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Influência da atopia na espessura coroideia em doentes com queratocone/ Influence of atopy on choroidal thickness in keratoconus patients

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Influência da atopia na espessura coroideia em doentes com queratocone

Influence of atopy on choroidal thickness in keratoconus patients

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Oftalmologia

TÍTULO DISSERTAÇÃO/~~MONOGRAFIA~~ (riscar o que não interessa)

Influence of Atopy on Choroidal thickness in Keratoconus Patients

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Faculdade de Medicina da Universidade do Porto, 13/03/2020

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Influence of Atopy on Choroidal thickness in Keratoconus Patients

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ABSTRACT

Purpose: The aim of this study was to determine if increased choroidal thickness is correlated with atopy in patients with keratoconus.

Methods: A cross-sectional study including 80 patients with KC of which 51 atopic and 29 non-atopic, aged between 14 and 30 years old, were studied. Patients with KC followed in Corneal Department of Centro Hospitalar São João, Porto, were identified and consecutively included between December 2017 and February 2018. A spectral-domain optical coherence tomography (OCT) using depth enhanced imaging was performed and choroidal thickness was measured and compared in the center of the fovea and at 500 µm intervals along a horizontal section. Statistical analysis was performed using SPSS.

Results: The statistical analysis showed that atopic-keratoconic patients seem to have a thicker choroid in every measured location. Mean subfoveal choroidal thickness (SFCT) values obtained were 391.53 ± 108.08 and 351.17 ± 85.60 in atopic and non-atopic groups, respectively (P<0.088).
In the multivariate analysis, adjusted to co-variates (age, sex and spherical equivalent) we found that having atopy makes the choroid thicker, on average 41.407 µm when compared to non-atopic, although without statistical significance (P = 0.084).
We found a statistically thicker choroid 62.656 µm (P=0.035) only in patients with atopic dermatitis but not in patients with asthma or rhinoconjunctivitis.

Conclusion: Atopic patients seem to have a thicker choroid compared with non-atopic patients, which could be associated with inflammatory choroidal mechanisms in patients with KC.

Keywords: Choroidal Thickness, Atopy, Keratoconus, Inflammation, Spectral-Domain Optical Coherence Tomography.

RESUMO

Objetivo: O objetivo deste estudo é determinar se a atopia está relacionada com o aumento da espessura coroideia em pacientes com queratocone (KC).

Materiais e Métodos: Realizou-se um estudo transversal com 80 pacientes com KC, dos quais 51 eram atópicos e 29 não atópicos, com idades compreendidas entre 14 e 30 anos. Pacientes com KC acompanhados no Departamento de Córnea do Centro Hospitalar São João, Porto, foram identificados e incluídos consecutivamente entre Dezembro de 2017 e Fevereiro de 2018. Foi realizada uma tomografia de coerência óptica (OCT) de domínio espectral usando imagens com profundidade aprimorada e a espessura coroideia foi medida e comparada no centro da fóvea e em intervalos de 500 µm ao longo de uma seção horizontal. A análise estatística foi realizada usando o SPSS.

Resultados: A análise estatística mostrou que os pacientes atópicos com KC parecem ter uma coroide mais espessa em todos os locais medidos. Os valores médios da espessura coroideia subfoveal (TCAR) obtidos foram 391,53 ± 108,08 e 351,17 ± 85,60 nos grupos atópico e não atópico, respetivamente (P <0,088). Na análise multivariada, ajustada às co-variáveis (idade, sexo e equivalente esférico), verificou-se que a atopia torna a coroide mais espessa, em média 41,407 µm quando comparada com os não atópicos, embora sem significância estatística (P = 0,084). A coroide é estatisticamente mais espessa, 62.656 µm (P = 0.035), em pacientes com dermatite atópica, mas não em pacientes com asma ou rinoconjuntivite.

Conclusão: Pacientes atópicos parecem ter uma coroide mais espessada em comparação com pacientes não atópicos, o que pode estar associado a mecanismos inflamatórios subjacentes.

Palavras-Chave: Espessura coroideia, Atopia, Queratocone**,** Inflamação, Tomografia de Coerência Óptica de Domínio Espectral.

INTRODUCTION

Keratoconus (KC) comes from the Greek words keras (cornea) and konos (cone) and has been classically defined as a progressive, bilateral and assimetrical non inflammatory corneal ectasia[1]. It is the most common cornea ectatic disorder, with a reported incidence of approximately 1 per 2000 per year, and a prevalence of 54.5 per 100 000 [3,6].

