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OBSERVATIONS OF THE DIFFERENT FUNDUS FLUORESCEIN ANGIOGRAPHIC CHARACTERISTICS OF ACUTE CENTRAL SEROUS CHORIORETINOPATHY

Ophthalmology

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ABSTRACT

Central serous chorioretinopathy is a common macular disorder usually affecting young males .**Aim of the study-** The aim of the study is to determine the different angiographic characteristics of acute CSC. **Material and methods**- This is a retrospective observational study, carried on 76 patients at Patna Medical college Hospital Patna, Bihar from October 2017 to September 2019. %.**Results**- The Ink blot pattern of hyperfluorescence was the most common type (76.31%) of leakage . Smokestack pattern was observed in 22.36%. **Conclusion**-The following conclusions were derived- CSC affects the younger age groups with high male to female ratio. Most common type of leakage was unilateral, unifocal and inkblot type. The leakage was. most commonly observed in uppernasal part.

KEYWORDS

Acute central serous chorioretinopathy, Hyperfluorescence, Fundus fluorescein angiography

Introductions-

Central serous chorioretinopathy is a common retinal disorder characterized by accumulation of fluid at the posterior pole that leads to neurosensory detachment and /or RPE detachment. This condition is usually self limiting. This disease is first described in 1866 by Von Graefe [1]as relapsing central syphilitic retinitis. In 1955 Bennet[2] coined the term central serous retinopathy. In the 1960 Maumensee and in year 1967 Gass[3] provided greater insight into the current understanding of the disease. Males[4,5] are more commonly affected compared to females. Affected patients usually belongs to younger age groups between 20 and 50 years .This disease usually presents with sudden painless blurring of vision with distortion of image, relative scotoma and desaturation of colours[4,5,6]. This disease is usually unilateral , but it is bilateral in 30-40% .Usually visual acuity is moderately reduced (6/9 to 6/12) ,often correctable to 6/6 with addition of weak plus glass. Disease is mostly idiopathic , usually involving men aged 25-50 years. In women, CSC typically occurs at a slightly older age , also it can be associated with pregnancy. Type A personalty, hypochondrial behavior and psychologic factors may be cause of CSC[4,5,6]. Cushing disease[4], adrenal adenoma and patients on long term treatment of corticosteroid[4,5] even in form of nasal spray or topical cream and steroid treatment in organ transplanted patients are associated with increased incidence of CSC. Refractive error hypermetropia[4] is also a risk factor of CSC. There may also be racial predisposition. There is higher incidence in whites, Hispanics and Asians and extremely low occurrence in black[4,5]. Obstructive sleep apnea[6] has been associated with CSC , as in some patients of sleep apnea high level of endogenous catecholamine has been noticed. Drugs -Phosphodiesterase inhibitors [5](e.g. sildenafil , tadalafil)have been associated with CSC . Several papers reported ,association between H pylori infection and CSC . Benificial effects were observed in CSR patients, treated for H Pylori[15] .The pathophysiology of CSC is poorly understood despite advancement in various imaging techniques. The major theories of the pathophysiology of CSC include dysfunction of the RPE, Choroid or both. Although in most cases diagnosis of CSC can be made by clinical examination, but fluorescein angiography provides definitive diagnosis and also rule out CNVM or other pathology. So fundus fluorescein angiography is still gold standard for confirming the diagnosis of acute CSC. On Fundus Fluorescein Angiography [4,5,6] two patterns of leak are usually observed -ink blot pattern and smoke stack pattern. The use of ICG[5] for study and examination of CSC has expanded the knowledge about the disease. Commonly multiple areas of hyperflourescent is noticed in early and mid phase, which fades on late phase. The area of hyperfluorescence is in congruence with the leaking point observed in FFA. ICG also provide information about multiple occult presumed RPE detachments, which is not picked up by FFA. Optical coherence tomography[5] is non invasive ,it serves as complementary for FFA .It also provides additional information on pathophsiology, presence of subretinal fluid, retinal thickening , about PED and complication of CNVM in CSC. Usually acute CSC resolves spontaneously in 3 months, if it does not heal spontaneously then focal laser photocoagulation is applied at leaking points. Thus FFA provides the details of leaking points and this information is very useful in treatment of non resolved cases.

So even with all these new diagnostic advancement, fundus fluorescein angiography is still gold standard for diagnosis and treatment of acute CSC. In view of above facts a retrospective observational study on fundus fluorescein angiography in acute CSC was conducted on patients attending Department of ophthalmology, Patna Medical Collage Hospital, Patna, Bihar to find out different angiographic and demographic characteristics.

