Presentation, Management, and Outcomes of Rhegmatogenous Retinal Detachments Before and After COVID-19: A Tertiary Center's Experience

Apresentação, Orientação e Resultados dos Descolamentos Regmatogeneos da Retina Antes e Após a COVID-19: Experiência de um Centro Terciário

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ABSTRACT

INTRODUCTION: Our purpose was to compare the presentation, management and outcomes of rhegmatogenous retinal detachments in the same period of 2019, 2020 and 2021.

METHODS: Retrospective study that included consecutive patients submitted to surgery for rhegmatogenous retinal detachment at Centro Hospitalar Universitário de Santo António, in April and May of 2019 (Group 1), 2020 (Group 2) and 2021 (Group 3). We evaluated best-corrected visual acuity (LogMAR) at presentation, postoperatively (month 3) and at the last follow-up, macula status at presentation, type of surgery and endotamponade, primary (month 3) and final (last follow-up) anatomical success, time from symptoms' onset to presentation and from presentation to surgery.

RESULTS: We included 29 eyes in Group 1, 37 in Group 2 and 40 in Group 3. The median time from symptoms' onset to presentation was 7 [0-30] days in Group 1, 7 [0-21] days in Group 2 and 5 [0-90] days in Group 3 (p=0.752). The median time from presentation to surgery was 2 [1-6] days in Group 1, increasing to 4 [0-10] days in Group 2 (p=0.006) and decreasing to 2 [1-7] days in Group 3 (p<0.001). Macula on was present in 17% in Group 1, 24% in Group 2 and 20% in Group 3 (p=0.207). Pars plana vitrectomy was the most performed surgery (>97%). The most common endotamponade was SF6 in Groups 1 and 3 (61% and 50%, respectively) and C3F8 in Group 2 (61%). There were no differences in the use of silicone oil (p=0.728). Primary and final anatomical successes were similar between groups (p=0.817 and p=0.827, respectively). There were no differences in the preoperative best-corrected visual acuity (p=0.308), and the improvement after treatment was similar (p=0.423).

CONCLUSION: Few differences were found in the presentation, management, and outcomes of rhegmatogenous retinal detachments during April and May 2020, when comparing with the previous and following year. The time from presentation to surgery was longer in 2020, reflecting the re-organization of the health care at the beginning of the COVID-19 pandemic. However, this did not lead to worse visual or anatomical results, showing that the measures implemented were effective and that appropriate care was delivered.

KEYWORDS: COVID-19; Pandemics; Retinal Detachment; Vitrectomy.

RESUMO

INTRODUÇÃO: O nosso objetivo foi comparar a apresentação, orientação e resultados dos descolamentos de retina regmatogeneos no mesmo período de 2019, 2020 e 2021.

MÉTODOS: Estudo retrospetivo que incluiu doentes consecutivos submetidos a cirurgia por descolamento de retina regmatogeneo no Centro Hospitalar Universitário de Santo António, em abril e maio de 2019 (Grupo 1), 2020 (Grupo 2) e 2021 (Grupo 3). Foram avaliados a melhor acuidade visual corrigida (LogMAR) na apresentação, pós-operatório (3 meses) e última visita, o estado da mácula à apresentação, o tipo de cirurgia e tamponamento, o sucesso anatómico primário (3 meses) e final (última visita), o tempo entre o início dos sintomas e a apresentação e entre a apresentação e a cirurgia.

RESULTADOS: Foram incluídos 29 olhos no Grupo 1, 37 no Grupo 2 e 40 no Grupo 3. O tempo mediano entre o início dos sintomas e a apresentação foi de 7 [0-30] dias no Grupo 1, 7 [0-21] dias no Grupo 2 e 5 [0-90] dias no Grupo 3 (p=0,752). O tempo médio desde a apresentação até à cirurgia foi de 2 [1-6] dias no Grupo 1, aumentando para 4 [0-10] dias no Grupo 2 (p=0,006) e diminuindo para 2 [1-7] dias no grupo 3 (p<0,001). Os casos de mácula on representaram 17% no Grupo 1, 24% no grupo 2 e 20% no Grupo 3 (p=0,207). A vitrectomia pars plana foi a cirurgia mais realizada (>97%). O tamponamento mais comum foi SF6 nos grupos 1 e 3 (61% e 50%, respetivamente) e C3F8 no Grupo 2 (61%). Não houve diferenças no uso de óleo de silicone (p=0,728). O sucesso anatómico primário e final foram semelhantes entre grupos (p=0,817 e p=0,827, respetivamente). Não houve diferenças na melhor acuidade visual corrigida pré-operatória (p=0,308), havendo uma melhoria semelhante após o tratamento (p=0,423).

