

ROLE OF OPTICAL COHERENCE TOMOGRAPHY IN DIAGNOSIS AND MANAGEMENT OF CENTRAL SEROUS RETINOPATHY

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ABSTRACT

BACKGROUND

Central serous retinopathy typically affects young and middle-aged males in their third to fifth decades. Patients usually develop serous detachment of RPE in macular or paramacular area followed by serous detachment of the overlying and surrounding retina. In the present study, central serous retinopathy is diagnosed and followed up with the help of optical coherence tomography and the importance of use of optical coherence tomography as a primary diagnostic tool has been highlighted.

MATERIALS AND METHODS

A total of 50 eyes of 50 patients with a clinical diagnosis of central serous retinopathy were evaluated with spectral domain optical coherence tomography. After detailed ocular examination, optical coherence tomography was performed, and various anatomical features were noted.

RESULTS

Out of 50 eyes, 43 had acute and 7 had chronic central serous retinopathy. The mean age of the patients was 34.8 (SD 6.8) years with male (84%) preponderance in our study. All patients had unilateral involvement with blurring of vision (36%) and metamorphopsia (46%) being the main presenting complaints. Total macular thickness ranged from 215 μ m to 1058 μ m (Mean \pm SD: 570 \pm 228) and vault height ranged from 78 μ m to 794 μ m (Mean \pm SD: 411 \pm 207). Retinal pigment epithelial abnormality was seen in 86% eyes. Hyper reflective deposits located deep to neurosensory retina in all 7(100%) eyes with chronic central serous retinopathy and 6 eyes with acute central serous retinopathy, however they were more intense in chronic cases.

CONCLUSION

Optical coherence tomography can be used as the primary diagnostic tool in central serous retinopathy.

KEYWORDS

OCT, CSR, SDOCT, Retina.

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BACKGROUND

In 1866, von Graefe¹ first described a disease of the macula with recurrent serous detachment and named it recurrent central retinitis. In 1955, Bennet² named it central serous retinopathy. Central serous retinopathy is a disorder characterized by serous retinal detachment and/or RPE detachment associated with leakage of fluid through RPE into the subretinal space. It is characterized by multifactorial etiology and complex pathogenesis. Some patients have a more chronic version of the disease that can often have

descending tracts of fluid inferiorly. This disorder typically affects young to middle aged men with type-A personality, but the average age reported in recent large studies has ranged from 45 to 51 years.³

OCT is an effective and noninvasive method for quantifying serous detachments of retina and RPE. Patterns seen are optically empty area representing neurosensory detachment, small bulges from RPE related to leaking spots, or semicircular space under the RPE with overlying thinned retina related to PED.⁴ While spectral domain optical coherence tomography (SD-OCT) generates a detailed three-dimensional image of the retina, advanced modalities allow also an assessment of the choroid, which is critical for both diagnosis and treatment of eye diseases, including CSR. Similarly, technical advancements have been made in the area of micro-perimetry (MP), where the sensitivity of specific regions of the retina and macula is registered with an image of the retina that is typically generated with a scanning laser ophthalmoscope.

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In this study we evaluated patients with clinical diagnosis of central serous retinopathy followed by management of the same using optical coherence tomography and tried to describe characteristic features observed during this study.

Aims and Objectives

- To evaluate patients with clinical diagnosis of central serous retinopathy using optical coherence tomography.
- To record the characteristic features of central serous retinopathy with the help of optical coherence tomography.
- To present the role of optical coherence tomography in diagnosis and management of central serous retinopathy by describing the characteristic features observed during this study.

MATERIALS AND METHODS

The present study was undertaken during the period from October 2015 to September 2017. In this study a total of 50 eyes of 50 patients with a clinical diagnosis of central serous retinopathy, were evaluated with spectral domain optical coherence tomography in the department of ophthalmology of MKCG Medical College. Ethics committee approval was sought, and informed consent was obtained from all patients.