It is characterized by a progressive cone-shaped thin cornea leading to myopia, irregular astigmatism, and consequently important vision impairment [1,2,3].

The onset of the disease usually occurs in puberty, although in some cases may develop in the early adulthood. Although it is a progressive condition, it usually stabilizes by the fourth decade of life. Early in the disease, the patient is typically asymptomatic, but with disease progression, visual acuity decreases, and the patient can notice visual distortion with significant life impact [1,3].

In the early stages, the condition is usually well managed by spectacles. As the condition progresses to a mild or moderate stage with irregular astigmatism, the treatment of choice is contact lenses, especially rigid gas permeable lenses. However, about 20% of patients with advanced or severe KC cannot tolerate or improve their vision sufficiently with contact lenses and will eventually need surgery. Actually, keratoconus is one of the most common indications for keratoplasty in developed countries even though its frequency has a tendency to decrease due to the emergency of collagen cross-linking therapy [1,2,34,35]. Regardless the treatment option applied, KC constitutes an important condition with a huge impact in a country economy and patient life's quality.

The most sensitive method for detecting and confirming a diagnosis of KC is unequivocally corneal topography based on the principles of Placido disc and Scheimpflug imaging [1].

The cause of this condition is still largely unknown, KC is believed to be a multifactorial disorder, with genetic and environmental factors being involved. A positive association between KC and many conditions has been suggested, including atopy, eye rubbing, handedness, cardiovascular disease, ocular trauma, collagen vascular disorders, pigmentar retinopathy, among others[1,2].

One of the factors that have been associated with the etiology of KC is atopy. Atopy refers to the genetic tendency to develop classic allergic diseases, such as allergic rhinoconjunctivitis, allergic asthma, and atopic dermatitis (eczema)[1]. Atopy is a predisposition to respond immunologically to diverse antigens/allergens, leading to CD4+/Th2 differentiation and overproduction of immunoglobulin E (IgE). The clinical consequence of this is the propensity to develop hypersensitivity reactions to allergens.

An association with atopic diseases and KC was confirmed in some studies, but the nature of this association is uncertain[1,3].

KC has been classically defined as a non-inflammatory disease since there is no evidence of inflammatory cell infiltration or neovascularization in the cornea. However, a large number of studies suggest a role for inflammation in the pathophysiology of this disease[1,2]. The choroid has been implicated in the pathogenesis of many inflammatory disorders of the eye so, the analysis of the choroid in the eye is crucial for our understanding of a range of ocular diseases and physiological processes[16,20].

Being both the most vascularized tissue of the eye and the tissue with the highest blood flow per weight unit, choroid may play a role on the pathogenesis of ocular inflammatory processes. Increased choroidal thickness in keratoconus patients has been reported in several studies, however the mechanism responsible for this event is not clear[19,20].

The Spectral Domain Optical Coherence Tomography (SD-OCT) is a noninvasive imaging modality that provides in vivo characterization of three-dimensional retinal anatomy. With enhanced depth imaging (EDI) software integrated into SD-OCT devices it is possible to visualize the entire choroid with high resolution. Thus, choroidal morphology and especially small changes in choroidal thickness have been assessed using this technology in several pathologic and physiologic conditions. Despite that, the measurement of choroidal thickness is currently made manually [1,11].

We suspect that the mechanism underlying atopy may be associated with increased choroidal thickness.

Therefore, the primary goal of this study was to determine if increased choroidal thickeness observed in KC is correlated with atopy.

MATERIAL AND METHODS

Patient Selection and Data

A cross-sectional study was performed. Patients with KC followed at the Ophthalmology Corneal Department of Centro Hospitalar e Universitário de São João were collected between December 2017 and February 2018. All patients included were aged from 14 to 30 years old and keratoconus had been previously diagnosed by a certified ophthalmologist.

Exclusion criteria were the following: existence of any other ocular pathology than KC; existence of active systemic or ocular inflammation; current treatment with anti-inflammatory drugs (local or systemic); corticosteroid or immunosuppressive treatment in the last six months; other ocular surgeries besides intracorneal ring segments or crosslinking procedures (performed at least 6 months prior to the scan) and any other systemic diseases rather than allergic conditions.