Aims of the study-

The aims and objectives of this study is to identify the patients' demographic characteristics (age and sex) and to determine the different angiographic characteristics (site, number,laterality and pattern of leakage) of acute CSC in Bihar and northern part of the India. We also evaluated the status of BCVA at the time of presentation.

Material and Methods

This retrospective study was done at Department of ophthalmology, Patna Medical college and Hospital Patna, Bihar. Duration of study was from October 2017 to September 2019. Total 76 cases were included in this study.

Inclusion criteria-

1. Cases between 20 to 50 years , clinically suspected or diagnosed as Acute central serous chorioretinopathy.
2. History of onset of symptoms - within 2 weeks.

Exclusioncriteria-

1.Patients allergic to fluorescein dye.
2. History of other macular and retinal diseases.
3.History of any ocular surgery.
4.Renal diseases.
5.History of major depression or other psychiatric disease.
6..History of recurrent CSC

Patients were selected having history of sudden painless loss of vision, clinical examination was done by slit lamp biomicroscopy with 90 D, indirect ophthalmoscopy, Amsler grid test. Age and sex of patients were recorded. Vision (BCVA) was also recorded.

Those Patients who fulfill the inclusion criteria were called for FFA study. Patients' pupil were dilated with tropicamide 0.8% plus phenylepherine 5% eye drop. A prior written consent was taken from each patient undergoing FFA procedure. Intradermal hypersensitivity test was performed before each procedure by injecting 0.05ml of fluorescein dye. Fluorescein angiogram was obtained after intravenous injection of 20% 3ml fluorescein dye. Ante-cuboital vein was preferred. Both eyes were studied by using Carl Zies Visucam Pro

NM FF 450 fundus camera with canon EOS 5D Digital camera. The number, site, laterality and type of leakage were recorded. Obtained data were analyzed. Results were compared with other studies. **Statistical analysis-** Data obtained were expressed as tables and percentage.

Observations

A total of 76 cases were studied. Among them 68 were male patients (89.47) and 8 (10.53%) were females .

The most common age group involved was 31-40 years, In this group there were 40 patients(52.63%). In 41-50 years age groups number of patients was 21(26.63%) and in 21-30 years age group's number of patients was 15(19.74%).

Table 1-Distribution of patients according to age groups

Age groups	No. of patients	percentage
21-30 years	15	19.74%
31-40 years	40	52.63%
41-50 years	21	27.63%
total	76	100

Table 2-Distribution of cases according to age and sex

Age groups	Male patients		Female patients		Total no	Percentage of total no.
	numbers	percentage	numbers	percentage		
21-30 years	13	19.12	2	25	15	19.74
31-40 years	36	52.94	4	50	40	52.63
41-50 years	19	27.94	2	25	21	27.63
total	68	100	8	100	76	100

As evident from table 2 male patients were more affected than female patients in all the age groups. In 31-40 years of age group 36 (52.94 %) were male patients and 4 (50 %) were females . In 41-50 years of age group 19 (27.94 %) were male patients,2 (25 %) were females . In age groups 21-30 years 13 (19.12 %) were male patients and 2 (25 %) were females.

Best Corrected Visual acuity(BCVA) at presentation-

BCVA was 6/9 in majority (26 ,34.21%) of cases . This was followed by 6/12 in 20 (26.31%). 11 (14.47%) patients had BCVA 6/18. . As evident from table 3, 22 (32.35%) male patients, had BCVA 6/9 and 18 (26.47)% had 6/12 . In female patients 4 (50%) had BCVA 6/9 and 2(25%) had 6/ 12.

Table 3-BCVA at the time of presentation

Vision (BCVA)	male patients		female patients		Total no of patients	Percentage of total
	numbers	percentage	numbers	percentage		
6/6	5	7.35	0	0.0	5	6.57
6/9	22	32.35	4	50.0	26	34.21
6/12	18	26.47	2	25.0	20	26.31
6/18	10	14.71	1	12.5	11	14.47
6/24	6	8.82	0	0.0	6	7.89
6/36	4	5.89	0	0.0	4	5.26
6/60 or less than 6/60	3	4.41	1	12.5	4	5.26

Laterality

Unilateral disease was noticed in 60 patients (78.95%) and bilateral in 16 (21.05%).

