

Impact Of COVID-19 Lockdown On Vitreo Retina Interventions In A Tertiary Eye Care Hospital In South India- An Observational Study

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Abstract

Purpose:

To study the impact of nationwide lockdown imposed in view of the pandemic caused by corona virus disease (COVID) on Vitreo retina interventions (VRI) in a tertiary Vitreo retina (VR) centre in south India.

Methods:

Retrospective data of patients who underwent VRI during the time period spanning from a month before (pre-lockdown group) and a month after (post lockdown group) the lockdown period (lockdown group) was analysed. The VRI were sub grouped into medical (lasers and injections) and surgical. Also interventions were categorized as urgent, semi-urgent and less urgent based on national guidelines.

Results:

A total of 1210 patients underwent VRI during pre-lockdown, lockdown and post-lockdown periods. The proportion of urgent VRI increased significantly to 26.61 % during lockdown as compared to 9.81 % and 13.15 % during pre and post-lockdown period respectively (*p value <0.001, chi square test*). The proportion of semi-urgent and less urgent VRI decreased significantly during the lockdown period. The median presenting best corrected visual acuity (BCVA) was significantly lesser during the lockdown period. The proportion of retina interventions increased significantly (more than 3 fold) during the lockdown period as compared with cumulative non retina subspecialty interventions.

Conclusion:

The proportion of urgent VRI during lockdown increased with statistical significance. Our study highlights the value of VR speciality service and its critical place in any ophthalmic set up to address the various vision threatening disorders needing urgent intervention, a significant proportion of which stem from retinal pathologies.

Introduction

The novel coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was identified first in Wuhan, China in December, 2019. ^[1] Due to its rapid spread, World health organisation declared COVID-19 as a public health emergency on January 31, 2020. ^[2] The global COVID-19 pandemic led many governments from different nations to adopt stringent protective measures to reduce its spread. Government of India confirmed the first case of COVID-19 on January 30, 2020 and a nationwide lockdown was implemented on March 23, 2020. Non-essential health care services were temporarily made unavailable. ^[3]

Though majority of comprehensive eye care services are elective, there are certain ocular emergency situations especially in Vitreo retina (VR) department which need timely interventions. ^[4] In view of this,

VR services at our hospital were fully functional for all emergency vitreoretinal interventions (VRI) during the lockdown. In this study, we have attempted to understand the impact of the nation-wide lockdown on VRI at our centre.

Methods

This observational study reviews the data of patients who underwent VRI during the time period extending from a month prior (pre-lockdown) and a month after (post lockdown) the nation-wide lockdown (lockdown period) at a single VR centre of a tertiary eye care hospital in South India. Patients included in the study were divided into 3 groups. 1) **Pre-lockdown group**: 30 days from February 23, 2020 to March 22, 2020 2) **Lockdown group**: 50 days from March 23, 2020 to May 16, 2020 3) **Post lockdown group**: 30 days from July 6, 2020 to August 05, 2020.

Data on demographics, clinical presentation, diagnosis and management of patients who underwent VRI during those above mentioned periods was extracted from electronic medical records and entered on Microsoft excel. The study adhered to the tenets as per the Declaration of Helsinki. The study was approved by the institutional ethics committee. A written informed consent was obtained from all study participants.

Vitreo retina interventions were categorized into urgent, semi-urgent and less urgent as per national guidelines. ^[5,6] The interventions were further divided into medical (lasers and injections) and surgical.

Statistical Plan:

Continuous variables were expressed as mean \pm standard deviation and categorical variables were expressed as percentage. The normality of the data set was checked using Shapiro Wilk test. Chi square test was used to find out the difference in categorical variables (lockdown status, type of VRI, type of emergency) between three groups. Difference between the median pBCVA between the three groups was done using Kruskal Wallis test. Difference between the proportion of retina and non-retina interventions was done using proportion test. P value < 0.05 is considered as statistically significant. All the statistical analysis was done using STATA software 14.2 (Texas, USA).

Outcome measures:

The primary outcome measure is to study the influence of COVID-19 lockdown on the proportion of urgent VRI. The secondary outcome measures are 1) To study the influence of COVID-19 lockdown on the proportion of semi-urgent and less urgent VRI 2) To study the impact of lockdown on the pBCVA of patients who underwent VRI 3) To compare the proportion of retina and non-retina interventions between the three groups.