A total of 80 patients were included. Each patient included was asked about their atopy history. The following features were collected: eye's rubbing, history of atopy (Alergic Rhinoconjunctivitis, Alergic Asthma, Atopic dermatitis) and corticosteroids or immunosuppressants use. The information collected was verified with the system SClínico and only patients with a previously validated atopic history diagnosed by an immunologist were included in the atopic group.

The morphological characterization and follow up of the cornea were performed using Corneal Tomography Scheinflug Analysis (Pentacam HR, OCULUS Optikgeräte GmbH, Wetzlar, Germany).

This was a cross-sectional study which 80 patients with KC followed at Ophthalmology Corneal Department of Hospital de São João were included.

Patients with KC, aged from 14 to 30 years old, were identified and consecutively included between December 2017 and February 2018.

All patients had been previously diagnosed with keratoconus by a certified ophthalmologist.

Ophthalmic examination included measurement of the best-corrected Snellen visual acuity (BCVA), slit-lamp biomicroscopic examination, intraocular pressure measurement with Goldmann applanation tonometry and fundus examination with mydriasis and a 90D lens to exclude other ocular pathologies.

During clinical observation patients were asked about their atopy history. The following features were collected: rubbing eyes, history of atopy (Alergic Rhinoconjunctivitis, Alergic Asthma, Atopic dermatitis) and taking corticosteroids or immunosuppressants.

This information were verified with the system SClínico and only patients with a atopic history previously diagnosed and validated by an immunologist or an ophthalmologist were accept in this study.

Exclusion criteria were the following: existence of any other ocular pathology than KC; existence of active systemic or ocular inflammation; current treatment with anti-inflammatory drugs (local or systemic); corticosteroid or immunosuppressive treatment in the last six months; other ocular surgeries besides intracorneal ring segments or crosslinking procedures (performed at least 6 months prior to the scan) and any other systemic diseases rather than allergic conditions. Subjects whose acquired OCT images were of poor quality, including an indistinct chorioscleral interface, were also excluded.

The patients were informed about the nature of the study and consented to participate. The Institutional Committee of Ethics of Centro Hospitalar e Universitário de São João approved our research protocol.

Choroidal Imaging

The patients underwent EDI SD-OCT using the Spectralis® Heidelberg® apparatus (Heidelberg Engineering, Carlsbad, CA, USA). The SD-OCT scans were single 30º B-scans centered on the fovea using the EDI function averaged 100 times. CT was measured from the outer edge of the hyperreflective line, corresponding to the retinal pigment epithelium, to the choroidal-scleral juction. These measurements were taken at the subfoveal choroid and at 500 µm intervals from the fovea: temporal 500 µm (T500), 1000 µm (T1000), 1500 µm (T1500) and nasal 500 µm (N500), 1000 µm (N1000) and 1500 µm (N1500). Choroid thickness was measured manually (from the outer portion of the hyperreflexivity line corresponding to the retinal pigment epithelium to the inner surface of the sclera).

Statistical Evaluation

Statistical analysis was performed using the SPSS® statistical software (version 24.0 for Mac OS; SPSS Inc., Chicago, IL., USA). In the present study, just one eye from each patient was used for statistical analyses (the right eye was chosen, of the patients who had both eyes affected with keratoconus). The Kolmogorov–Smirnov test and normal probability plots were used to confirm the normal distribution of the data. Parametric or non-parametric tests were used for continuous variables comparison between the atopic and non-atopic group, according to the normality of data. Chi2 or Fisher´s exact tests were performed for categorical variables comparison. Multivariate linear regression analysis (adjusted to co-variates age, sex and spherical equivalent), using generalized

linear models, was performed to identify the potential variables associated with subfoveal choroidal thickness. Statistical significance for all the analyses was set at a P value less than 0,05.

RESULTS

Patient Characterization

A total of 80 patients were included in this study, 19 (23.8%) women and 61 (76.3%) men. Their age ranged from 14 to 30 years old with a mean age of 23.5 ± 4.401 years old. A sample characterization of patients is present in table 1. Of the 80 eyes analyzed, 68 (85%) were right eyes and 12 (15%) left eyes. Best corrected visual acuity was 0,79 ± 0,21, with glasses or contact lenses. The mean spherical equivalent of the studied eyes was -2.3484 ± 2,27 diopters. Regarding surgical treatments, 8 eyes (10%) had been submitted to an intrastromal corneal ring and crosslinking was performed in 14 eyes (17.5%).

