

Incidence and characteristics of rhegmatogenous retinal detachment during coronavirus-19 pandemic: A French study

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Abstract

Purpose: To assess the impact of the Covid-19 pandemic and subsequent lockdown on the number and clinical characteristics of patients with retinal detachment (RD) in a French public university eye hospital.

Methods: Single-center, retrospective non-interventional study. Patients consulting at the emergency room (ER) of Quinze-Vingts Hospital (France) for rhegmatogenous RD before and after instauration of the lockdown were reviewed. We compared the characteristics of patients with RD between the containment period (March 17th - April 27th, 2020) and the period preceding the lockdown (February 18th - March 16th, 2020). We compared the number of RD surgeries performed between the first month of lockdown (March 17th - April 19th, 2020) and the corresponding period of 2019. Number of cases, delay between diagnosis and surgery, visual acuity was measured.

Results: During the first month of lockdown, 59 RDs were operated on, compared to 107 in the corresponding period in 2019 (-44.8%). Mean time from first symptoms to surgery was significantly higher during the lockdown 12.7 (11.3) days vs 7.6 (7.8) days ($p = 0.031$) before. During the lockdown, the mean BCVA was lower albeit the difference did not reach statistical significance (1.16 (0.9) during pre-containment vs 1.5 (0.9) during containment; $p = 0.09$). Reasons for delayed consultation were: fear of Covid-19 (31%; $p = 0.0001$), absence of referral doctor (31%; $p = 0.003$) and difficulties in getting to public transport (10.3%; $p = 0.859$).

Conclusion: Despite maintaining access to emergency eye care facilities in our hospital, the lockdown affected visual health. Should the lockdown be reinstated, we postulate that a better information about eye care access for non-Covid emergencies may attenuate its effect on visual health.

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Introduction

The Covid pandemic and the ensuing lockdown caused a profound reorganization of health care systems worldwide. Following the instauration of lockdown on March 18, 2020, health authorities recommended to delay non-essential care but maintained essential health service delivery and access to the ERs in public hospitals in France.¹⁻³ Despite this, there has been a decrease in non-Covid emergencies in all healthcare fields.^{4,5} In Veneto (Italy), a 26% decrease of the number of thrombolysis procedures was observed during the lockdown.⁵ Similarly, there has been a decrease for stroke cases in French hospitals and these were often beyond recommended delays for thrombolysis. In the ophthalmologic field, an Indian study shows that majority of ophthalmologists in India were not seeing patients during the lockdown.⁶ Studies about the impact of containment on retinal detachment presentation have been carried out in different countries around the world. These studies show different results, probably related to the reorganisation of the care system and the introduction or not of containment.⁷⁻¹² The Quinze-Vingts National hospital is a university-based tertiary eye hospital that provides emergency care to patients of the Ile-de-France region. During lockdown, while non-urgent surgeries were deferred, the hospital maintained full staffing for the emergency room (ER) and emergency consultations, as in the major hospitals in France. Social distancing measures, distribution of mask and of hydro-alcoholic solution were promptly instated. We nevertheless noted a sharp decrease in the number of surgeries for rhegmatogenous retinal detachment (RD). We therefore underwent this study to quantify the effect of confinement on the access of patients to emergency eye care.

Patients and methods

This investigation is a single-center, retrospective non-interventional study of patients undergoing RD surgery during the COVID 19 lockdown. We compared the first 6 weeks of containment period March 17th- April 27th, 2020) with 4 weeks immediately preceding the lockdown period (February 18th – March 16th, 2020). The lockdown was divided into « early » (March 17th – April 6 th) and “late” lockdown period (7th April – April 27th). We analyzed the clinical characteristics of RD cases. We also compared the number of RD surgeries performed between the

first month of lockdown (March 17th- April 19th, 2020) and the corresponding period of 2019. Patients with exudative and tractional detachments or rhegmatogenous RD older than 3 months were excluded. Information was retrieved from various sources, mainly the digital file database (Softalmo, Corilus, Belgium) and surgical reports from secretaries to ensure exhaustivity. If clinical data were missing, patients were called back. Collected data included patient demographics, time between first symptoms and surgery, initial best corrected visual acuity (BCVA) converted into logarithm of the minimum angle of resolution (LogMAR), RD extent, presence of proliferative vitreoretinopathy (PVR) and type of surgery (pars plana vitrectomy or scleral buckling). Patients who have waited more than 72 h after first symptoms before consulting were in the “delayed” group.^{13,14}

