulgação, sem a prévia autorização por escrito emitida pelo Editor Chefe. Os artigos que não apresentarem mérito, que contenham erros significativos de metodologia, ou não se enquadrem na política editorial da revista, serão rejeitados não cabendo recurso.

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O artigo enviado deverá ser acompanhado de carta **assinada por todos os autores**, autorizando sua publicação, declarando que o mesmo é inédito e que não foi, ou está sendo submetido à publicação em outro periódico e foi aprovado pela Comissão de Ética em Pesquisa da Instituição em que o mesmo foi realizado.

A esta carta devem ser anexados:

• Declaração de Conflitos de Interesse, quando pertinente. A Declaração de Conflitos de Interesses, segundo Resolução do Conselho Federal de Medicina nº 1595/2000, veda que em artigo científico seja feita promoção ou propaganda de quaisquer produtos ou equipamentos comerciais;

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• Artigo que trata de pesquisa clínica com seres humanos deve incluir a declaração de que os participantes assinaram Termo de Consentimento Livre Informado.

Todas as pesquisas, tanto as clínicas como as experimentais, devem ter sido executadas de acordo com a Declaração de Helsinki.

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Resumo e Descritores: Resumo, em português e inglês, com no máximo 250 palavras. Para os artigos originais, deverá ser estruturado (Objetivo, Métodos, Resultados, Conclusão), ressaltando os dados mais significativos do trabalho. Para Relatos de Caso, Revisões ou Atualizações, o resumo não deverá ser estruturado. Abaixo do resumo, especificar no mínimo cinco e no máximo dez descritores (Keywords) que definam o assunto do trabalho. Os descritores deverão ser baseados no DeCS - Descritores em Ciências da Saúde - disponível no endereço eletrônico http://decs.bvs.br/

Abaixo do Resumo, indicar, para os Ensaios Clínicos, o número de registro na base de Ensaios Clínicos (http://clinicaltrials.gov)*

C) Texto

Deverá obedecer rigorosamente a estrutura para cada categoria de manuscrito.

Em todas as categorias de manuscrito, a citação dos autores no texto deverá ser numérica e sequencial, utilizando algarismos arábicos entre parênteses e sobrescritos. As citações no texto deverão ser numeradas sequencialmente em números arábicos sobrepostos, devendo evitar a citação nominal dos autores.

Introdução: Deve ser breve, conter e explicar os objetivos e o motivo do trabalho.

Métodos: Deve conter informação suficiente para saber-se o que foi feito e como foi feito. A descrição deve ser clara e suficiente para que outro pesquisador possa reproduzir ou dar continuidade ao estudo. Descrever a metodologia estatística empregada com detalhes suficientes para permitir que qualquer leitor com razoável conhecimento sobre o tema e o acesso aos dados originais possa verificar os resultados apresentados. Evitar o uso de termos imprecisos tais como: aleatório, normal, significativo, importante, aceitável, sem defini-los. Os resultados da pesquisa devem ser relatados neste capítulo em seqüência lógica e de maneira concisa.

Informação sobre o manejo da dor pós-operatório, tanto em humanos como em animais, deve ser relatada no texto (Resolução nº 196/96, do Ministério da Saúde e Normas Internacionais de Proteção aos Animais).

Resultados: Sempre que possível devem ser apresentados em Tabelas, Gráficos ou Figuras.

Discussão: Todos os resultados do trabalho devem ser discutidos e comparados com a literatura pertinente.

Conclusão: Devem ser baseadas nos resultados obtidos.

Agradecimentos: Devem ser incluídos colaborações de pessoas, instituições ou agradecimento por apoio financeiro, auxílios técnicos, que mereçam reconhecimento, mas não justificam a inclusão como autor.

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Artigos de Periódicos:

Dahle N, Werner L, Fry L, Mamalis N. Localized, central optic snowflake degeneration of a polymethyl methacrylate intraocular lens: clinical report with pathological correlation. Arch Ophthalmol. 2006;124(9):1350-3.

Arnarsson A, Sverrisson T, Stefansson E, Sigurdsson H, Sasaki H, Sasaki K, et al. Risk factors for five-year incident age-related macular degeneration: the Reykjavik Eye Study. Am J Ophthalmol. 2006;142(3):419-28.

Livros:

Yamane R. Semiologia ocular. 2a ed. Rio de Janeiro: Cultura Médica; 2003.

Capítulos de Livro:

Oréfice F, Boratto LM. Biomicroscopia. In: Yamane R. Semiologia ocular. 2ª ed. Rio de Janeiro:

Cultura Médica; 2003.

Dissertações e Teses:

Cronemberger S. Contribuição para o estudo de alguns aspectos da aniridia [tese]. São Paulo: Universidade Federal de São Paulo; 1990.

Publicações eletrônicas:

Herzog Neto G, Curi RLN. Características anatômicas das vias lacrimais excretoras nos bloqueios funcionais ou síndrome de Milder. Rev Bras Oftalmol [periódico na Internet]. 2003 [citado 2006 jul 22];62(1):[cerca de 5p.]. Disponível em: www.sboportal.org.br

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O número de identificação deverá ser registrado abaixo do resumo.

Os trabalhos poderão ser submetidos pela Internet, pelo site - rbo.emnuvens.com.br

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