Table 4- showing laterality of the disease.-

laterality	male patients		female patients		Total no of patients	Percentage of total patients
	numbers	percentage	numbers	percentage		
unilateral	55	80.88	5	62.5	60	78.95%
bilateral	13	19.12	3	37.5	16	21.05
	68	100	8	100	76	100

Number of leakages o at first presentation -

Table 5- showing number of leakage during FFA

Type of leak	Numbers of male patients	Percentage of male patients	Numbers of female patients	Percentage of female patients	Total numbers	Total percentage
Single leak	58	85.29	7	87.5	65	85.52
Multiple leak	10	14.71	1	12.5	11	14.48
total	68	100	8	100	76	100

On FFA Single leak was noticed in 85.52 % (65 patients) and while multiple leaks were noticed in 14.48%(11 patients).Among males , 85.29% (58 patients) had single leaks and 14.71% (10 patients) had multiple leaks . In females ,87.5% (7 patients) had single leak and 12.5% (1 patient) had multiple leaks.

Pattern of hyperfluorescence -

The ink blot pattern (76.31%) was most commonly observed on FFA. This is followed by smoke stack pattern (22.36%). Only in one male patient (1.32%) irregular diffuse leak was observed. Among male patients 76.47 % showed ink blot pattern and 75.00 % of female patients showed ink blot pattern. Smokestack pattern was noticed in 22.06 % in males and 25.00 % in females .

Table 6- showing pattern of hyperfluorescence

Pattern of leakage	male patients		female patients		Total no of patients	Percentage of total patients
	numbers	percentage	numbers	percentage		
Ink Blot Appearance	52	76.47	6	75.0	58	76.31
Smokestack appearance	15	22.O6	2	25.0	17	22.36
Single leak irregularly diffuse	1	1.47	0	0.0	1	1.32
total	68	100	8	100	76	100

Site of leakage according to the quadrant of macula, determined from centre of fovea-

On FFA most common site of leak was observed at the upper nasal quadrant of macula (59.21%), in which 55.82% were males and 59.21 % were females. This was followed by 23.68% in lower nasal quadrant, in which male patients were 23.53 % and female patients were 25.00 %. Upper temporal quadrant was involved in 11.84%, in which 11.76 % were male patients and 12.5 % were female patients. It was observed that central macula area was rarely involved (1.32 %) . In present study it was noticed in only one male patient. Lower temporal quadrant area was involved in 3.95% male patients .

Table 7-Distribution of leakage according to site

Location of leak on FFA	male patients		female patients		Total no of patients	Percentage of total patients
	numbers	percentage	numbers	percentage		
Upper nasal quadrant	40	55.82	5	62.50	45	59.21
Lower nasal quadrant	16	23.53	2	25.0	18	23.68
Upper temporal quadrant	8	11.76	1	12.5	9	11.84
Lower temporal quadrant	3	4.41	0	0.0	3	3.95
central	1	1.47	0	0.0	1	1.32
Total	68		8	100	76	100

DISCUSSION-

Age and sex Distribution

A total of 76 cases were studied. Among them 89.47% were males and 10.53% were females. In our study male to female ratio was 8.5:1. In the study, done by Alicia C, S.W.How, and Adrian HC Koh[7] ,male to female ratio was 8:1. Similar study done by S P Garg, H K Tiwary and R V Azad [8] also observed male to female ratio was 8:1. In Study of Avinash Mishra ,VK Baranwal, S Agarwal, Sandeep Shankar, JKS Parihar, TS Ahuwalia[9] also showed high male to female ratio which was 9.57:1. Our study corresponds to study done by many other authors. Shahin MM [12]also showed high involvement (91%) of male patients.

The most common age group involved was between 31-40 years, which was 52.63% . In 41-50 years age group , percentage of patients was 26.63% and in 21-30 years age group percentage of patients was 19.74%.

In our study, patients between 31-40 years of age were commonly involved both in males and females . Percentage of male patients was 52.94% and percentage of female patients was 50% . In 41-50 years age group 27.94% were male patients, and 25% were female patients. These findings are in accordance with the study done by Alicia C,S.W.How, and Drian HC Koh[7] who also observed 84% patients were between age 30 to 50 years. Similar study done by S P Garg, H K Tiwary and R V Azad [8] , also observed that highest frequency of the disease(70%) was between 20-40 years of age . Avinash Mishra ,VK Baranwal, S Agarwal, Sandeep Shankar, JKS Parihar, TS Ahuwalia[9] , also observed 79.79% patients in the age group of 20 to 40 years. Jamil AZ, Mirza KA, Qazi ZU, Iqwal W,Khaliq J,Fawad ur Rahman[10] in Pakistani study also revealed the involvement in lower age groups(mean age39.52years). Jamil et al[14] also observed mean age of 38.8 +/- 6.9 years in their study.