CONCLUSÃO: Poucas diferenças foram encontradas na apresentação, orientação e resultados dos descolamentos de retina regmatogeneos durante abril e maio de 2020, comparando com o ano anterior e após. O tempo entre a apresentação e a cirurgia foi superior em 2020, o que reflete a reorganização dos cuidados de saúde durante a pandemia COVID-19. No entanto, isto não levou a resultados visuais ou anatómicos piores, mostrando que as medidas implementadas foram eficazes na orientação adequada destes doentes.

PALAVRAS-CHAVE: COVID-19; Descolamento da Retina; Pandemia; Vitrectomia.

INTRODUCTION

In December 2019, the first human cases of COVID-19 were identified in Wuhan, China. In January 2020, the COVID-19 disease was considered a Public Health Emergency of International Concern and, on March 11, 2020, it was classified as a pandemic. The first case of COVID-19 in Portugal was diagnosed on March 2, 2020, and on March 18, a State of Emergency was established in the country, followed by a lockdown that lasted from March 18 to May 2, 2020.

At Centro Hospitalar Universitário de Santo António, in Porto, Portugal, during the lockdown period, contingency measures were implemented to ensure appropriate allocation of medical resources and to prevent the spread of the disease. On March 18, the American Academy of Ophthalmology issued the recommendation that ophthalmologists should provide care only in cases considered urgent or emergent.[1] During this period, in our hospital, surgeries were limited to these situations, and the outpatient clinics adopted strategic telemedicine measures, allowing access only to priority cases.

Rhegmatogenous retinal detachments (RRD) are one of the most common emergencies in ophthalmology, as they can lead to permanent visual loss. Moreover, many studies show that early treatment leads to better visual results, in particular in cases in which the macula is attached.[2–4] Previous studies have shown that the pandemic has led to patients presenting late to the emergency department for various diseases.[5–7] This was also verified in patients with retinal detachment, which could impact visual outcomes.[8]

In 2021, although still under the COVID-19 pandemic and the restriction measures implemented by the government, the Vitreoretina outpatient clinic of our hospital was functioning normally, and surgeries were carried out for both emergent and non-emergent cases, as scheduled.

Our purpose is to compare the presentation, management and outcomes of eyes with primary RRD in April and May of 2019, 2020, and 2021.

METHODS

This study is a retrospective review of the medical records of consecutive eyes submitted to surgery due to

primary RRD at Centro Hospitalar Universitário de Santo António in April and May of 2019, 2020, and 2021. Eyes with a previous history of retinal detachment (RRD, serous or tractional), with recurrent RRD, or with less than 6 weeks of follow-up were excluded. Eyes with previous maculopathy or retinopathy were also excluded. This study was performed in accordance with the tenets of the Declaration of Helsinki in its latest amendment (Brazil, 2013), and the study protocol complies with the requirements of the institute's committee on human research.

The surgical technique consisted of either pars plana vitrectomy (PPV) or scleral buckle. PPV was performed with a 23-gauge transconjunctival system. Epiretinal membrane peeling, cryo and laser therapy, use of perfluorocarbon heavy liquid and choice of endotamponade (SF6, C3F8, air or silicone oil) were performed in accordance with the surgeon's discretion. Scleral buckles were secured to the sclera using partial-thickness bites of 5-0 mersilene sutures. The choice of the buckle characteristics (type, encircling versus segmental, height) was at the surgeon's discretion. When appropriate, phacoemulsification was performed during the same surgical session.

Patients were divided into three groups: Group 1 represents patients submitted to surgery in 2019, Group 2 in 2020, and Group 3 in 2021. Demographic data (age and gender) was recorded. The best-corrected visual acuity (BCVA) was measured on the Decimal Scale and converted to the LogMAR chart for statistical analysis, before and after surgery.[9] The presenting symptoms, the time between symptoms and seeking treatment, and between seeking treatment and surgery were recorded. The status of the macula at presentation was considered as: macula on means that the macula was completely attached, macula off means that the macula was completely detached and macula on-off means that the macula was partially detached. The status of the lens at presentation and the procedure performed (type of surgery, endotamponade) were also assessed. Postoperative BCVA and primary anatomical success (retina attached after one procedure) were evaluated 12 weeks after surgery. Final BCVA and final anatomical success (retina attached, after removal of silicone oil when applied) were evaluated at the last follow-up visit.