A characterization of topographic and pachymetric indices (kmax, Kmed, K2, Pakam, D, Class) is listed in table 2. The mean of Kmax was 56,72 ± 7,95, mean Pakmin was 457,66 ± 52,81, mean Bad-D was 9,53 ± 5,30 and the median keratoconus classification was 2,35 ± 1.02. Regarding keratoconus classification, 8 eyes were classified in class 0.5, 4 eyes in class 1, 3 eyes in class 1.5, 13 eyes in class 2, 13 eyes in class 2.5, 28 eyes in class 3 and 10 eyes in class 3.5.

Patients Atopy History

Among our patients, 63.8% (n=51) have a positive atopy history. Of these, 31.3% (n=25) specified to have allergic rhinoconjunctivitis, 2.5% (n=2) allergic asthma; 8.8% (n=7) atopic dermatitis, 7.5% (n=6) allergic rhinoconjunctivitis and asthma; 7.5% (n=6) allergic rhinoconjunctivitis and atopic dermatitis; 1.3% (n=1) asthma and atopic dermatitis. 5% (n=4) referred to have all of these pathologies.

Patients were also asked to quantify the frequency of eye rubbing. Only 17.5 (n=14) from a total of 80 patients denied doing it. Of the remaining 82.5% (n=66) patients, 33.8% (n=27) admitted doing it rarely, 33.8% (n=27) stated that sometimes rub their eyes, the remaining 15% (n=12) answered often.

We found that atopic group was more eye rubbing than non-atopic group with statistical significance ($P<0.003$).

None of patients reported the use of corticosteroids or other immunosuppressants in the last 6 months.

Comparison between atopic and non-atopic group

In this study 80 patients with keratoconus were classified according to the presence or absence of atopic conditions. Of these 51 patients were included in atopic group and 29 in the non-atopic. Regarding frequency variables, no differences were found between

atopic and non-topic groups. When comparing choroidal thickness between both groups, there is no statistically significant differences between them, as showed in table 3. However, it is evident a tendency for an increased choroidal thickness in the atopic group. For all evaluated points of choroid, mean thickness was higher in the atopic group. Subfoveal mean CT values obtained were 391.5 ± 108.1 and 351.2 ± 85.6 in atopic group and non-atopic group respectively (P<0.088) but it was not statistically significant.

In the univariate analysis when we compare patients with asthma, rhinoconjunctivitis or atopic dermatitis with patients without known allergies we find a tendency for an increased choroidal thickness, but it is not statistically significant. Subfoveal mean CT values obtaind were 381.22 ± 112.52 in rhinoconjuntivitis subgroup (P<0.230); 376.23 ± 75.99 in asthma subgroup (P<0.370) and 405.55 ± 106.50 in atopic dermatitis subgroup (P<0.06).

In the multivariate analysis, adjusted to co-variates (age, sex and spherical equivalent) we found that having atopy makes the choroid thicker, on average 41.407 µm when compared to non-atopics, although without statistical significance (P = 0.084).

We found a statistically thicker choroid 62.656 µm (P=0.035) in patients with atopic dermatitis. Although in patients with rhinoconjunctivitis and asthma the choroid was thicker 26.661 µm (P=0.296) and 27.690 µm (P=0.335) respectively, it is not statistically significant.

DISCUSSION

The relative contribution of environmental factors to the etiology of KC are poorly understood. An association with atopic disease and KC was confirmed in some studies, but the nature of this association is uncertain.

The analysis of the choroid is crucial for the understanding of a range of ocular diseases and physiological processes. The choroid has been implicated in the pathogenesis of many inflammatory disorders of the eye. EDI SD-OCT provides the ability to capture highly detailed cross-sectional images of the choroid, so using this method an enhanced image from Bruch's membrane to the suprachoroidal space can be obtained [11,30]. Recent studies using these imaging modalities have shown anatomical choroidal changes in various inflammatory chorioretinal disorders and multisystemic inflammatory disorders without ophthalmologic manifestations. These findings may support a choroidal role on the pathogenesis of inflammatory disorders. Recent data also shows the existence of an inflammatory environment in the cornea of KC eyes[33]. Taking this into account, we examined the possible association among choroidal thickness and atopy. We analyse CT using EDI SD-OCT scans in KC eyes and we compare the differences between atopic and non-atopic patients.