Laterality

Unilateral disease was noticed in 78.95% and bilateral in 21.05%. Avinash Mishra ,VK Baranwal, S Agarwal, Sandeep Shankar, JKS Parihar, TS Ahuwalia[9] , observed unilateral disease in 55.85%.and bilateral in 44.15%. Jamil AZ, Mirza KA, Qazi ZU, Iqwal W, Khaliq J, Fawadur Rahman in their study[10] also showed bilateral involvement in 34.4%.

Numbers of leaks/hyperfluorescence spot--

On FFA 85.52%, had unifocal leak , while 14.48 % had multiple leaks.

Among male patients, 85.29 % had single leak, in 14.71% had multiple leaks. In 87.5% female patients had single point leak and 12.5% had multiple leaks. Similar findings were observed by many researchers. The study of Mudvari SS, Goff M J, Fu AD, Mc Donald .HR, Jhonson RN, Ai E and Jumper JM[16] in 2007,who observed unifocal leakage in 76% against multifocal leakage in 24%. Similar results were also obtained by Spitznas M and Huke J[17], who observed single leakage point was in 71.6% and multiple leakages in 28.4%. Remo Turchetti , Haroldo Vieirade , Moraes junior and Hugo Maia Smith[18] also reported almost 90% of their cases presented with unifocal leak. But in contrary to above studies Avinash Mishra ,VK Baranwal, S Agarwal, Sandeep Shankar, JKS Parihar, TS Ahuwalia [9], observed multifocal leak in 55.72% and unifocal leak in 44.28%.

Pattern of hyperfluorescence-

In our study , the ink blot pattern (76.31%) was most commonly observed in FFA. This was followed by smokestack pattern (22.36%). Irregular diffuse leak was noticed in 1-32% (one male patient) . The results obtained is in accordance with the studies done by many others. S P Garg, H K Tiwary and R V Azad [8]studied the different hyperfluorescence pattern and they found 4 patterns of leakage , in which inkblot pattern was most common (45%) followed by smoke stack pattern (36%).They also noticed single leak not increasing in size (12%),and single leak that became irregular(8%) Most of the other studies have considered only classical ink blot and smokestack pattern in their studies. Spitznas M and Huke J[17] also observed ink blot pattern in 93% and smoke stack pattern in 7% patients. Alicia C,S,W.How, and Adrian HC Koh[7] also observed that ink blot pattern was in 80% and smokestack pattern was in 16%. Testsuju Sekiryu, Tomohiro Lida, Ichiro Maruko ,Kuniharu Saito and Takeshi Kondo[19] with their study The infrared autofluorescence and central Serous Retinopathy in 2010, observed the ink blot pattern in 84.3% , smokestack pattern in 15.6% and diffuse leak in 9.6% . Avinash Mishra ,VK Baranwal, S Agarwal, Sandeep Shankar, JKS Parihar, TS Ahuwalia[9] ,observed inkblot pattern in 75.65% and smokestack pattern in 22.51%.

Site of involvement-

Macula is the primary site of involvement. On FFA most common site of leak was present in uppers nasal quadrant of macula, which was 59.21 % . This was followed by lower nasal quadrant which was 23.68 %, Upper temporal quadrant involvement was in 11.84 %. It was observed that central macula area was rarely involved which was 1.32%, and present in male patient only. Lower temporal quadrant area was involved in 3 male patients (3.95%) .

The study done by Baajarboura D, Nagpal PN and Deka M[13] revealed that leakage in parafoveal superonasal quadrant was 31.42% . S P Garg, H K Tiwary and R V Azad [8] had found that area between the optic disc and macula was the site of predilection (74%) and 21% leakage was in temporal part. The upper nasal area was involved in 42% followed by lower nasal in 17%.The upper temporal area was involved in 15% cases and the lower temporal and central area involved in 3% each.

BCVA-

In our study ,at the time of presentation , BCVA varied from 6/6 to finger counting. In 34.21% cases had best corrected visual acuity 6/9 . This is followed by 6/12 in 26.31%. , 6/18 in 14.47%, 6/24 in 7.89%, 6/36 in 5.26% and 6/60 or less than 6/60 in 5.26% cases. In our study we observed that 6.5 % patients had vision 6/6 but they also had other signs of the disease like distorted image , micropsia and diminished contrast. These patients reported early due to symptoms. S S Badrinath and S H Baig[11] in their study found that visual acuity varied from 6/9 to finger counting. Mudvari SS, Goff MJ, Fu AD, Mc Donald HR, Jhonson RN, Ai E and Jumper JM[16] in 2007, observed that mean visual acuity was 6/9 (range 6/5 to 3/60). Ravi kant Bamotra et al[20] also observed visual acuity of 6/9-6/9p in 32.14% and 6/12 to 6/12p in 28.57% cases.