Statistical analysis was performed using IBM SPSS Statistics 26. The normality of the data was assessed using the Kolmogorov-Smirnov test. Continuous variables are summarized as mean and standard deviation for variables with a normal distribution, and median and range for variables with a skewed distribution. Categorical variables are summarized as absolute and relative frequencies. Continuous variables were compared using parametric and non-parametric tests, as appropriate. Categorical variables were evaluated with a Chi-square test. A p-value inferior to 0.05 was considered statistically significant.

RESULTS

This study included 106 eyes of 106 patients: 29 eyes in Group 1, 37 in Group 2, and 40 in Group 3. There were no significant baseline differences between groups (Table 1).

In Group 1, the most common presentation symptom was vision loss (56%), followed by the association of vision loss with floaters and/or flashes (28%). In Group 2, the most common symptom was vision loss (39%), followed by presence of a shadow (28%), and in Group 3, the most common symptom was vision loss (63%), followed by floaters (13%). The median time from symptoms' onset to the first hospital visit was 7 [0-30] days in Group 1, 7 [0-21] days in Group 2, and 5 [0-90] days in Group 3 (p=0.752). The median time from the first hospital visit to surgery was 2 [1-6] days in Group 1, increasing to 4 [0-10] days in Group 2 (p=0.006), with a subsequent decrease to 2 [1-7] days in Group 3 (p<0.001). There were no differences in the time between the first hospital visit and the surgery when comparing Group 1 with Group 3 (p=0.459).

The total number of periods available for Vitreoretinal surgery changed from 48 in 2019 to 30 in 2020 and 35 in 2021.

Regarding the macular status, the frequency of presentation with macula on was 17% in Group 1, 24% in Group 2, and 20% in Group 3 (p=0.183, Table 1).

PPV was the most performed surgery. The most common endotamponade was SF6 in Groups 1 and 3 (61% and 50%, respectively) and C3F8 in Group 2 (61%). There were no differences in the frequency of use of silicone oil (p=0.728). Primary anatomical success was similar between

Table 1. Baseline characteristics.

	Group 1	Group 2	Group 3	p-value
Age, years, mean±SD	63±12	60±14	65±10	0.318
Gender, male, n (%)	15 (52%)	26 (70%)	31 (78%)	0.064
Macula status, n (%)				
On	5 (17%)	9 (24%)	8 (20%)	
Off	18 (62%)	27 (73%)	29 (73%)	0.183
On-off	6 (21%)	1 (3%)	3 (7%)	
BCVA, logMAR, mean±SD	1.4±1.0	1.3±0.9	1.6±0.9	0.308
Pseudophakic, n (%)	11 (38%)	16 (43%)	18 (45%)	0.853
Right/left eye, %	62%/38%	57%/43%	47%53%	0.501
History of trauma, n (%)	1 (3%)	1 (3%)	2 (5%)	0.532
History of previous RRD in the fellow eye, n (%)	3 (10%)	2 (5%)	2 (5%)	0.698

SD – standard deviation; BCVA – best-corrected visual acuity; RRD – rhegmatogenous retinal detachment.

groups (p=0.817). Details of the surgical procedure are presented in Table 2.

There were no differences in the pre- (p=0.308) and postoperative BCVA between groups (p=0.601), and there was a similar improvement (Δ=-0.7±1.1 *vs* Δ=-0.6±1.0 *vs* Δ=-0.9±1.1 logMAR, p=0.423) in all groups after treatment. Four eyes (14%) in Group 1, 7 (19%) in Group 2, and 12 (30%) in Group 3 required subsequent cataract surgery. There were no differences in the final BCVA between groups (p=0.268). BCVA variation is summarized in Table 3.

DISCUSSION

The COVID-19 pandemic led to dramatic changes globally in healthcare facilities, caused by the increased number of patients infected with the virus, the consequent need to reorganize resources and the risk of spread among regular patients and healthcare providers.

The Surgical Retina Unit of Centro Hospitalar Universitário de Santo António receives a large number of patients coming from the North part of Portugal. Before 2020, patients coming with a RRD would have an appointment with a Vitreoretinal surgeon in the following days, and the surgery would be scheduled, usually within one week of presentation, with priority given to macula on detachments. When possible, patients would be submitted to surgery on the same day of presentation.