Statistical analysis

Source apportionment of elements was carried out using MS Excel 2010 ®. Data was analyzed through XLSTAT ® software. Primary endpoints were evaluated using Chi-square test, with $p < 0.05$ considered statistically significant. Ethics Committee ruled that approval was not required for this study.

Results

In 2019, from mid-march to mid-april, 107 RD surgeries were performed. During the first month of lockdown, 59 RD surgeries were performed (- 44.8%) (Figure 1 and Figure 2). This decrease was more pronounced at the beginning of the lockdown during which the number of RD surgeries declined by 53.9%. During the first week (Figure 1), while the lockdown was still in effect, the number of surgical procedures was comparable to those prior to the lockdown ($p > 0,05$). There was a similar variation in the total number of ER consultation. The frequency of RD was statistically different between the pre-containment measures and early lockdown period ($p = 0,05$) and between the early lockdown and late lockdown ($p = 0,05$). There was no significant difference between the pre-containment period and the late containment period. The charts of the 29 patients seen during the first three weeks of the lockdown were analyzed. Six cases were excluded because they did not meet study criteria (lack

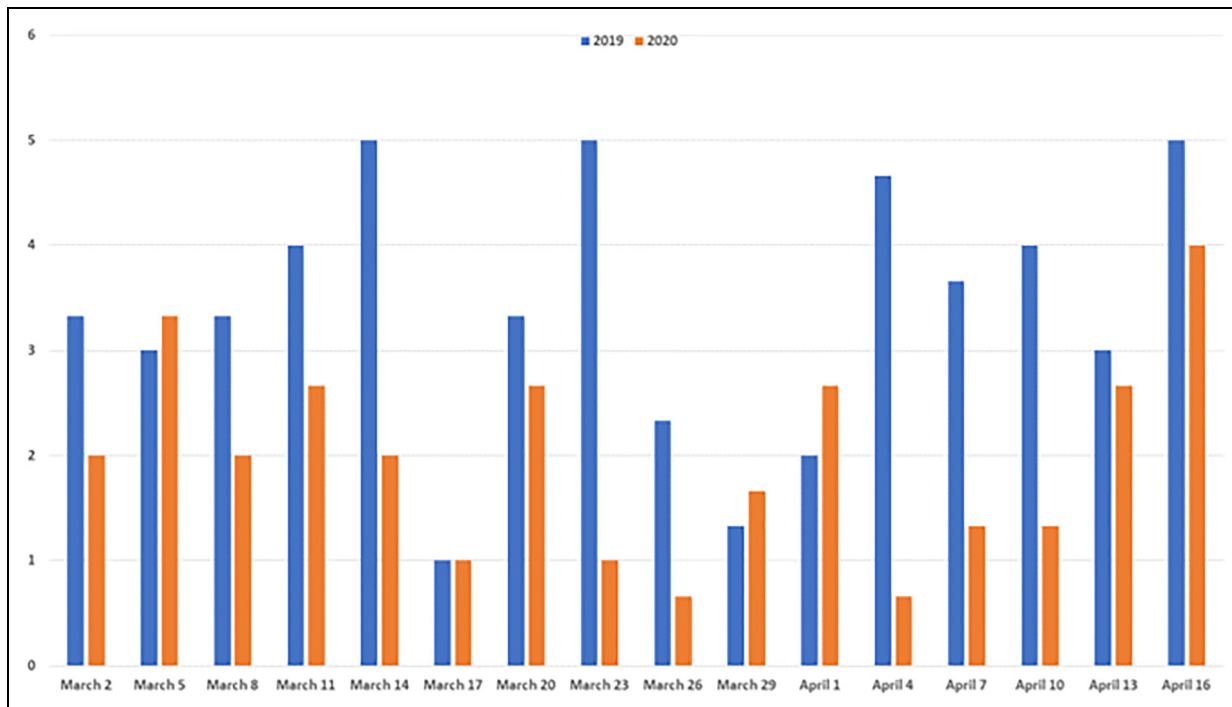


Figure 1. Comparison of the number of RD during COVID-19 pandemic (2020) and 2019.