To provide insight into the mechanism underlying increased choroidal thickness in KC patients. We performed a multivariate analysis to compare the choroidal thickness in atopic and non-atopic patients with KC and we adjusted this analysis to spherical equivalente and age because these variables influence CT and could influence our results.

To our knowledge, this is the first study evaluating the choroidal thickness of KC patients and atopy.

Our results show a tendency for a thicker choroid in atopic patients with KC compared with patients without an atopic disease in every point measured but it was not statistically significant.

In the multivariate analysis, adjusted to co-variates (age, sex and spherical equivalent) we found a statistically thicker choroid in patients with atopic dermatitis but not in patients with rhinoconjunctivitis and asthma.

The exact pathophysiological mechanism resulting in a thicker choroid in KC patients is not known, but we think that this could be associated with inflammatory choroidal mechanisms in keratoconic eyes. Despite KC being classically defined as a non-inflammatory disease and the fact that no consistent relation to systemic inflammatory disorders has been described, a role for inflammation in the pathophysiology of KC has been suggested[12,13]. In fact, a large number of studies provided evidence of increased

levels of pro-inflammatory cells, cytokines and other inflammatory mediators in tears of KC patients, whereas other inflammatory suppressants seem to be reduced. Multiple inflammatory mediators have been found to be increased in tears of KC patients, including the well documented IL-1, IL-6, TNF-a and MMP-9 [14,15,17,33].

Most authors who reviewed the pathogenesis of KC consider eye rubbing to be strongly associated with the disease. The microtrauma caused to the epithelium by rubbing KC corneas generates elevated levels of matrix metalloproteinases MMP-1 and MMP-13, which are secreted by epithelial and stromal cells, and inflammatory mediators including IL-6 and TNF-α. The process include apoptosis of keratocytes as a result of increased levels of interleukin IL-1 with subsequent loss of stromal volume[1].

Atopy is a predisposition to respond immunologically to diverse antigens/allergens, leading to CD4+/Th2 differentiation and overproduction of immunoglobulin E (IgE)[1,24].

Predominant tissue eosinophilia is a hallmark of allergic inflammation; the number, activity, and survival of eosinophils are controlled through multiple pathways, including cytokines released by inflammatory cells such as T helper cells, NK cells, eosinophils, and mast cells. T helper lymphocytes can be divided into TH1 and TH2 cells on the basis of their cytokine production. TH1 cells produce IL-2 and IFN-γ (TH1 cytokines); TH2 cells produce IL-4, IL-5, IL-6, IL-10, and IL-13[36].

The "hygiene hypothesis," which suggests that diminished exposure to childhood infections in modern society has led to decreased TH1-type responses. Reduced TH1 may lead to enhanced TH2-type inflammation, which is important in promoting atopic disease[36].

The clinical impression that keratoconus for some unexplained reason shows a strong tendency to coexist with atopic disorders is confirmed by some studies. Keratoconus and atopy seem to have the same immunological abnormalities[24].

A limitation of this study is its cross-sectional design, which clouds the determination of a causal relationship between the altered choroid profile and KC development. Moreover, a longitudinal study could control better some possible biases of this single point observation. The generalizability of the data may not be assured because we just included 80 patients, all attending at one medical center. This fact, might lead to an over-representation of more severe forms of the disease. So it would be interesting to conduct similar studies in other locations of our country to define a better profile of patients. This is a cross-sectional retrospective design so the information about ophtalmologic examination, systemic background or risk factors could be incomplete.

Furthermore, in this study we included some patients which had performed intracorneal ring segments or crosslinking procedures at least 6 months before CT evaluation which could have some influence in CT.

CONCLUSION

The current study indicates that atopy can be correlated with an increased choroidal thickness in patients with KC.

Atopic patients seem to have a thicker choroid compared with non atopic patients, which could be associated with inflammatory choroidal mechanisms in patients with KC.

Our study may be a guide for further studies to clarify atopic effect on choroid. Future controlled longitudinal studies should be planned to shed light on these points.

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FINANTIAL INTEREST DECLARATION

No benefit was received for the present study.