Results

A retrospective analysis of 1210 patients who underwent VRI during the pre-lockdown, lockdown and post lockdown periods was done. Table 1 shows the demographic profile. Average number of VRI was downscaled to 2 per day during lockdown period compared to 21 in the pre-lockdown period (82.47 % reduction). The proportion of VR patients who presented with sudden onset of symptoms needing VRI increased almost 10 times (19.3%) during lockdown when compared to pre-lockdown (1.9%). Table 2 provides the list of retinal disorders which needed VRI during different phases of lockdown. The median presenting visual acuity was significantly lesser in patients who underwent VRI during the lockdown period as compared to pre and post lockdown periods (Table 3)

Table 1
Demographic profile of patients who underwent VRI during pre-lockdown, lockdown, post-lockdown periods

Parameters	Pre- Lockdown N (%)	Lockdown N (%)	Post- lockdown N (%)
<i>Age in years</i>	<i>58.57 ± 12.04</i>	<i>51.10 ± 13.10</i>	<i>55.96 ± 11.93</i>
<i>Gender</i>			
<i>Male</i>	<i>299 (65.3)</i>	<i>63 (81.8)</i>	<i>213 (70.1)</i>
<i>Female</i>	<i>159 (34.7)</i>	<i>14 (18.2)</i>	<i>91 (29.9)</i>
<i>District</i>			
<i>Chennai</i>	<i>267 (58.3)</i>	<i>47 (61.0)</i>	<i>176 (57.9)</i>
<i>Kanchipuram</i>	<i>57 (12.5)</i>	<i>10 (13.0)</i>	<i>41 (13.5)</i>
<i>Tiruvallur</i>	<i>72 (15.7)</i>	<i>12 (15.6)</i>	<i>65 (21.4)</i>
<i>Vellore</i>	<i>33 (7.2)</i>	<i>3 (3.9)</i>	<i>12 (3.9)</i>
<i>Others</i>	<i>29 (6.3)</i>	<i>5 (6.5)</i>	<i>10 (3.3)</i>
<i>Systemic illness</i>			
<i>Nil</i>	<i>74 (16.2)</i>	<i>18 (23.38)</i>	<i>35 (11.5)</i>
<i>Cardiac</i>	<i>2 (0.4)</i>	<i>-</i>	<i>1 (0.3)</i>
<i>Diabetes Mellitus</i>	<i>86 (18.8)</i>	<i>16 (20.78)</i>	<i>75 (24.7)</i>
<i>Hypertension</i>	<i>33 (7.2)</i>	<i>8 (10.39)</i>	<i>18 (5.9)</i>
<i>Multiple comorbidities</i>	<i>262 (57.3)</i>	<i>35 (45.46)</i>	<i>175 (57.6)</i>

Table 2
Indications for VRI during pre, lockdown and post-lockdown period.

Parameters	Pre-lockdown N (%)	Lockdown N (%)	Post-lockdown N (%)
<i>Total interventions</i>	622	109	479
<i>Average no. of VRI per day</i>	21	2	16
Complaints			
<i>Sudden</i>	12 (1.9)	21 (19.3)	16 (3.3)
<i>Insidious</i>	610 (98.1)	88 (80.7)	463 (96.7)
Diagnosis			<i>Per</i>
<i>PDR</i>	282 (45.3)	45 (41.3)	182 (38.0)
<i>PDR + TRD</i>	4 (0.6)	1 (0.9)	17 (3.5)
<i>PDR + NVG</i>	11 (1.8)	5 (4.6)	16 (3.3)
<i>PDR + VH</i>	19 (3.1)	4 (3.7)	61 (12.7)
<i>RRD</i>	11 (1.8)	8 (7.3)	15 (3.1)
<i>Retinal Hole</i>	22 (3.5)	1 (0.9)	12 (2.5)
<i>HST</i>	4 (0.6)	-	4 (0.8)
<i>Retinal dialysis</i>	1 (0.2)	-	-
<i>ROP</i>	-	2 (1.8)	-
<i>BRVO</i>	9 (1.5)	2 (1.8)	5 (1.0)
<i>BRVO + CME</i>	36 (5.8)	2 (1.8)	19 (4.0)
<i>CRVO</i>	18 (2.9)	2 (1.8)	16 (3.3)
<i>CRVO + NVG</i>	5 (0.8)	-	2 (0.4)
<i>CNVM</i>	50 (8.0)	9 (8.3)	25 (5.2)
<i>CRAO</i>	-	-	1 (0.2)
<i>CSCR</i>	4 (0.6)	-	5 (1.0)
<i>Closed globe injury</i>	3 (0.5)	-	-
<i>Aphakia</i>	2 (0.3)	-	1 (0.2)
<i>Endophthalmitis</i>	2 (0.3)	8 (7.3)	4 (0.8)
<i>ERM</i>	1 (0.2)	-	-
<i>Fuchs heterochromic uveitis</i>	1 (0.2)	-	-