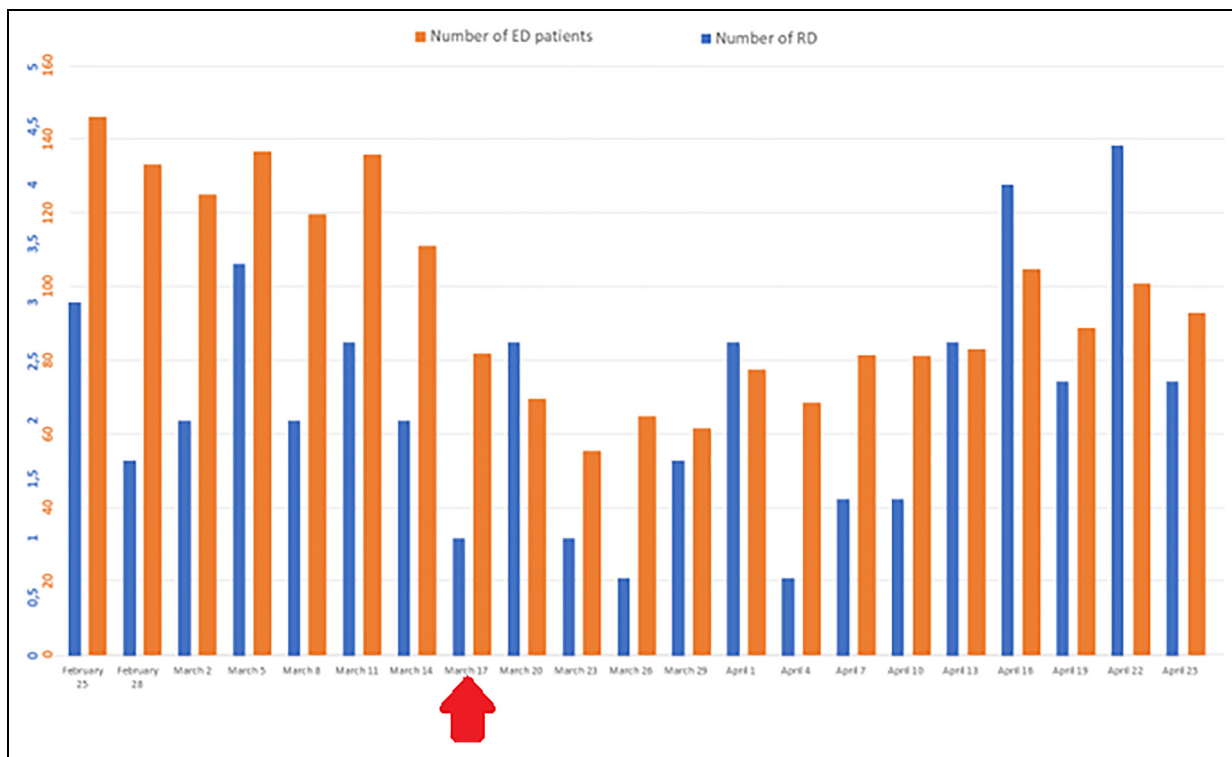


Figure 2. Number of RD and total ER consultations during COVID-19 pandemic (red arrow corresponds to the beginning of the lockdown).

Table 1. Demographic and clinical data of retinal detachment during pre-containment period and containment period.

