

Clinical Study on Central Serous Chorioretinopathy

Savithiri Viswanathan¹, Thendral Velmurugan²

¹Associate Professor, Department of Ophthalmology, Tirunelveli Medical College, Tirunelveli, Tamil Nadu.

²Postgraduate, Department of Ophthalmology, Tirunelveli Medical College, Tirunelveli, Tamil Nadu.

ABSTRACT

BACKGROUND

CSCR is a pachychoroid spectrum of disorders and fourth common retinopathy which is characterised by serous detachment between neurosensory retina and RPE. Central serous chorio retinopathy, age- and sex-distribution, duration of symptoms, common FFA and OCT patterns, pre- and post-treatment macular thickness in the study group and control group were studied. This study emphasises the importance of early treatment with laser in perifoveal leakage for faster resolution of macular oedema and for better visual outcome.

METHODS

A randomized cross-sectional interventional study on cases of central serous chorioretinopathy seen in Regional Institute of Ophthalmology, Chennai, was conducted between January 2019 and June 2019. Patients with perifoveal leakage were subdivided into two groups by randomization, first group was treated with argon laser photocoagulation and the second group was observed.

RESULTS

In this study, prevalence was more among males than among females. Most common presenting symptom was defective vision with metamorphopsia. Ink blot pattern was the most common in FFA. The improvement of visual acuity and reduction in macular oedema was more in laser treatment group than the observation group in patients with perifoveal leakage.

CONCLUSIONS

Early treatment with laser photocoagulation shows promising early reduction in macular thickness than late or no treatment in patients with perifoveal leakage.

KEYWORDS

CSCR, Argon Laser, Macular Thickness, Ink Blot, Smokestack

Corresponding Author:

Dr. Thendral Velmurugan,

Postgraduate,

Tirunelveli Medical College,

Tirunelveli, Tamil Nadu.

E-mail: thendralkutty@gmail.com

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BACKGROUND

CSCR was first described by Albert Von Graefe as central recurrent retinitis. It is the serous detachment of neurosensory retina at macula.¹ CSCR is a pachychoroid spectrum of disorders and fourth common retinopathy which is characterised by serous detachment between neurosensory retina and RPE. CSCR is more common in middle aged men in age group of 20-64 and the ratio male: female is 2.6:1 to 6: 1.² Most cases are idiopathic and regress spontaneously within 4 months with good visual acuity, but some may progress to chronic and recurrent disease. The risk factors of CSCR include type A personality, corticosteroid intake antipsychotic medication, psychological stress, smoking, hypertension, GERD, *H. pylori* infection. This study aims at describing clinical spectrum of CSCR and effect of laser treatment in improvement in visual acuity and macular thickness.

METHODS

This study was conducted in Regional Institute of Ophthalmology-Chennai. This is a prospective cross-sectional interventional study. All new and old cases of CSCR seen in Regional Institute of Ophthalmology -Retina Clinic from January 2019 to June 2019 were included in the study. Patients with ocular infective and inflammatory conditions, patients with diabetes and patients with collagen vascular disease were excluded from the study. All 53 patients in our study underwent detailed history including occupation which is classified under national classification of occupation, duration of symptoms, history of similar episodes, treatment history, history of systemic illness, risk factors, drug history, Visual acuity on Snellen's chart, Retinoscopy refraction, Slit lamp examination, Amsler grid examination, Fundus examination with 90 D and Indirect ophthalmoscopy, FFA and OCT. Out of 53 patients, 30 patients with new onset of CSCR and evidence of leakage 375 microns away from fovea (perifoveal) were divided into two groups. In both the groups, patients were randomly assigned according the selection criteria and subgroup 1 was treated with laser and subgroup 2 was taken as control.

15 randomly selected patients [Sub Group 1 (Study Group)] were subjected to laser treatment with the following parameters- 100-150 mw power, 100-200 microns spot size, 0.1-0.2 seconds. Another 15 patients [Sub Group 2 (Control Group)] were given placebo treatment and kept under observation. For both the groups, visual acuity using Snellen's chart and central macular thickness is measured using OCT. Both the groups were followed up at 4th and 12th week. The total sample size was 53.

RESULTS

In our study of 53 patients, one patient was in age group of 1-20 years, 5 patients were in age group of 21-30 years, 24

patients in age group of 31-40 years, 20 patients were in the age group of 41-50 years, 3 patients were in age group of more than 50 years and only. Male: female ratio is 13:7. The most common occupation, classified under national classification of occupation is Group IV (professionals - 24%) followed by group II (Craft and Related Trades Workers- 17% and Service Workers and Shop & Market Sales Workers - 17%) (Chart 1). Though the incidence of central serous retinopathy was more in left eye there was no significant difference between the eyes involved.