When the first lockdown period was announced in Portugal in March 2020, changes were implemented. Routine outpatient clinic appointments were transformed into telephonic evaluations, and only patients who had pathologies or complaints that required urgent evaluation were seen in the hospital. All non-urgent surgeries were canceled. In each operating period, surgeons of different subspecialties were paired to ensure that patients were submitted to surgery according to the priority of the disease. This meant that patients with retinal detachments, glaucoma or other pathologies requiring urgent surgical care could be operated in the same period. A new protocol was created to deal with patients coming from the emergency department with RRD. The senior surgeon of the Surgical Retina Unit (A.M.) was on-call every day from 9 a.m. to 11 p.m. (or 8 p.m. when the nightshift was assured by the other tertiary center of Porto), sorting the patients, giving specific instructions and appointing the likely day of surgery. To decrease the risk of transmission of the disease, all patients undergoing general

Table 2. Baseline characteristics.

	Group 1	Group 2	Group 3	*p*-value
Type of surgery, n (%)				
PPV	28 (97%)	36 (97%)	39 (98%)	0.971
Scleral Buckle	1 (3%)	1 (3%)	1 (2%)	
PPV + phacoemulsification, n (%)	3 (10%)	1 (3%)	1 (3%)	0.311
Endotamponade – PPV, n (%)				
Silicone oil	2 (7%)	5 (14%)	4 (11%)	0.728
C3F8	9 (32%)	22 (61%)	15 (39%)	**0.043**
SF6	17 (61%)	9 (25%)	19 (50%)	**0.014**
Air	0 (0%)	0 (0%)	0 (0%)	-
Endotamponade - Scleral Buckle, %				
Silicone oil	0 (0%)	0 (0%)	0 (0%)	-
C3F8	0 (0%)	0 (0%)	0 (0%)	-
SF6	1 (100%)	0 (0%)	0 (0%)	0.999
Air	0 (0%)	0 (0%)	0 (0%)	-
Primary anatomical success	24 (83%)	31 (84%)	31 (78%)	0.817
Final anatomical success	27 (93%)	33 (89%)	37 (95%)	0.827

PPV – pars plana vitrectomy.

Note: statistically significant values are highlighted in bold

Table 3. Evolution of best-corrected visual acuity.

	Preoperative BCVA (logMAR)	Postoperative BCVA (logMAR)	*p*-value	Cataract surgery[1]	Final BCVA	*p*-value*
Group 1	1.4±1.0	0.8±0.8	**0.015**	4(14%)	0.9±0.8	0.180
Group 2	1.3±0.9	0.8±0.7	**0.033**	7(19%)	0.6±0.7	**0.043**
Group 3	1.6±0.9	0.6±0.7	**<0.001**	12(30%)	0.6±0.7	0.093
***p*-value**	0.308	0.601	-	0.442	0.268	-

BCVA – best-corrected visual acuity; * postoperative BCVA vs Final BCVA; [1] Frequency of cataract surgery between the evaluation considered as "postoperative" and the last follow-up visit.

Note: statistically significant values are highlighted in bold.

anesthesia or with a prolonged surgical time underwent a SARS-CoV-2 test by PCR.

The end of the mandatory lockdown period, at the beginning of May 2020, was followed by a progressive increase in presential activity over the following months, with a gradual increase in patients seen in the outpatient clinic and the allocation of some surgical rooms specifically for the Surgical Retina Unit. In 2021, the Surgical Retina Unit was fully operational again, following the same protocol as before 2020 while still maintaining specific measures to avoid hospital transmission of the COVID-19 disease. However, due to reorganization of the operating rooms in the hospital, the number of periods available for Vitreoretinal surgery never reached those of the pre-COVID era.

In this study, we compared the management and outcomes of RRD in three study periods: before the COVID-19 pandemic, during the first 2 months of the pandemic in 2020, and in the same period in 2021. In our study, we found an increase (28%) in the number of patients treated for RRD in our center, comparing 2020 with 2019. This could be justified by the fact that some public and private hospitals stopped offering treatment during this period, and more patients resorted to the emergency department of our center.

We did not find significant differences in the time between symptom's onset and the first hospital evaluation between the three study periods. As the number of infected patients and deaths was still low in the country at this point, these symptoms probably generated enough worry to overcome the fear of social contact. In turn, the time between the first hospital visit ant the surgery increased from 2019 to 2020, with a subsequent decrease in 2021. The slight increase seems to be a reflex of the need to reorganize the workflow, with a decrease of 38% in the number of rooms available for Vitreoretina surgery in 2020. Furthermore, in 2020, the operating rooms were shared with other ophthalmology subspecialties. In 2021, there was a subsequent decrease in the waiting time before surgery, reaching similar values to 2019, reflecting the superior availability of operating rooms fully dedicated to the Vitreoretina unit.

