

## Retrospective Analysis of CSR Patient in Pre and Post COVID Era

Sachala Bhoi<sup>1</sup>, Sabita Devi<sup>2</sup>, Sujata Padhy<sup>3</sup>, Mohit Sharma<sup>4</sup>

<sup>1</sup>Associate Professor, Department of Ophthalmology, MKCG Medical College & Hospital, Brahmapur, Odisha, India.

<sup>2</sup>Assistant Professor, Department of Ophthalmology, MKCG Medical College & Hospital, Brahmapur, Odisha, India.

<sup>3</sup>Assistant Professor, Department of Ophthalmology, MKCG Medical College & Hospital, Brahmapur, Odisha, India.

<sup>4</sup>Senior Resident, Department of Ophthalmology, MKCG Medical College & Hospital, Brahmapur, Odisha, India

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Corresponding author: Dr. Mohit Sharma

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### Abstract

**Background:** A retrospective analysis of CSCR patient to ascertain the link between noble corona virus and CSCR disorder. Explosion of covid 19 cases inflated the use of steroid as well as stress in the patients leading to increase CSCR cases in post covid era.

**Aim:** To determine the risk factors in covid 19 patients leading to the development of CSR.

**Materials and Methods:** A Retrospective Observational study was done in a tertiary care center from February 2019- January 2021 including all CSR cases and categorizing them into two groups. One pre covid CSR group with patients of CSR diagnosed between February 2019- January 2020 and Post covid CSR group with newly diagnosed CSR cases between February 2020- January 2021.

**Results:** The pre-covid group had 194 patients with 132 males and 62 females ageing between 24-40 years. Post covid group had 290 patients with 170 males and 120 females ageing between 21-48 years. B/L disease increased from 2 cases to 13 cases after covid. OCT thickness ranged 290-370  $\mu\text{m}$  in the pre covid group in comparison post covid group ranged 319-450  $\mu\text{m}$ . Mean steroid intake in post covid group was 41%.

**Conclusion:** The outbreak of covid 19 with an increase in stress and irrational use of corticosteroid are major causes of increment in cases of CSR in post covid patients.

**Keywords:** Cscr, Covid, Steriod, Anxiety, Stress.

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### Introduction

Central serous retinopathy (CSR) is a serious condition characterized by a localised serous detachment of the sensory retina at macula secondary to leakage from the choriocapillaris through one or more hyperpermeable RPE site. CSCR is a

vision-threatening retinopathy after AMD, diabetic retinopathy and branch retinal vein occlusion [1]

An increased prevalence among men was seen in several studies, with 72%-88% of cases occurring in male patient [2,3]. An

epidemiological data reporting a higher mean age than generally expected, ranging between 39 and 51 years [4,5].

CSCR patients are more likely to be exposed to oral corticosteroid medications and are at higher risk for developing CSCR [4,6,7,8,9,10]. Considering the route of administration, most studies reported that systemic intake (oral or intravenous) is an independent risk factor for CSCR [7,9,10]. CSCR has also been described after local administration of corticosteroids via the following routes: inhaled and intranasal epidural, intra-articular topical dermal and periocular.

In 1986, Yannuzzi observed an correlation between CSCR and type-A personality pattern, characterised by a competitive drive, urgency, an aggressive nature and a hostile temperament [11]. Higher levels of emotional distress, depression was observed in CSCR patients [12].

Standard initial management of acute classic CSR is careful observation with modification of various risk factors. Acute CSR has typically an excellent prognosis and self-resolving natural course with almost full visual recovery to the premorbid level. Acute CSR has an excellent prognosis (90-95%) and self-resolving natural course with almost full visual recovery to the premorbid level. Active intervention should be considered in cases of CSR with persisting macular subretinal fluid (SRF) or reduced visual acuity.