All patients presented with defective vision and 64% had central scotoma followed by 36% patients with metamorphopsia. The most common presenting visual acuity is 6/6-6/12, followed by 6/12-6/24. The most common fluorescein pattern is ink blot pattern (54.7%), followed by association with PED (24.5%), smokestack appearance (18.8%) and multifocal CSR (1.8%). The newly diagnosed cases in our study was 66%, recurrence rate in our study was 25%, 9% of patients had persistence disease with duration of > 4 months (Table 1). Location of leak (Table 2) in fluorescein angiography showed that 38% was within foveal avascular zone or within 375 microns from the center of fovea, 25% was in the inferotemporal quadrant, for 6% leak was in inferonasal quadrant, 15% had leakage in superotemporal quadrant, 17% had leakage in superonasal quadrant. The most common OCT pattern is serous detachment (64.1%) followed by association with PED (35.8%). Newly diagnosed cases were 66%, recurrent cases were 25%, persistent cases were 9%.

Totally, 71.6% of patients were treated with observation with NSAIDS, 24.5% were treated with argon laser photocoagulation, 3.7% were treated with Anti-VEGF. Subgroup 1: 15 Patients with 375 microns away from the fovea that treated with laser photo coagulation. The pre-treatment macular thickness (Chart 2) in subgroup 1, 20% had 200-300 microns, 46.67% had 301-400 microns, 13.33% had 401-500 microns, 20% had more than 500 microns. In subgroup 2, 33.33% had 200-300 microns, 33.33% had 301-400 microns, 13.33% had 401-500 microns, 20% had >500 microns. It was observed that 60% of the patients regained 6/6- 6/9 vision within the period of 4 weeks whereas no patient in subgroup 2 had 6/6- 6/9 vision. Visual acuity observed at 12 weeks showed that 80% regained 6/6- 6/9 vision whereas only 13.33% patients in control group regained 6/6- 6/9 vision (Table 3). Post treatment macular thickness at 4th week in subgroup 1, 20% had <200 microns, 66.66% had 201-300 microns, 13.33% had 301- 400 microns. In subgroup 2, 40% had 201-300 microns, 40% had 201- 300 microns, 40% had 301-400 microns, 20% had >400 microns (Table 4). Average reduction in central macular thickness in Subgroup 1 at the end of fourth week was 157 Microns whereas in subgroup 2, it was 56.87 Microns. Average reduction in central macular thickness in Subgroup 1 at the end of 12th week was 186 microns whereas in subgroup 2 it was 98.87 microns. About 60% patients in subgroup 1 had complete resolution of serous detachment at the end of 12 weeks, whereas the remaining 40% had residual detachment (Table 5).

Thickness in the range of 201-300 microns was noted in 66.67% of the Subgroup 2. No patient had complete resolution at the end of 12 weeks as compared to the laser treatment group. The statistical analysis for the macular thickness at 4 weeks showed significant probability chi-square test of 0.029% and 0.002% at 12 weeks. The statistical analysis for the visual acuity at 4 weeks showed significant probability chi - square test of 0.041% and 0.017% at 12 weeks.

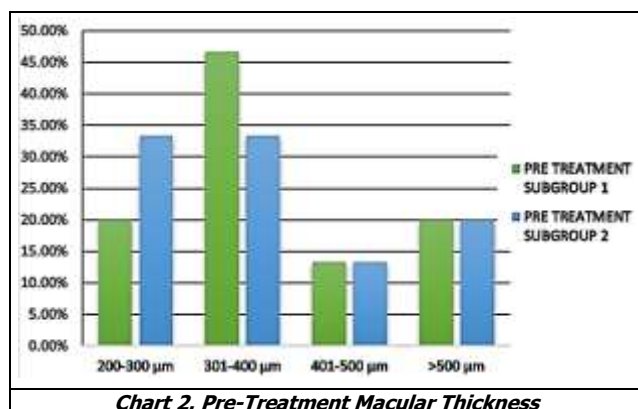


Category	No.	%
Newly Diagnosed	35	66%
Recurrent cases	13	25%
Persistent Cases	5	9%

Table 1. Number of New Cases and Recurrent Cases

Site of Leak	No.	%
FAZ	20	38%
STQ	8	15%
SNQ	9	17%
ITQ	13	25%
INQ	3	6%

Table 2. Location of Leak in FFA



Visual Acuity	Laser Group	Placebo
6/6-6/9	12 (80%)	2 (13.33%)
6/12-6/18	3 (20%)	10 (66.67%)
>6/18	0 (0%)	3 (20%)