	Pre-containment (n = 76) (February 18 th – March 16 th , 2020)	Containment (n = 29) (March 17 th - April 8 th , 2020)	p-value
Female (%)	30.3	41.4	0.280
Mean age (SD)	61.6 (14.4)	58.5 (12.3)	0.283
Left eye (%)	48.7	58.6	0.362
Phakic (%)	59.2	58.6	0.956
High blood pressure(%)	32.9	0	0.0001*
Diabetes(%)	10.5	0	0.05*
Cancer(%)	3.9	3.4	0.905
Initial LogMAR (SD)	1.16 (0,9)	1.5 (0,9)	0.096
Mean time between first symptoms and surgery (days)	7.6 (7.8)	12.7 (11.3)	0.031*
“ Delayed » patients (%)	60.5	89.6	0.004*
Mean time between diagnosis and surgery (hours)	23.4	9.1	0.009*
Macular detachment (%)	56.6	68.9	0.247
Proliferative vitreoretinopathy (%)	23.7	17.2	0.616
Location of RD (%)			
Inferior	25	10.3	
Superior	56.6	51.7	
Total	18.4	37.9	
Pars Plana Vitrectomy (%)	93.4	96.5	

of data). Those 29 cases were compared to the 76 RD patients operated in the four weeks preceding the lockdown. Demographic and baseline characteristics are presented in the Table 1. No significant differences were found for sex ratio, age or lens status. In our study, patients with diabetes, high blood pressure consulted less during the confinement period ($p=0,0001$). RD characteristics mean time from first symptoms to surgery and surgical management are presented in the Table 1. Among the patients that consulted for RD during the first three week of lockdown, 89.6% reported that they declared to have had delayed their consultation, because of fear of Covid-19 (31%; $p=0,0001$), absence of referral doctor (31%; $p=0003$) and difficulties to access to public transportation (10.3%; $p=0859$). On the other hand, time between patient presentation and surgery was significantly lower during lockdown suggesting a better healthcare availability ($p=0009$). No patients had history of coronavirus-like infection. Mean time from first symptoms to surgery was significantly higher during the lockdown 12.7 (11.3) days vs 7.6 (7.8) days ($p=0.031$) before (Table 2). During the lockdown, the mean BCVA was lower albeit the difference did not reach statistical significance (1,16 (0,9) during pre-containment vs 1,5(0,9) during containment; $p=0,09$). During lockdown, there appears to be an increase in total retinal detachment (37,9% vs 18,4%; $p=0,06$)

Discussion

Overall, during the first month of lockdown, we performed 44.8% less surgeries than in the corresponding period of

2019. There was a progressive recovery in subsequent weeks. The medical profile of patients was also different, with less comorbidities. This may be because the morbidity and mortality of COVID-19 was perceived to be higher in older with comorbidities patients. There was no significant difference between the pre-containment population and the late containment period. There was therefore no catch-up in the frequency of retinal detachment during the late containment period. The significance of this finding is uncertain since some patients may have sought advice elsewhere or may have renounced to care. The cause of this decreased surgical activity was probably not due to redirection of RD patients toward other healthcare facilities since most private practices were closed. When the lockdown was instated, many people left the Ile-de-France region. This may have redistributed RD cases in other regions. However, the INSEE (French national institute for statistical and economic studies) survey showed that less than 11% of the Parisian were relocated.¹⁵ Clinically, there seemed to be more macula-OFF and total retinal detachment cases during the lockdown, as expected from the significantly longer delayed time from initial symptoms to surgery, around 13 days versus around 8 days ($p=0031$). Therefore, given the fact that macula off RD have a poorer visual prognosis, final BCVA may be poorer in the “lockdown” population later.¹⁶ PVR rates were however similar, perhaps because PVR usually occurs later in the course of DR, and there are other risk factors for PVR than delayed treatment.^{17–19} Some surgeons reported to us the occurrence of bilateral RDs which dramatically exemplifies the health issues created by difficulties to access health care. Additionally,

Table 2. Demographic and clinical data of retinal detachment during pre-containment period and containment period (early and late).