CONCLUSION-

Following conclusions were derived from the study **"**Observations of the different Fundus Fluorescein angiographic characteristics of Acute Central Serous Chorioretinopathy" which was carried on 76 patients from October 2017 to September 2019 at Department of Ophthalmology Patna Medical College Hospital ,Patna **.**

1. In our study male to female ratio was 8.5:1 .
2. The most common age group involved was 31 to 40 years (52.62%) followed by age group of 41 to 50 years (26.63%). .
3. It was also observed that, at the time of presentation BCVA ranged from 6/6 to finger counting. Best corrected visual acuity was 6/9 in 34.21%. This is followed by 6/12 in 26.31%. . So majority of patients had best corrected visual acuity of 6/6 to 6/12 . Only 5.26% patients of CSC had BCVA 6/60 or less than that.
4. On FFA, unifocal leak was noticed in 85.52% while 14.48 % had multiple leaks .
5. The inkblot pattern (76.31%) was the most common FFA pattern in cases of CSC. This was followed by smoke stake pattern (22.36%).
6. Upper nasal quadrant of macula was observed as most common site of leak, which was 59.21% .
7. In our study Unilateral involvement was noticed in 78.95% and bilateral involvement in 21.05%.

So with this study we have now better understanding about CSC. This study revealed the age and sex predilection of CSC. This also confirmed that majority of patients had mild to moderate type of visual impairment . This confirms the mild nature of the disease. Ink blot pattern was the most common type of angiographic finding and in maximum patients upper nasal quadrant involved most commonly and central macula had least involvement.

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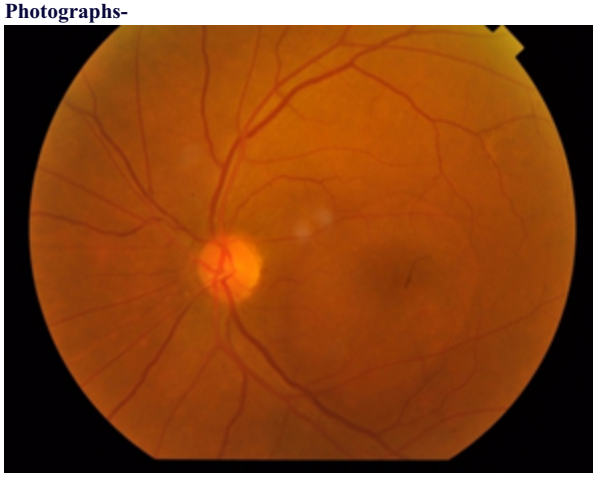
Conflicts of interest- There is no conflicts of interest.

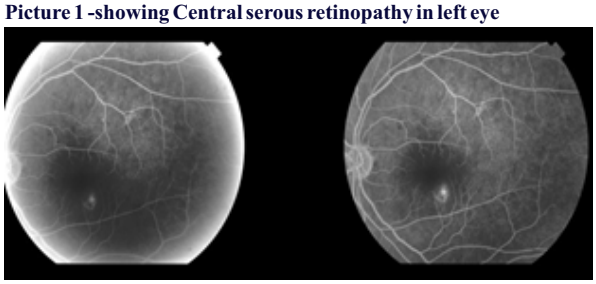
Abbreviations-

CSC- Central serous chorioretinopathy, BCVA-Best corrected visual acuity, FFA- Fundus fluorescein angiography

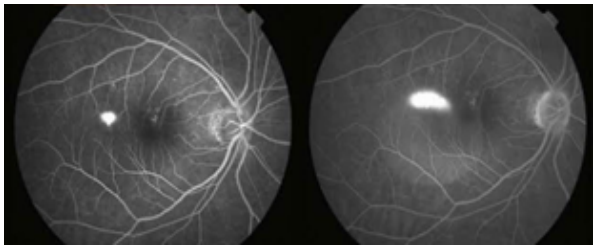
Photographs-



Picture 1 -showing Central serous retinopathy in left eye



Picture 2- left eye showing ink blot pattern



Picture 3- right eye showing smokestack pattern

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