Table 3. Post Treatment Visual Acuity 12th Week

Macular Thickness	Laser Group	Placebo
<200 µm	3 (20%)	0
201-300 µm	10 (66.66%)	6 (40%)
301-400 µm	2 (13.33%)	6 (40%)
>400 µm	0	3 (20%)

Table 4. Post Treatment Macular Thickness 4th Week

Macular Thickness	Laser Group	Placebo
<200 µm	9 (60%)	0 (0%)
201-300 µm	5 (33.33%)	10 (66.67%)
>300 µm	1 (6.67%)	5 (33.33%)

Table 5. Post Treatment Macular Thickness 12th Week

DISCUSSION

In a study conducted 53 cases of CSCR were included in our study. The most common age group was 31-40 years in our study, which is in accordance with study of Gass et al.,³ which showed the most common age group between 20-50 years. Males were affected more than females. In a study conducted by Desai et al in Asian, African American, Caucasian population, males are affected more than the females.⁴ Most common occupation associated is with Professionals (Group II - classified under national classification of occupation). This increased occurrence could be due to increased stress associated with these occupations. All patient presented with defective vision and 64% had central scotoma followed by 36% patients with metamorphopsia. The newly diagnosed cases in our study was 66%, recurrence rate in our study was 25%, 9% of patients had persistence disease with duration of >4 months which is similar to the study by Gass et al³ which shows recurrence in 20-30% of patients. History of steroid usage as systemic, topical, ointment and nasal sprays was found in 6% of patients in our study. Corticosteroid affects vascular autoregulatory mechanism and inhibit collagen synthesis in Bruch's membrane which alters ion transport in RPE leads to leakage of Sub retinal fluid into subretinal space. Systemic hypertension leads to autonomic dysfunction which in turn cause failure to maintain choroidal haemostasis thereby causing choroidal hyper perfusion which cause accumulation of subretinal fluid. *H. pylori*, causing acid peptic disease may lead to increased stress which results in CSCR. The clinical stages of CSCR has been divided into acute and chronic. The acute CSCR resolves in 3-4 months. Patients may present with central scotoma, metamorphopsia, micropsia and blurred vision. Patient may have ring reflex in fundus and yellowish fibrin deposits in subretinal space owing to the fibrin accumulation. The differential diagnosis of CSCR include Optic pit maculopathy, Age related macular degeneration, Polypoidal choroidal vasculopathy, ocular histoplasmosis. The other less common differential diagnosis are disseminated intravascular coagulopathy, Harada's disease, toxemia of pregnancy, macular holes in high myopic patients, sympathetic ophthalmia, benign reactive lymphoid hyperplasia of the uvea.⁵

In fundus fluorescein angiography, Ink blot pattern was most commonly seen (54.7%), followed by association with PED (24.5%), smokestack appearance (18.8%) and multifocal CSCR (1.8%). Location of leak in fluorescein angiography showed leakage was more commonly seen within foveal avascular zone (38%) or within 375 microns from the center of fovea, followed by inferotemporal quadrant, superonasal quadrant, supratemporal quadrant, Inferonasal quadrant. Bennet et al⁶ observed that leak was more in superonasal quadrant followed by inferonasal quadrant, followed by superotemporal and inferotemporal quadrant. In acute CSCR, typically shows a single leakage point in two forms a) INK blot pattern b) Smoke stack pattern. The INK blot pattern is the most common pattern in our study (54.7%). In a study conducted by, Maha M

Shahin et al., showed similar pattern of increased number of INK blot pattern (53%) compared to smokestack pattern (47%).⁷

In chronic CSCR, FFA shows multifocal leakage or diffuse leakage of dye due to diffuse RPE defect leads to mottled or granular hyper fluorescence in mid and late phases. If the patient has SRF, there will be a diffuse circular hyper fluorescence in mid and late phases. Indocyanine green angiography demonstrate dilated choroidal vasculature and choroidal hyperpermeability in the late phase.⁸ ICGA differentiates CSCR from CNVM and PCV. Similar choroidal permeability changes have been reported in more than 50% of the patients in other eye.⁹ Optical coherence tomography showed the most common pattern is serous detachment (64.1%) followed by serous detachment with PED. OCT shows serous elevation of neuro sensory retina, erosion of photoreceptor outer segment at the level of leakage secondary to mechanical disruption by RPE break, elongation of photoreceptor outer segment at the level of leakage. In chronic cases, there will be deposition of hyper reflective layer over the bruch's membrane leading to "double layer sign" which has been also described in other pachychoroidal diseases like pachychoroid pigment epitheliopathy, pachychoroid neovascularopathy and polypoidal choroidal vasculopathy.¹⁰ Recently, subretinal hyperreflective dots have been demonstrated in OCT of patients with acute and chronic CSCR.¹¹ In our study, the most commonly employed treatment modality was observation with topical NSAIDS (71.6%), argon laser photocoagulation (24.5%), Anti-VEGF (3.7%).