A detailed history was taken. Ocular examination included visual acuity testing using Snellen’s chart, slit lamp examination, Amsler grid examination, cycloplegic refraction and slit lamp biomicroscopy with 90D fundus non contact lens, indirect ophthalmoscopy.

a) Inclusion Criteria

- Patients with sudden central vision loss/blurring of vision.
- Patients giving consent.
- Slit lamp biomicroscopy showing features suggestive of CSR.
- Patients who were followed up, up to 6 months.

b) Exclusion Criteria

- Patients with hazy media and poor fixation.
- Diagnosed cases of uveitis and choroidal tumours.
- Patients suffering from confounding diseases like diabetes mellitus.
- Diagnosed cases of any other macular diseases.
- Unwilling patients and patients lost to follow up.

RESULTS

In the present study, 50 eyes of 50 patients of central serous retinopathy were evaluated. The maximum number of patients were in the age group 31-35 years (38%) followed by 26-30 years (30%). There were very few patients beyond the age of 50 years; (Table 1). 42 out of 50 patients (84%) of the study population were males; (Table 2). The most common symptom in our study population was scotoma (64%) followed by metamorphopsia (46%) and blurring of vision (36%); (Table 3). All the 50 patients in the study

population had involvement of only one eye at the time of presentation of CSR out of which 23 patients (46%) had presentation in the Right Eye (OD) and 27 patients (54%) had presentation in Left eye (OS); (Table 4). (28%) of the total study population was addicted to some form of tobacco. Stress (74%) shows itself as one of the major associated factors contributing to CSR followed by hypertension (16%); (Table 5). maximum number of our patients in our study had a visual acuity of 6/12 at presentation (26%). This was followed by visual acuities of 6/18P or 6/18 (24%) and 6/9P or 6/9 (18%). Very few patients were there with 6/60 or less; (Table 6). Majority (88%) of the study population had neurosensory detachment which was found through OCT; (Table 7). Majority (42%) of patients with CSR have irregular retinal pigment epithelium and there are very less number of patients who have no RPE abnormality; (Table 8). In our study the vault height (the height of the fluid under the sensory retina) of only the patients with neurosensory detachment was measured. It was found in the range of 78 μm to 794 μm (Mean±SD: 411±207); (Table 9). Total macular thickness was measured in all the 50 eyes and was in the range of 220 μm-1120 μm (Mean±SD: 570±228); (Table 10). It was found that majority of patients had improved their vision as the number of patients whose BCVA came in the range of 6/6 to 6/6P increased from 4 patients (8%) to 42 patients i.e. (84%) of the study population in a span of 6 months; (Table 11). The height of the fluid under the sensory retina has drastically decreased for majority (76%) of study population and the mean vault height at 6 months follow up was found to be (Mean±SD: 116±239)μm; (Table 12).

Age (Yrs.)	No. of Patients	Percentage
26-30	15	30
31-35	19	38
36-40	9	18
41-45	4	8
46-50	1	2
>50	2	4
Mean Age ± SD 34.74 ± 6.8		
Table 1. Distribution of Age Group in Study Population		

Gender	No. of Cases	Percentage
Males	42	84 %
Females	8	16%
Table 2. Distribution of Gender in Study Population		

Complaint	No. of Patients	Percentage
Blurring of Vision	18	36%
Scotoma	32	64%
Micropsia	8	16%
Metamorphopsia	23	46%
Table 3. Complaints at Presentation		

Laterality	Number of Patients	Percentage
Unilateral	50	100.00
Simultaneously Bilateral	0	0.00
Right Eye	23	46
Left Eye	27	54

Table 4. Laterality

Risk Factor	No. of Patients	Percentage
Stress	37	74%
Steroid Use	7	14%
Hypertension	8	16%
Smoking & Tobacco Use	14	28%

Table 5. Associated Risk Factors

Visual Acuity	No. of Patients	Percentage
6/6 P	4	8%
6/9 - 6/9 P	9	18%
6/12 - 6/12 P	13	26%
6/18 - 6/18 P	12	24%
6/24 - 6/24 P	2	4%
6/36 - 6/36 P	7	14%
6/60 P and less	3	6%