We also did not find significant differences in macula status or preoperative visual acuity among the three groups. We found similar rates of primary and final anatomical success and visual acuity improvement in the three groups. The frequency of cases that required silicone oil was also similar between groups. C3F8 was used as gas endotamponade more often in 2020. This could either be due to a higher frequency of more severe cases, a precautionary measure to prevent recurrences that would imply another surgery in a complicated period, or an attempt to increase the time between appointments.

Other studies have evaluated the differences found in retinal detachment's care during the pandemic period. A study performed in Japan,10 similarly to our results, found that there were no significant differences in the frequency of macula on detachments, presentation visual acuity, and time of symptoms onset, when comparing the same study period (April and May) in 2018, 2019 and 2020. However, the number of RRD was lower in 2020. The authors also found that there were no differences among groups in the time between the symptom's onset and the surgery.[10] Another study[11] that evaluated RRD in April and May of 2019 and 2020 in a Scottish center also did not find a decrease in the total number of RRD (in fact, there was a significant increase) and did not find differences in the number of RRD involving the fovea. The authors also found that for macula off RRD, the time between symptoms and hospital evaluation decreased in 2020 compared to 2019. These results, however, were not in accordance with the national trend in Scotland, in which there was a decrease in the global number of RRD.[11]

Weber *et al*[12] also compared the outcomes of retinal detachments in April and May of 2019, 2020, and 2021. The authors found that the time between symptoms and surgery was longer in 2020, with less frequency of macula on detachments and lower visual acuity at presentation. However, despite this, the visual acuity gain after surgery was similar between groups.[12] Patel *et al*[13] also compared a 50-day period in 2020 during the pandemic with the same period in 2019. The authors found that there was a lower rate of RRD in 2020, as well as fewer RRD with macula on, worse initial visual acuity, and fewer patients seeking medical care within 1 day of symptoms' onset. However, there were no differences in the overall duration of symptoms between the two study periods.[13] Other studies found similar trends, showing that during 2020 there were fewer retinal detachments and more macula off cases.[14–16]

Regarding the visual outcomes, the results vary. In spite of the tendency for a superior number of studies showing the increase of macula off RRD and worse visual acuity at baseline in 2020, most studies also found that the visual and anatomical outcomes after surgery were similar.[12,15,17]

Our study has some limitations. We only evaluated two months in each year, and hence, the results are not generalizable to the whole year. Nonetheless, we chose April and May for three main reasons. These months are the first fully under the pandemic period, meaning that the majority of RRD occurred already during the COVID-19 pandemic. It also encompasses the first lockdown, and the period of greater uncertainty, and when changes in our department were more pronounced. Finally, the choice of these two months also facilitates comparisons with the existing literature since many studies also used this period. Another limitation of this study is that we did not evaluate the presence of PVR at presentation due to a lack of consistent information in all reports, which is an important prognostic factor. A few eyes underwent combined surgery (phacoemulsification and PPV), which could affect the visual outcomes. However, the number of cases was very low, and there were no significant differences between groups. Finally, we only evaluated the cases treated in a single center, and results may vary across the country. Regardless, our hospital is a referral center and one of the centers with the largest volume of RRD in the country.

In conclusion, the COVID-19 pandemic led to changes in medical care that seem to vary across the globe and,

sometimes, even in different centers of the same country. In our study, few differences were found in the presentation, management, and outcomes of RRD during April and May of 2020 when compared with the same period in the year before and after. We did find a longer time from hospital presentation to surgery in 2020, which seems to reflect the re-organization of the health system during this critical period. However, this did not lead to worse visual or anatomical results, showing that, despite the circumstances, the measures implemented in our center were effective in delivering appropriate care to patients with RRD.

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CONTRIBUTORSHIP STATEMENT / DECLARAÇÃO DE CONTRIBUIÇÃO:

CC: Participated in the data acquisition and wrote the original draft.

AF, MA and AM: Participated in the data acquisition.

All authors accept to be held accountable for the contents of this work and all authors participated in the analysis and interpretation of the data.

All authors revised and approved the final draft.

CC: Participou na aquisição de dados e escreveu o projeto original.

AF, MA e AM: Participaram na aquisição dos dados.

Todos os autores aceitam ser responsabilizados pelo conteúdo deste trabalho e todos os autores participaram na análise e interpretação dos dados.

Todos os autores reviram e aprovaram a versão final.

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