The treatment options include, Argon laser photocoagulation and micro pulsed diode laser, Photodynamic therapy, Conventional PDT, safety enhanced PDT with reduced verteporfin dosage and reduced laser fluence, anti-vascular growth factor injection, Transpupillary thermotherapy, scleral resection, Anti corticosteroid therapy, aspirin, *Helicobacter pylori* treatment. Mean reduction in central macular thickness in study group (157 microns) at the end of fourth week was more than the control group (56.87 microns). In the study group, 60% of the patients had complete resolution of serous detachment at the end of 12 weeks, 40% had residual detachment due to high pre-treatment macular thickness. Whereas the thickness in the control group was in range of 201 - 300 microns in 66.67%. No patient had complete resolution at the end of 12 weeks as compared to the laser treatment group. The reduction in macular thickness in the study group at 4th week (p value - 0.029%) and 12th (P value - 0.002%) week was statistically significant. Also, the statistical analysis of the visual acuity in the study group at 4th week (0.041%) and at 12 weeks (0.017%). Post laser recurrences of CSCR couldn't be documented in short term follow up. Currently, studies by Burumcek E et al,¹² laser treatment shortens the disease course and decreases the risk of recurrence, it does not improve the final visual prognosis. Further studies are needed with larger study population to document the

importance of laser photocoagulation regarding improvement of visual acuity.

CONCLUSIONS

Early treatment with laser photocoagulation is effective in the restoration of vision within 12 weeks. Though observation and follow up is the most common treatment modality in CSCR, early laser treatment in patients with leakage more than 375 microns shows promising improvement in visual acuity than late- or no-treatment. Further studies are needed with long term follow up to document the recurrence of CSCR and also to record the post laser complications such as CNVM.

REFERENCES

- [1] Nicholson B, Noble J, Forooghian F, et al. Central serous chorioretinopathy: update on pathophysiology and treatment. *Surv Ophthalmol* 2013;58 (2):103-126.
- [2] Kitzmann AS, Pulido JS, Diehl NN, et al. The incidence of central serous chorioretinopathy in Olmsted County, Minnesota, 1980-2002. *Ophthalmology* 2008;115 (1):169-173.
- [3] Hussain D, Gass JD. Idiopathic central serous chorioretinopathy. *Indian J Ophthalmol* 1998;46 (3):131-137.
- [4] Desai UR, Alhalel AA, Jacobsen GR, et al. Central serous chorioretinopathy in African Americans. *J Natl Med Assoc* 2003;95 (7):553-559.
- [5] Shuler RK, Mruthyunjaya P. Diagnosing and managing central serous chorioretinopathy. *Am Acad Ophthalmol* 2006.
- [6] Bennett G. Central serous retinopathy. *Br J Ophthalmol* 1955;39 (10):605-618.
- [7] Shahin MM, Angiographic characteristics of central serous chorioretinopathy in an Egyptian population. *Int J Ophthalmol* 2013;6 (3):342-345.
- [8] Spaide RF, Hall L, Haas A, et al. Indocyanine green video angiography of older patients with central serous chorioretinopathy. *Retina* 1996;16 (3):203-213.
- [9] Tsujikawa A, Ojima Y, Yamashiro K, et al. Punctate hyperfluorescent spots associated with central serous chorioretinopathy as seen on indocyanine green angiography. *Retina* 2010;30 (5):801-809.
- [10] Sheth J, Anantharaman G, Chandra S, et al. "Double-layer sign" on spectral domain optical coherence tomography in pachychoroid spectrum disease. *Indian J Ophthalmol* 2018;66 (12):1796-1801.
- [11] Hanumunthadu D, Matet A, Rasheed MA, et al. Evaluation of choroidal hyperreflective dots in acute and chronic central serous chorioretinopathy. *Indian J Ophthalmol* 2019;67 (11):1850-1854.
- [12] Burumcek E, Mudun A, Karacorlu S, et al. Laser photocoagulation for persistent central serous retinopathy: results of long-term follow-up. *Ophthalmology* 1997;104 (4):616-622.