Severe acute respiratory syndrome virus 2 (SARS-CoV2) infection resulted in a global pandemic of Coronavirus disease 2019 (COVID-19). Wuhan in China was the first place of the outbreak in December 2019. Conjunctival involvement, cotton wool spots (CWS) and retinal hemorrhages, central retinal artery/vein occlusion, ophthalmic artery occlusion, panuveitis, papillophlebitis, multifocal chorioretinitis and Adie's syndrome are the ophthalmic manifestations associated with COVID-19 infection [13,14,15,16,17].

## Objective

To determine the risk factors in covid 19 patients leading to the development of CSR

## Materials and Methods:

A Retrospective Observational study was done in a tertiary care center from February 2019- January 2021. Including all previously diagnosed CSCR cases and categorizing them into two groups. 1). Pre covid CSCR group with patients of CSCR diagnosed between February 2019-January 2020 and 2). Post covid CSCR group with patients that had history of covid infection with newly diagnosed CSCR cases between February 2020- January 2021.

All the available retrospective data including Patients registration number, demographic details, history of any risk factors like steroid intake, visual acuity with BCVA, presenting complaints, fundus photograph and Optical Coherence Tomography was studied.

In post Covid group adequate history was taken including record of hospitalization and medical history including Diabetes Mellitus and corticosteroid treatment.

## Exclusion criteria

1. Post covid group with previously diagnosed CSCR
2. Any history of renal disorder, hypertension, any sleep disorder, smoking, alcohol and other drug intake like sildenafil
3. Any chronic CSCR case in pre-covid group
4. Any history of covid vaccination

## Statistical analysis

Statistical analysis was conducted using SPSS software. Chi-square test was used and p value <0.05 was considered as statistically significant.

## Results

The pre-covid group with 194 patients which had 132 males and 62 females aging between 24-40 years. The post covid group

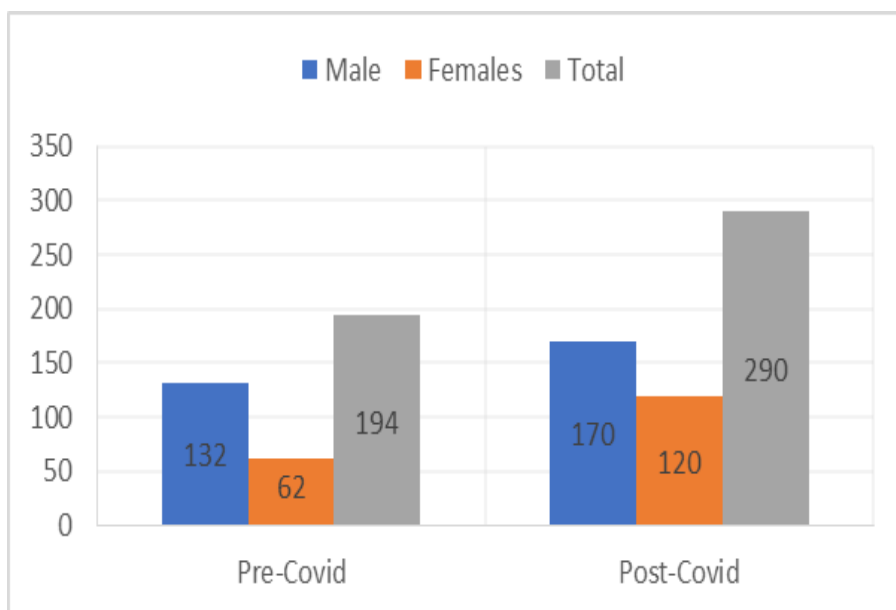
with 290 patients including 170 males and 120 females aging between 21-48 years.

Pre covid as well as in post covid group the CSCR was detected more in males as compared to females which was

statistically significant(table no. 1).Ratio of M:F in pre covid Era was 2:1 and in Post Covid Era was 1.4:1 as well as an increase in number of CSCR cases in Post Covid Group.