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TABLES

Table 1

Variable	Mean ± SD
Age	23.5 ± 4.40
BCVA	0.788 ± 0.20
Sferical Equivalent	-2.35 ± 20.27
Women	N=19

Table 2

Variable	Mean ± SD
Kmax	56.72 ± 7.95
Kmed	48.38 ± 5.37
K2	50.05 ± 5.94
Class	2.354 ± 1.02
Pak min	457.15 ± 52.81
Bad-D	9.54 ± 5.30

Table 3

	Atopic (N=51)	Non Atopic (N=29)	P
	Median	Median	
Subfoveal	391.5	351.2	P<0.088
N500	376.1	338.7	P<0.114
N1000	353.4	317.9	P<0.130
N1500	322.2	285.3	P<0.109
T500	388.7	354.3	P<0.139
T1000	380.8	348.8	P<0.164
T1500	368.0	340.7	P<0.230

LEGENDS:

Table 1 - Summary of demographical and clinical characteristics by group. Results are expressed as mean ± SD for continuous variables and gender is expressed as count and percentage of women. P was calculated using Mann-Whitney U test for continuous variables and using Pearson's chi-square test for gender. BCVA – Best corrected visual acuity

Table 2 – Characterization of topographic and pachymetric indices in the atopic group. Results are expressed as mean ± SD for continuous variables and median (range) for Keratoconus classification.

Table 3 – Choroidal thickness in different locations by group. Results are expressed as median (range). Measurements undertaken at subfoveal, temporal 500 μm (T500), 1000 μm (T1000), 369 1500 μm (T1500), and nasal 500 μm (N500), 1000 μm (N1000), and 1500 μm (N1500). P was calculated using Mann-Whitney U test.

ATOPY - QUESTIONNAIRE

1. Identification Code _____

2. Habits

Do you rub your eyes?

Yes __

No __

How often do you rub your eyes?

Rarely __

Sometimes __

Frequently __

3. History of atopy

Do you have any atopic disease?

Alergic Rhinoconjunctivitis __

Alergic Asthma __

Atopic dermatitis (eczema) __

Others __

If you answered others, specify the type of atopy history: _____

4. Medication Habits

Have you taken corticosteroids in the last 6 months?

Yes___

No___

ANEXOS

I. Parecer da Comissão de Ética

II. Normas de publicação da revista

I. Parecer da Comissão de Ética

Unidade de Investigação
Tomei conhecimento. Nada a opor. À DC.
03 de Fevereiro de 2020
A Coordenadora da Unidade de Investigação
(Prof.ª Doutora Ana Azevedo)

DIRECÇÃO CLÍNICA
4/2/2020
n.º 331/19

SÃO JOÃO

PEDIDO DE AUTORIZAÇÃO

Realização de Investigação

Exmo. Senhor Presidente do Conselho de Administração
do Centro Hospitalar de São João

CONSELHO DE ADMINISTRAÇÃO - REUNIÃO DE
Presidente do Conselho de Administração
2020.02.06

Nome do Investigador Principal:

Ana Francisca do Couto Aires

Título da Investigação:

Influência da atopia na espessura coroideia em doentes com queratocone

Pretendendo realizar no(s) Serviço(s) de:

Oftalmologia

a investigação em epígrafe, solicito a V. Exa., na qualidade de Investigador/Promotor, autorização para a sua efetivação.

Para o efeito, anexo toda a documentação referida no dossier da Comissão de Ética do Centro Hospitalar de São João/ Faculdade de Medicina da Universidade do Porto respeitante à investigação, à qual enderecei pedido de apreciação e parecer.

Com os melhores cumprimentos. *O Investigador/ Promotor*

Porto, 02 *de* Outubro *de* 2019 . Ana Francisca do Couto Aires
assinatura

•Centro Hospitalar São João•
Centro de Epidemiologia Hospitalar
14.1.2020

CES-IM005-0

II. Normas de publicação da revista

A revista da Sociedade Portuguesa de Oftalmologia é uma revista em open access que publica de forma prioritária artigos de investigação básica e clínica, como artigos de revisão, artigos originais, casos clínicos, relacionados com Oftalmologia nas suas diferentes especialidades, bem como temas de áreas de conhecimento fronteira com interesse para a prática médico-cirúrgica e processo clínico na perspetiva da governação clínica em Oftalmologia. O rigor e a exatidão dos conteúdos, assim como as opiniões expressas são da exclusiva responsabilidade dos Autores.