	Pre-containment (n = 76) (February 18th – March 16th, 2020)	Early Containment (n = 29) (March 17th – April 6 th , 2020)	Late Containment (n = 51) (April 7th - April 27th, 2020)
Female (%)	30.3	41.4	26
Mean age (SD)	61.6(14.4)	57.6(14.1)	58.7 (14.9)
High blood pressure	32.9	0	20
Diabetes	10.5	0	6
Initial BVCA Log MAR (SD)	1.16(0.9)	1.5	1.4
Mean time between first symptoms and surgery (days)	7.6(7.8)	12.7	16.5
Macular detachment (%)	56.6	68.9	72.5
Proliferative vitreoretinopathy (%)	23.7	17.2	35.3
Total RD	18.4	37.9	31.4

difficulties to access to public transportation and fear of public transports or of coming to hospitals are most likely contributing factors. Indeed, many RD cases are within the high-risk group for severe Covid-19 because of their comorbidities. During an infectious disease epidemic, patients use medical care when they feel that the benefits of healthcare utilization outweigh the risk of infection.²⁰ None of the patients in our cohort had positive COVID-19 symptomology or positive testing, so COVID-19 illness was not expected to influence the time to presentation. In the near future, the profile of RD patients may evolve, with more delayed RD hence with high risk of PVR; on the other hand, there will also be less RD because very few cataract surgeries have been performed during the lockdown. Pseudophakic RD occurs on average several months after cataract surgery.^{21,22} The accumulation of unmet or unresolved needs will imply higher levels of complexity and severity of RD, increasing economic risks associated with these characteristics. The distribution of the number of retinal detachment consultations and the total number of emergency room consultations follows the same pattern (Figure 2), suggesting that the lockdown did not modify the typology of ophthalmological emergencies; therefore, what was observed for RD surgeries might be applicable to all ophthalmological emergencies. This also raises the question of the healthcare access for patients with ocular tumors. Therefore, the communication of the actions taken, and the users' confidence gain is essential to ensure that those who effectively need to seek emergency services can do so without fearing an increased risk of contamination. Such action may avoid a larger problem in the future.

Our results are consistent with an American study.¹¹ Patel et al. have analyzed primary RD in a 50-day period during the USA COVID-19 pandemic (March 9th - April 27th, 2020) and the corresponding 50-day period during the previous year (March 4th - April 22th, 2019). This study also shows a decrease in the number of RD (111

patients in 2019 vs 82 patients in 2020), a decrease in the number of macula-ON RD (49,5% in 2019 vs 24,4% in 2020; $p=0001$), a worse median VA at presentation (LogMAR 0.48 in 2019 vs LogMAR 1.00 in 2020, $p=0.008$), and an increase in the delay between the first symptoms and diagnosis that was analyzed by studying the patients presenting within one day of symptoms (19.5% in 2020 vs 36.9% in 2019, $p=0.005$). In contrast, in a German university hospital, the morbidity of RD did not increase and admitted cases did not decrease during the pandemic when compared to the same period in the previous year.¹⁰ One reason for this finding is that France has been much more seriously affected by the COVID-19 pandemic, so that medical capacities may have been more limited and the fear to getting to hospital may have been larger than in Germany. Another reason for this finding is that the German government has not established containment measures but only social distancing measures. Finally, a study performed in United-Kingdom (UK) showed an increase of RD during COVID-19 pandemic.¹² This is likely related to the reduction in the capacity of neighboring optometry services and general practitioner to provide care for ophthalmologic emergencies due to the reorganization of the healthcare system during the covid19 pandemic in UK. An intriguing finding was that the duration of symptoms preceding presentation to a London ophthalmology department for macula off RD during the pandemic decreased significantly compared to 2019. In addition, UK government has established the lockdown lately compared to the beginning of COVID-19 pandemic (March 24th, 8 days after France). Therefore, the British could move easily at the beginning of the pandemic. It is likely that many RDs consulted before the containment measures. This finding could also be due to fewer "pinch points" in the patients' access to vitreoretinal surgeons; as access to GPs and emergency services may have been easier and local optometry services severely limited; resulting in patients contacting

ophthalmology department directly. With greater surgeon availability in UK, due to a reduction in ophthalmic elective work, there may have been an overall positive influence on the patients' surgical journey.

Our study reports a significantly delayed presentation of RD during the pandemic. We show that despite available ophthalmic care, the environmental milieu of social distancing and stay-at-home orders during the COVID-19 pandemic may have an unintended consequence for outcomes of RD. Given the persistence of COVID-19 worldwide and the arrival of a second epidemic wave, we stress the need for continued public education regarding visual symptoms and the need for continued eye care.


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Declaration of conflicting interests

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