**Table 1: Demographic Distribution**

	MALE	FEMALE
Pre-covid	132	62
Post-covid	170	120
Chi Square	4.3966	
P value	0.03601(significant)	



**Figure 1: Demographic Distribution in Pre Vs. Post Covid Group**

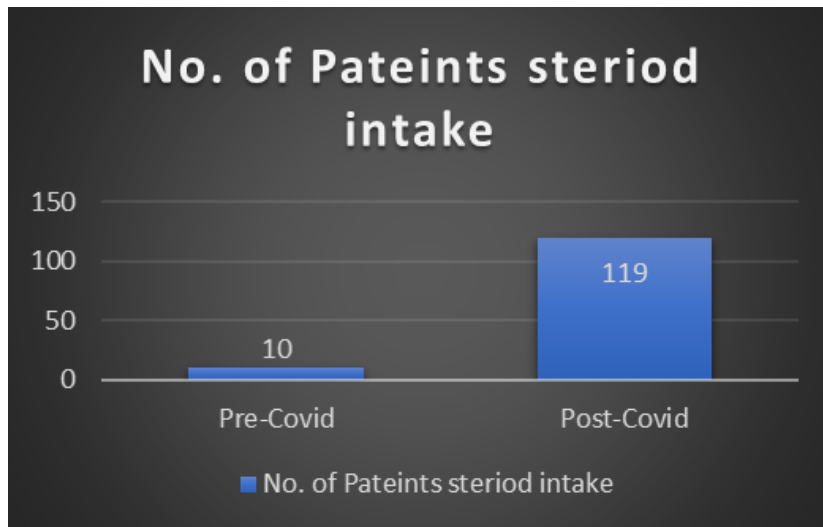
Most common complaints was distortion of vision, metamorphopsia and central diminution of vision in both Pre and Post Covid Group. The mean duration of presentation in post Covid group was 2 months.

Visual Acuity in pre-covid group ranging from 6/6-6/12 as compared to Post Covid Group ranging from 6/6-6/24.

**Steroid Intake**

**Table 2: Comparison of Steroid Intake**

	Steroid intake	No Steroid Intake
Pre-Covid Group	10	184
Post-Covid Group	119	171
Chi square	76.54	
p value	0.00001	



**Figure 2: No. Patient Taking Steroid in Pre Vs. Post COVID Group**

Out of 194 patients in pre covid group only 10 (5.15%) patients has history of steroid intake. Out of 290 patients in Post Covid group 119(41%) patients had history of steroid intake which was statistically significant(table no. 2).

Bilaterality of the disease increased from 2 cases to 13 cases after Covid. OCT thickness ranged from 290-370  $\mu\text{m}$  in the

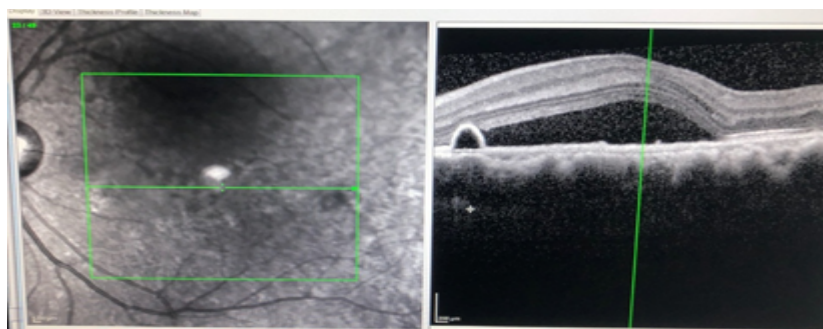
pre covid group in comparison to post covid group which ranged from 319-450  $\mu\text{m}$ . Out of 290 patients in Post Covid Group only 41(14%) patients had history of hospitalization and all of them history of steroid intake.

**Fundus Photograph**



**Figure 3: Two Different Patients with Serous Retinal Detachment**

**OCT Picture**



**Figure 4: Optically Empty Neurosensory Elevation with One Small PED**

## Discussion

Studies showed SARS-CoV-2 might bind to the angiotensin-converting enzyme (ACE) 2 receptor of human cells. ACE 2 receptors are present in many organs, especially the lungs, heart, and endothelium of vessels. SARS-CoV-2 can cause endotheliitis leading to endothelial dysfunction [18].