PROCESSO EDITORIAL

1. Condições gerais – Os artigos devem ser preferencialmente redigidos em Português ou Inglês, sendo desejável que progressivamente sejam em Inglês. Será dada sempre preferência de publicação aos artigos submetidos simultaneamente em Português e Inglês. Poderão ser publicados artigos numa outra língua (espanhol ou francês), sendo que estes têm de ser obrigatoriamente submetidos também em Inglês.

Os manuscritos depois de rececionados são encaminhados para o editor da revista, que fará uma primeira avaliação editorial com o fim de comprovar a sua adequação (no âmbito temático e de interesse para a revista) e o cumprimento dos requisitos de apresentação formal exigidos nas normas de publicação. Desta apreciação resulta a aceitação para revisão por pares ou a sua devolução ao autor para correção e nova submissão.

Os manuscritos devem ser submetidos em ficheiros de texto em formato Word (DOC ou DOCX), com texto seguido e sempre com o mesmo tipo de letra. Os textos devem ser formatados em letra “Arial”, tamanho 11 com espaçamento de 1,5 linhas. Os títulos e sub-títulos deverão estar assinalados a negrito e em tamanho 12. A primeira página (página de rosto) deve conter somente os elementos descritos adiante na rubrica “Organização do Artigo”.

Os documentos submetidos para publicação serão propriedade da revista Oftalmologia da SPO transferindo os seus autores o direito de propriedade (copyright) a partir do momento que são aceites para publicação. Não serão aceites artigos simultaneamente submetidos noutras publicações científicas.

Os trabalhos devem ser submetidos em formato electrónico, na plataforma da revista da SPO, acessível a partir do site da SPO: http://www.spoftalmologia.pt ou da plataforma da revista “Oftalmologia” no serviço de alojamento de revistas científicas do Repositório

Científico de Acesso Aberto de Portugal (RCAAP): revistas.rcaap.pt/index.php/oftalmologia.

2.– Uma vez aprovado pelo editor o manuscrito será enviado para revisão por parte de dois ou mais revisores, de forma confidencial e anónima. Os autores receberão a informação da avaliação dos revisores através do editor, sendo-lhes solicitadas as correções oportunas e consequente re-submissão. A seleção dos revisores realiza-se através do conselho redatorial da revista, tendo em conta os méritos académicos, científicos e experiência profissional, em cada uma das subespecialidades oftalmológicas, incluindo investigadores nacionais ou internacionais. Cada artigo será obrigatoriamente revisto por um membro do conselho redatorial e por um revisor externo ao mesmo.

3. Política editorial – a decisão do editor, após consultados os revisores, para aceitação-rejeição de um trabalho submetido baseia-se nos seguintes fatores:

I. Originalidade: assunto e/ou método original, com informação valiosa e apresentação de resultados novos ou confirmação de resultados já anteriormente verificados.

II. Atualidade e/ou novidade – tema que está na agenda das reuniões ou comunicações científicas ou é novo.

III. Relevância – aplicabilidade dos resultados para a resolução de problemas concretos da prática oftalmológica.

IV. Inovação e significância – avanço do conhecimento científico, técnico e/ou prática clínica.

V. Fiabilidade e validade científica – boa qualidade metodológica evidenciada.

VI. Apresentação – boa redação e organização do texto (boa coerência lógica e apresentação do material).

VII. Prazo de resposta as revisões – Todos os artigos que não tenham uma resposta às decisões editoriais num prazo de 6 meses serão automaticamente rejeitados pelo editor

SECÇÕES

1. Editoriais e notas - Os editoriais e notas editoriais serão ou encomendados pelo editor da revista a quem considere oportuno ou da sua responsabilidade.

2. Cartas ao editor - Esta secção pode incluir comentários sobre artigos previamente publicados ou comentários sobre outras matérias de interesse científico para oftalmologia. Esta correspondência estará sujeita ao processo de revisão pelos pares e

será publicada na medida em que o espaço, as prioridades e interesse o permitam. Estas não devem ultrapassar as 500 palavras. As cartas ao editor que versem sobre artigos previamente publicados terão direito de resposta, preferencialmente no mesmo número.

3. Artigos de revisão e “guidelines” – O objetivo da secção é atualizar determinados temas de oftalmologia, discutir novos conceitos ou rever conceitos clássicos tendo em vista os novos avanços de diagnóstico e tratamento e a divulgação das boas práticas em oftalmologia. Serão solicitados pelo Editor / Conselho Redatorial a personalidades reconhecidas e ou grupos de trabalho. Para além das revisões por convite, os artigos de revisão podem ainda ser submetidos por autores com elevada experiência numa área de estudo da oftalmologia para serem submetidos ao processo editorial.