Parameters	Pre-lockdown	Lockdown	Post-lockdown
	N (%)	N (%)	N (%)
<i>Giant retinal tear</i>	-	-	1 (0.2)
<i>HCRVO</i>	1 (0.2)	-	-
<i>Hypertensive Retinopathy</i>	-	-	2 (0.4)
<i>IOFB</i>	-	2 (1.8)	-
<i>Macular hole</i>	4 (0.6)	-	2 (0.4)
<i>Mixed Retinopathy</i>	3 (0.5)	-	1 (0.2)
<i>NPDR</i>	84 (13.5)	10 (9.2)	57 (11.9)
<i>Posterior dislocation of nucleus</i>	1 (0.2)	1 (0.9)	1 (0.2)
<i>NVG</i>	-	-	4 (0.8)
<i>Open globe injury</i>	1 (0.2)	-	1 (0.1)
<i>PCV</i>	8 (1.3)	4 (3.7)	3 (0.6)
<i>Subluxated IOL</i>	-	-	1 (0.2)
<i>Vasculitis</i>	3 (0.5)	-	1 (0.2)
<i>Vitreous Haemorrhage</i>	7 (1.1)	1 (0.9)	1 (0.2)
<i>VPT</i>	-	-	1 (0.2)
<i>Silicon oil filled eye</i>	19 (3.1)	2 (1.8)	15 (3.3)
<i>CME</i>	3 (0.5)	-	3 (0.6)
<i>PCO</i>	1 (0.2)	-	-
<i>Choroiditis</i>	1 (0.2)	-	-
<i>PEHC</i>	1 (0.2)	-	-

PDR: Proliferative diabetic retinopathy, TRD: Tractional retinal detachment, NVG: Neovascular glaucoma, VH: Vitreous haemorrhage, RRD: Rhegmatogenous retinal detachment, HST: Horseshoe tear, ROP: Retinopathy of prematurity, BRVO; Branch retinal vein occlusion, CRVO: Central retinal vein occlusion, CME: Cystoid macular oedema, CNVM: Choroidal neovascular membrane, CRAO: Central retinal artery occlusion, CSCR: Central serous chorioretinopathy, ERM: Epiretinal membrane, HCRVO: Hemi- Central retinal vein occlusion, IOFB: Intraocular foreign body, NPDR: Nonproliferative diabetic retinopathy, PCV: Polypoidal choroidal vasculopathy, VPT: Vasoproliferative tumour, PCO, PEHC: Peripheral exudative haemorrhagic chorioretinopathy.

Table 3
Comparison of presenting best corrected visual acuity between groups

Visual acuity (Baseline)	Pre-lockdown (30 days)	Lockdown (50 days)	Post-lockdown (30 days)	P value
Median	0.5	0.8	0.6	0.0001*
Interquartile range	0.2–1	0.3–1.3	0.3–1	
<i>* kruskal wallis test</i>				

The proportion of urgent VRI during the lockdown period had significantly increased to 26.61 % when compared to pre-lockdown (9.81 %) and post lockdown (13.15 %). The proportion of semi-urgent VRI increased significantly during the post lockdown period (15.87%) when compared to other lockdown phases. The proportion of less urgent VRI decreased significantly during the lockdown period (66.97%) as compared to pre lockdown period (86.98%) (Table 4). There has been no significant difference in the proportion of patients who underwent various types of VRI ({medical: lasers and injections}, surgical) during different phases of lockdown (Table 5).The most common (MC) indication for surgical VRI was rhegmatogenous retinal detachment (RD) during the lockdown period, whereas diabetic vitrectomy was the MC indication during pre-lockdown and post-lockdown period. The proportion of VRI significantly increased (> 3 times of that of pre-lockdown period) as compared to cumulative non retina interventions during the lockdown period. (p value < 0.001) (Table 6)

Table 4
Categorisation of VRI.