Table 6. Visual Acuity at Presentation

Neurosensory Detachment	No. of Patients	Percentage
Present	44	88%
Absent	6	12%

Table 7. Neurosensory Detachment

Sl. No.	Abnormality Type	N	%
1.	RPE Detachment	10	20%
2.	RPE Bulge	12	24%
3.	Irregular RPE	21	42%
4.	No RPE abnormality	7	14%

Table 8. Retinal Pigment Epithelial Abnormalities

Sl. No.	VH(μm)	N	%
1.	100 - 300	12	24%
2.	300 - 500	12	24%
3.	500 - 700	14	28%
4.	700 - 900	6	12%
5.	Without NSD	6	12%

Table 9. Vault Height (Height of Subretinal Fluid)

Sl. No.	Total Macular Thickness	N	Percentage of Patients
1.	200-400	8	16%
2.	400-600	20	40%
3.	600-800	12	24%
4.	800-1000	5	10%
5.	1000-1200	5	10%

Table 10. Macular Thickness

BCVA	N	%
6/6—6/6 P	42	84%
6/36—6/36 P	6	12%
6/60	2	4%

Table 11. BCVA at 6 Months Follow Up

VH (μm)	N	%	N2	%
0-100	0	0	38	76%
100-300	12	24%	1	2%
300-500	12	24%	2	4%
500-700	14	28%	1	2%
700-900	6	12%	2	4%
Without NSD	6	12%	6	12%