4. Artigos originais – Podem incluir-se tanto trabalhos experimentais como clínicos, sempre que se trate de trabalhos de investigação. Os trabalhos de investigação devem ser inéditos e não podem ter sido submetidos para publicação em outra revista estrangeira indexada. Incluem-se nesta rubrica os prémios atribuídos no âmbito da SPO.

5. Comunicações curtas e casos clínicos – Deverão ser manuscritos resumidos descrevendo inovações técnicas e tecnológicas, manobras cirúrgicas inovadoras, aspectos de outras áreas do conhecimento relacionados com a prática oftalmológica, bem como casos clínicos com informação de prática clínica relevante.

6. Histórias da História da Oftalmologia Portuguesa – Será uma rubrica curta realçando aspetos relacionados com personalidades ou acontecimentos da oftalmologia portuguesa.

7. Flash-look. Nesta rúbrica agrupam-se artigos curtos de atualização em conceitos básicos da prática clínica de oftalmologia, como classificação, opções terapêuticas, manuais de procedimentos de determinadas patologias.

ORGANIZAÇÃO DO ARTIGO

Os artigos devem ser submetidos em formato bilingue (sendo que a segunda língua do manuscrito deve ser o Inglês), ou somente em Inglês.

1. Página do título/identificação – (página separada) Contendo título do artigo, nome(s) dos(s) autor(es), serviço(s) hospitalar(es) e departamentos ou organismos onde foi realizada a investigação, títulos académicos e/ou hospitalares dos autores. Nesta página deve ainda figurar o endereço postal completo para envio de correspondência e o endereço eletrónico do autor correspondente. Se o trabalho já tiver sido apresentado,

indicar onde e em que data bem como a referência a prémio obtido. Os autores deverão manifestar a existência de conflito de interesse (nomeadamente comercial no produto, equipamento ou processo), certificar que o trabalho não foi publicado previamente e que cedem os direitos de autor à SPO.

2. Resumo – Em Português e em Inglês com o máximo 250 palavras. O resumo deve ser subdividido em: Objetivos, Material e Métodos, Resultados, Conclusões.

3. Palavras-chave – Duas listas de cinco palavras-chave, em Português e Inglês, que resumam e classifiquem os principais assuntos focados no texto: estas destinam-se a codificação no índex.

4. Texto – Recomenda-se que o texto tenha as seguintes secções separadas: Introdução, Material e Métodos, Resultados, Discussão; poderá ser necessário fazer adaptações a circunstâncias particulares, como no caso dos casos clínicos ou dos artigos de “flash look”. O autor deverá indicar no texto, em local apropriado, em numeração árabe e em “superscript”, as citações bibliográficas que fizer. É da exclusiva responsabilidade do autor a verificação da exatidão das referências bibliográficas e da sua colocação no texto.

5. Agradecimentos – Tanto a pessoas, como a entidades, quando tal for justificado.

6. Declaração de interesses financeiros

7. Bibliografia – De modo geral segue-se o sistema de Vancouver, com a diferença principal de que a lista das referências bibliográficas deve ser subsequentemente numerada. Se houver mais de uma referência do mesmo autor, serão indicadas em primeiro lugar aquelas em que o autor aparece isolado e só depois aquelas em que há mais que um autor.

8. Quadros, tabelas e figuras – são enviados em formato eletrónico, em ficheiros separados do texto. Os quadros e tabelas podem ser feitos num processador de texto ou numa folha de cálculo (em Excel). As figuras devem ser feitos em formato editável tipo “TIF”, um ficheiro para cada imagem com qualidade de impressão (≥ 300 dpi). As figuras quadros e tabelas devem ser referenciadas no texto e deve ser indicado a zona do texto às quais ficarão adstritas após formatação do artigo.

9. Legendas das figuras. As figuras devem ser obrigatoriamente legendadas e as legendas enviadas nesta secção. Os quadros e tabelas não devem ter legendas.

10. Abreviaturas e símbolos – Só devem ser usadas abreviaturas de uso corrente. Se for imprescindível recorrer a abreviaturas menos usuais, na primeira vez em que o termo

aparece no texto ele deve figurar por extenso, logo seguido pela abreviatura entre parêntesis.