Parameter	Pre-lockdown N (%)	Lockdown N (%)	Post-lockdown N (%)	P value
<i>Urgent</i>	61 (9.81)	29 (26.61)	63 (13.15)	
<i>Semi-urgent</i>	20 (3.22)	7 (6.42)	76 (15.87)	< 0.0001*
<i>less-urgent</i>	541 (86.98)	73 (66.97)	340 (70.98)	
<i>Total</i>	622 (100)	109 (100)	479 (100)	
<i>*Chi square test</i>				

Table 5
Comparison of types of VRI during lockdown phases.

Parameter	Pre-lockdown	Lockdown	Post-lockdown	P value
<i>Surgery</i>	79 (12.71)	17 (15.59)	64 (13.36 %)	0.160
<i>Laser</i>	289 (46.54 %)	53 (48.62)	250 (52.19)	
<i>Injection</i>	253 (40.74)	39 (35.77)	165 (34.45)	
<i>Total</i>	621 (100)	109 (100)	479 (100)	
<i>*Chi square test</i>				

Table 6
Comparison between Retina VS Non-retina interventions.

Parameter	Pre-lockdown N (%)	Lockdown N (%)	Post-lockdown N (%)
<i>Retina</i>	76 (7.47)	17 (26.98)	63 (13.12)
<i>Non-Retina</i>	941 (92.52)	46 (73.01)	417 (86.87)
<i>Total</i>	1017 (100)	63 (100)	480 (100)

<i>Pre-lockdown Vs. Lockdown in Retina interventions</i>	261.17% (I)	< 0.0001
<i>Pre-lockdown Vs. Lockdown in Non-Retina interventions</i>	21.08% (D)	< 0.0001
<i>Lockdown Vs. post-lockdown in Retina interventions</i>	51.37% (D)	0.0035
<i>Lockdown Vs. post-lockdown in Non-Retina interventions</i>	18.98% (I)	0.0035
<i>I- Percentage increase; D-Percentage decrease</i>		
<i>*Proportion test</i>		

Discussion

Corona virus disease became a pandemic in early 2020. [1] The disease spread rapidly through droplet transmission. [7] Nationwide lockdown was imposed in various countries across the globe including India to control the pandemic. Healthcare facilities were asked to attend only emergency situations. [8] Ophthalmologists are among the most vulnerable subspecialties as social distancing is difficult during eye examinations. [9] A survey done by Nair AG et al mentioned that 72.5 % of ophthalmologists in India stopped seeing patients completely whereas 27.5 % ophthalmologists attended only emergency patients. [10] Although comprehensive ophthalmic services are often elective and non-urgent, VR is an important sub specialty which deals with a lot of vision threatening conditions.

In view of the pandemic and in accordance with national guidelines, we, at our VR department of a tertiary eye care centre in southern India, discouraged consultations of non-urgent VR patients. The absolute number of VR patients who visited our department decreased drastically during the lockdown period. Though our services were open for all emergency VR patients, many of them could not access our services, probably due to non-availability of public transport and compromised livelihood. In this study we wish to understand the influence of the COVID-19 nation-wide lockdown on VRI at our tertiary VR centre in South India.

During lockdown, there was a 50% reduction in the proportion of female patients who underwent VRI. This could probably suggest the indirect greater influence of lockdown on the female gender. A similar gender pattern was observed by Das et al. ^[11, 12] Despite inter-district transport restrictions and non-availability of basic public transport facilities, we did not observe any major alteration in the proportion of VR patients who came from metro city and neighbouring districts. This suggests the awareness among patients regarding retinal disorders even in the smaller districts.

The fact that the absolute numbers decreased significantly for semi-urgent and less urgent VRI (combined reduction by 85 %) as compared to urgent VRI (reduction by 52 %) implies that there is good awareness among the general public and at the same time, commutation becomes a major barrier in health care access, especially, in the event of natural calamities.