Table 12. Initial Vault Height & VH at 6 Months Follow Up

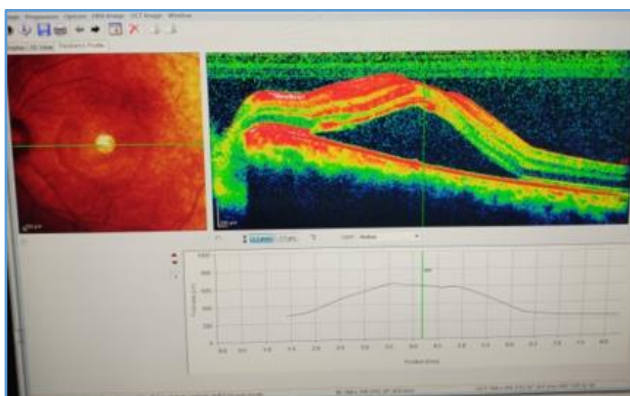


Image 1. OCT Image showing Neuro Sensory Detachment with Vault Height 611 μm

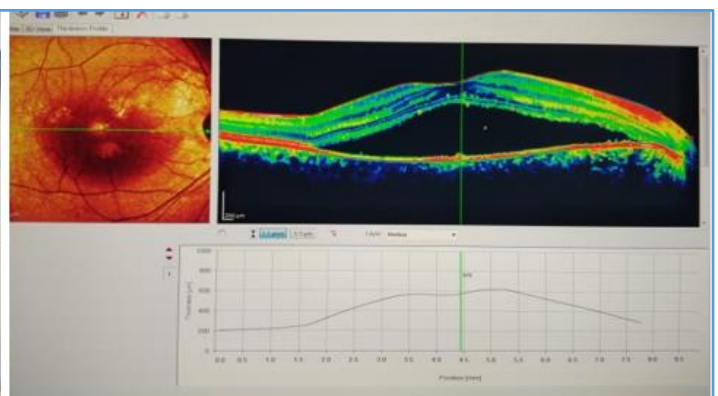


Image 2. OCT Image Showing CSR with Vault Height 570 μm

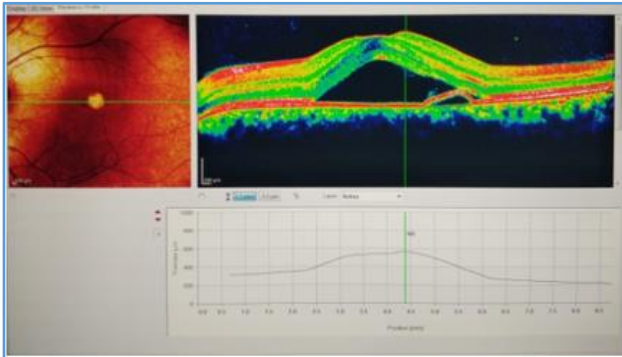


Image 3. OCT Image Showing CSR with PED

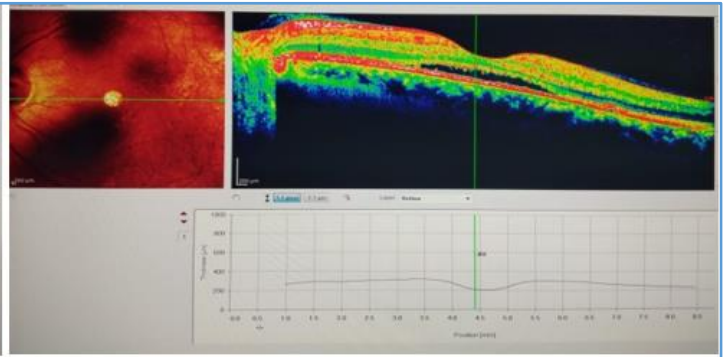


Image 4. OCT Image Showing CSR With Vault Height 208 μm

DISCUSSION

Majority of the patients in the present study were male (84%), the ratio between males and females being 5: 1. Men are affected approximately 8 or 9 times more often than women.⁵

The youngest and the oldest patient in the study were 26 and 50 years old respectively (Range 26–50 years with mean age of 34.8 years SD 6.8). The youngest patient with CSCR ever described is a 7-year-old girl.⁶

The highest number of patients was seen in the age group 26 to 35 years and least number was seen in 40 to 50 years of age group. It shows that this disease has a predilection for younger age

All the patients in this study had unilateral presentation.

In our study the commonest presenting complaint was relative scotoma (64%) and metamorphopsia (46%) followed by blurring of vision (36%) and micropsia (16%).

In our study out of 50 patients 7 had chronic central serous retinopathy (duration more than 3 months) and 43 patients had acute central serous retinopathy (Duration less than 2 weeks). 2 patients out of 48 patients had a history of similar episode in the fellow eye in past, which had recovered fully without any residual defect.

Visual acuity of the patients was measured on Snellen's chart. The visual acuity of most of the patients (94%) was in the range of 6/6 P to 6/36. 6% patients had a visual acuity of 6/60 or less. Symptoms of CSR varies from Mild blurring of vision with visual acuity ranging from 6/6 to 6/60, usually correctable with hyperopic correction^{7,8} with varying degrees of central scotoma (due to detached retina), metamorphopsia (owing to irregular retinal plane), micropsia⁹ (due to increased distance between photoreceptors in the detached retina), dyschromatopsia (due to anatomic derangements), hypermetropization¹⁰ (due to anterior displacement of retinal plane), and migraine-like headaches.

Optical coherence tomography showed neurosensory detachment in all 44 eyes with acute central serous retinopathy and only in 2 out of 6 eyes with chronic central serous retinopathy.

Total macular thickness ranged from 215 μm to 1058 μm (Mean \pm SD: 570 \pm 228).

Vault height corresponding to the height of the fluid under the sensory retina was measured in only 44 eyes because only 44 eyes showed neurosensory detachment in my study. It ranged from 78 μm to 794 μm (Mean \pm SD: 411 \pm 207).

Out of 48 eyes of central serous retinopathy, 43(86%) eyes showed some kind of retinal pigment epithelium abnormality on optical coherence tomography.

Majority of patients improved their vision as the number of patients whose BCVA came in the range of 6/6 to 6/6P increased from 4 patients (8%) to 42 patients i.e. (84%) of the study population in a span of 6 months. Most of the CSCR cases resolve spontaneously within few months with final visual acuity of 6/9 or better.^{11,12} Only 5% of all CSCR cases experience severe permanent visual loss.

Vault height (the height of the subretinal fluid at the center of macula) decreased for majority (76%) of study population and the mean vault height at 6 months follow up was found to be (Mean \pm SD: 116 \pm 239) μm .

The mean macular thickness at the end of 6 months was (Mean \pm SD: 360 \pm 219) μm .

CONCLUSION

OCT plays an important role in the diagnosis and evaluation of retinal damage in central serous retinopathy and helps in understanding its mechanisms. It also helps in monitoring disease progression.

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