The exact pathophysiology of CSCR remains unknown. Hypothetically, the disease can occur due to endothelial dysfunction and hyperpermeability of Choriocapillaris, and also retinal pigment epithelium (RPE) pump dysfunction [19]. However, there is no evidence that SARS-CoV-2 can lead to CSCR directly.

A case report of a 49-year-old female who presented with bilateral blurred vision three months after the COVID-19 infection. She had been treated with intravenous Remdesivir and Dexamethasone. After her recovery from the disease, she developed gradual visual impairment in both her eyes. Upon examinations and optical coherence tomography, bilateral CSCR was revealed [20].

Another case report of a 42-year-old female presented with unilateral blurring, in the right eye (OD), 12 days after COVID-19 infection. She had been treated with intravenous and oral antibiotics with injection heparin/remdesivir and was also on steroid inhalers. Fundus examination of the OD showed central serous retinopathy (CSCR) with OS being normal [21].

A study reporting 5 patients (5%) with retinal vascular occlusion either branch retinal vein occlusion (BRVO) or central retinal artery occlusion (CRAO), 2 patients (2%) with anterior ischemic optic neuropathy (AION), 3 patients (3%) with uveitis and 2 patients (2%) were having central serous chorioretinopathy (CSCR) in COVID Group. In control group, 2 patients (2%) with retinal vascular occlusion and no one had AION, uveitis or CSCR (P value = 0.006) [22].

Another case report describe an adult patient with COVID-19 infection and received intravenous and oral corticosteroid treatment for three weeks. He presented with central visual loss in both eyes for six days. Fundus examination showed multiple localized serous retinal detachments in both eyes. Optical coherence tomography (OCT) of the macula confirmed the presence of multiple areas of serous retinal detachment and pigment epithelial detachment [23].

Amulya et al. [24] described a 30 year old male health care worker with COVID 19 infection presented with sudden diminution of vision in his right eye for 3 days . Fundus examination right eye revealed central elevation of the macula with CSR (thickness: 759um) which was confirmed on Spectral Domain Optical Coherence Tomography

Goyal et al. [25] reported a case of 27-year-old female patient with COVID-19 infection presented with central vision deterioration in LE of 10-days duration.. Fundus examination revealed serous detachment of the macula and was confirmed by OCT and the symptoms resolved spontaneously a few weeks later.

COVID19 pandemic has been reported to have a huge psychological impact. A survey done in China reported a 53.8% prevalence of moderate to severe psychological impact out of which 28.8% reported severe anxiety symptoms while 16.5% reported moderate to severe depressive symptoms [26].

In our study there was increase in CSCR Cases from 190 in Pre-Covid to 290 in Post Covid group. The number of male patients was more in both Pre and Post Covid group which was statistically significant. Mean age ranging from 24-40 years in pre-covid group as compared to 21-48 years in Post Covid Group. [27]

In our study there was increase in the number of female cases in Post Covid group and M:F decreasing from 2:1 in Pre-Covid to 1.4:1 in Post covid group. Post

Covid group there was pragmatic increase in steroid intake (41%). Consequences of which increase in Bi-laterality from 2-13 cases, increase in sub-retinal fluid in OCT and decrease in Male patients with CSCR as compared to Female cases.

Only 41(14%) were hospitalised and all had history of steroid intake, others with positive history had irrational use of steroid and some of them had the steroid use out of stress and anxiety.

### Conclusion

Covid epidemic is still ongoing in our country with new waves and new variants of covid still causing a havoc , and our study is first of a kind that establishes a correlation of CSR with Covid-19.

With outburst of covid cases there was pragmatic increase in stress and anxiety in patients which is the root cause of it and secondly irrational use of steroid ultimately increases CSCR cases in Post Covid Era.

General practitioner while dealing with COVID-19 patients should be aware of this side effect, as an early referral for ophthalmology assessment is crucial. In addition, introduction of newer protocols for controlling the irrational use of steroid in COVID-19 patients is necessary to reduce these complications.

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