Though there was no significant overall change in the proportion of surgical and medical VRI during lockdown, we observed that the MC indication for VR surgery during lockdown was RD whereas diabetic vitrectomy was the MC indication before lockdown. Das et al mentioned that RD (47.83 %) followed by endophthalmitis are the MC indications at their centre. ^[12] A retrospective study done by Agarwal D et al. showed that acute RD (38.5%) was the MC indication for emergency surgery during lockdown at their centre. ^[13] Tang et al. mentioned that RD surgery (47.4%) followed by open globe repair (15.8%) were the MC indication for emergency surgeries during lockdown at their tertiary eye care centre in Hong Kong. ^[14]

We analysed the top five retinal conditions needing some form of VRI during the lockdown and compared with pre- and post-lockdown periods. PDR, DME and CNVM are the top three retinal conditions which needed VRI throughout, irrespective of the lockdown status. Interestingly, CRVO became the 5th most common condition needing VRI in the immediate post lockdown status. There have been a few anecdotal reports correlating the occurrence of CRVO post COVID status in view of COVID-19 induced hypercoagulable status. Sheth JU et al reported a case of unilateral vasculitic retinal vein occlusion secondary to COVID after investigating and ruling out other causes of vasculitis. ^[15] A case of bilateral retinal vein occlusion was reported by Gaba WH et al in a 40-year-old male with active COVID signs, recovery to near normal vision with anticoagulant treatment. ^[16] However, we did not observe any major surge in the incidence of CRVO in the immediate post lockdown period as the absolute numbers remain more or less the same (18 CRVO patients in pre-lockdown and 16 in post lockdown period). It probably requires larger studies with longer follow up to ascertain any strong relationship between CRVO and COVID. The limitation in our study was that many of our patients were not tested for COVID, due to the

prevailing difficulty in accessing COVID testing centres at that time. We noticed a significant fall in median pBCVA of VR patients who underwent VRI during the lockdown period, which again suggests that daily livelihood, public transport and awareness are key determinants of health care access. We observed a significant uptrend in the proportion of VR interventions when compared to cumulative non-retina interventions at our centre during the lockdown. This study thus also underscores the crucial role of retina sub specialty services in any comprehensive eye care facility.

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Figures

Categorisation of VRI .

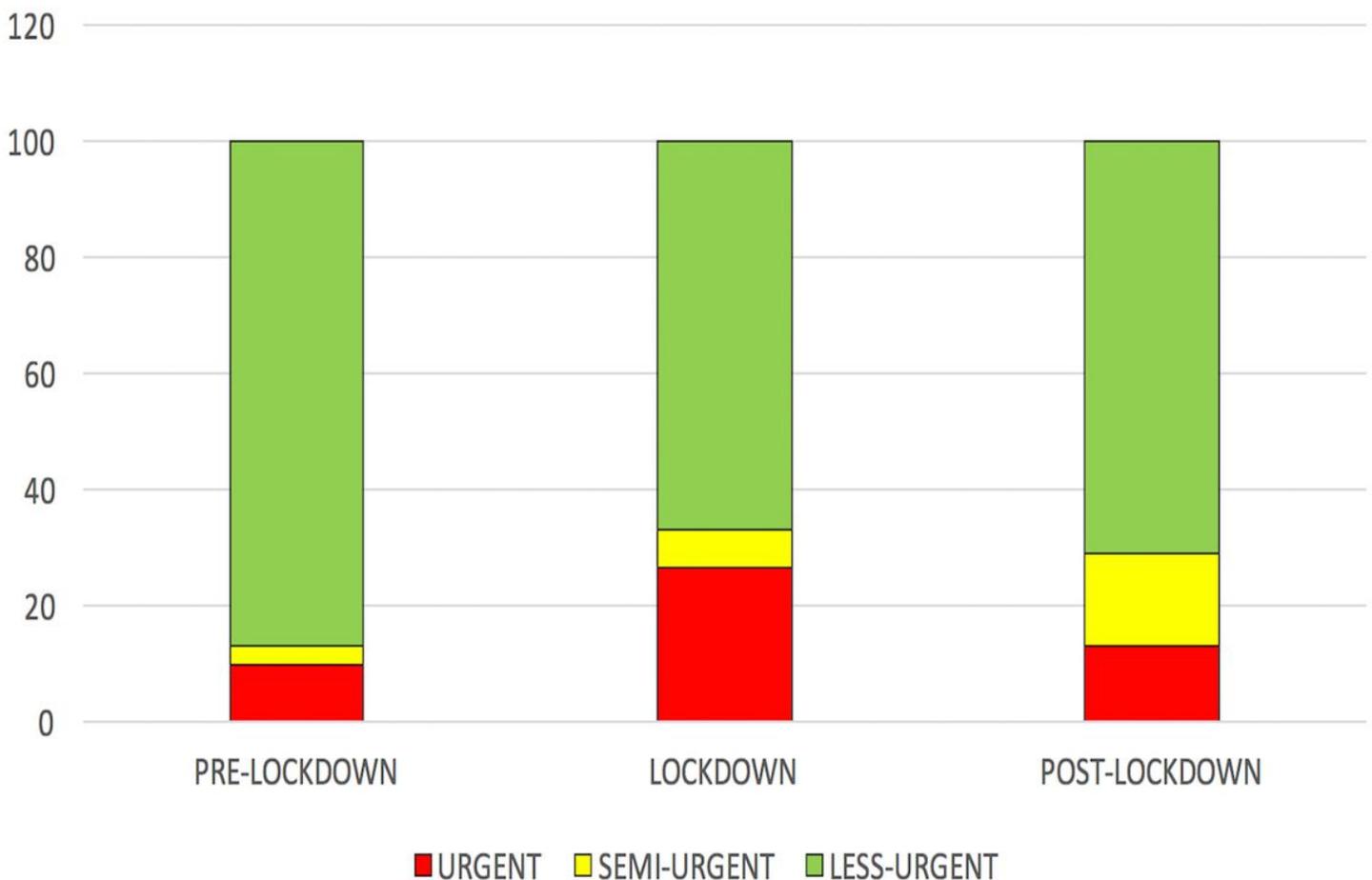


Figure 1

Bar diagram showing the proportion of urgent, semi urgent and less urgent VRI during pre, post and lockdown groups.

Comparison of types of VRI during lockdown phases

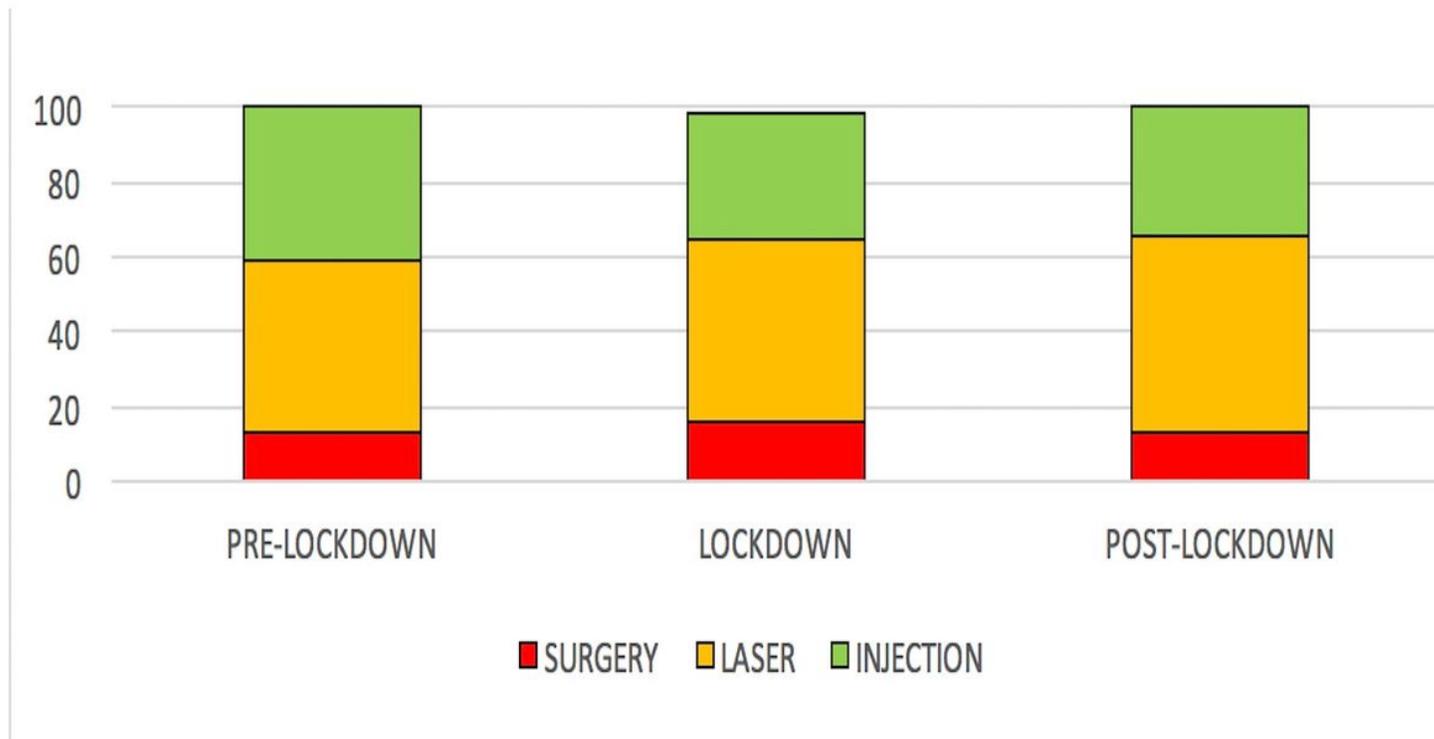


Figure 2

Bar diagram showing proportion of VRI types (surgical, laser and injection) during pre, post and lockdown groups.

Retina versus non retina interventions in proportions

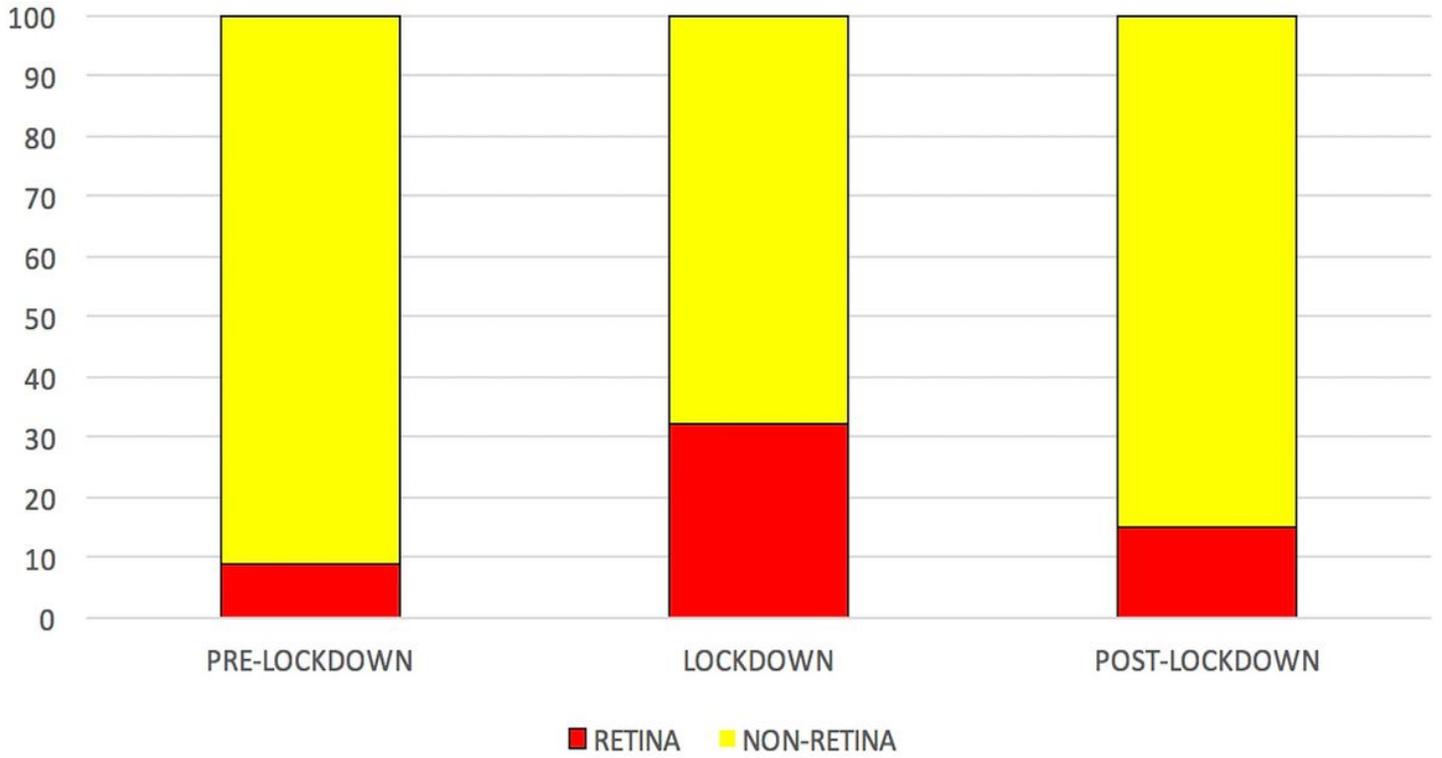


Figure 3

Bar diagram showing proportion of retina vs cumulative non retina interventions during pre, post and lockdown groups.