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FUNDUS FLUORESCEIN ANGIOGRAPHY AND OPTICAL COHERENCE TOMOGRAPHY FINDINGS IN RETINAL VEIN OCCLUSION- A CLINICAL STUDY

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ABSTRACT **Aim:** To study the Fundus Fluorescein Angiography (FFA) and Optical Coherence Tomography (OCT) findings in detecting early and late RVO. **Materials and Methods:** A total of 60 diagnosed patients of RVO from the outdoor of a Tertiary Care Centre were selected for the study. Detailed history and a thorough ocular examination including Visual Acuity, Intraocular Pressure, Amsler Grid Chart, Slit Lamp Examination, Slit Lamp Biomicroscopy with +90D lens, Indirect Ophthalmoscopy, FFA and OCT imaging were performed. Laboratory investigations including R/E blood, RBS, Serum creatinine and ECG were done. **Results:** Present study observed the role of FFA and OCT in detecting the various presentations, early and late RVO changes were also studied. Macular edema was the most common OCT finding. Findings of OCT were confirmed by FFA when statistically compared with FFA, OCT was found to be highly sensitive but less specific tool to detect RVO changes. **Conclusion:** OCT may be a good complementary imaging technique to FFA regarding the diagnosis of RVO. Using FFA as a standard reference, OCT has high sensitivity but only moderate specificity in detecting RVO lesions.

KEYWORDS : :

INTRODUCTION:

Retinal vein occlusion (RVO) is the second commonest cause of reduced vision due to retinal vascular disease after diabetic retinopathy[1]. Still it is a highly controversial subject in the ophthalmic world literature. Although multiple factors, both systemic and ocular, are apparently involved in the production of this retinal vascular accident, the exact etiology of RVO remains unclear. Conditions that may predispose to RVO include diabetes mellitus, hypertension, hyperlipidemia, systemic vascular disease, open angle glaucoma, hyperviscosity, increased ESR, certain medications, smoking, drinking etc. Retinal vein occlusion has been classified into 3 varieties: 1.) Branch Retinal Vein Occlusion (BRVO) 2.) Central Retinal Vein Occlusion (CRVO) 3.) Hemi Retinal Vein Occlusion[2,3]. Profound permanent decreased visual function is a predictable consequence of retinal vein occlusion. The reduced visual acuity in RVO is found to be due to cystoid macular edema, pigment scarring or fibrosis in advanced stage. Preventive measures are needed to reduce the burden of the disease. It is now well accepted that optical coherence tomography (OCT) has an important role to play in the diagnosis and management of retinal diseases. With the marked improvements in the quality of tomographic images achieved in the recent years, OCT has become extremely popular both in clinical research and in practice and is used to evaluate the severity of retinal vein occlusion. Fundus Fluorescein angiography (FFA) is of great value in classifying the clinical features of RVO. Interpretation of FFA images of this disease has a major impact on patient care and vision research. In eyes with RVO, FFA is probably most recognised for its ability to demonstrate the presence and extent of capillary perfusion.

MATERIALS AND METHODS:

This study was conducted in a Tertiary Care Centre for a period of one year. A total of 60 patients were selected for this study. Informed and written consents were obtained from each of the patients.

Inclusion criteria:

1. Age- diagnosed cases of RVO between 20-60 years of age
2. Sex- both male and female patients.

Exclusion criteria:

1. Patients with bilateral media opacity
2. Patients with ocular trauma
3. Patients with Central retinal artery occlusion (CRVO)
4. Patients with history of cardiac arrest, bronchospasm, convulsions, kidney disease etc. as they may lead to fatal adverse reactions during FFA.

A detailed history including age, sex, complaints, associated other disease, personal history and relevant family history were taken and a thorough systemic examination was done. Ocular examination was done very meticulously in every patient assessing Visual acuity, Intraocular pressure, Amsler Grid chart, detailed Slit Lamp examination, Slit Lamp biomicroscopy with +90D lens and Indirect Ophthalmoscopy for peripheral retina.

A routine blood examination, random blood sugar, serum creatinine and ECG were done.

Optical coherence tomography (OCT) imaging was performed using the Stratus OCT machine. The Fast macular thickness protocol was used. Only the high quality, well centred scans with signal strength more than 6 were saved. Each scan was analysed using the onboard Stratus OCT software (version 4.0) with segmentation of retinal layers and qualitative and quantitative assessment of retinal layers.

FFA and Fundus photographs were taken using fundus camera. After obtaining written consent, blood and ECG reports were checked. After dilating the pupil with mydriatics-cycloplegic combination, FFA was performed. Initially red free photographs of each eye were taken. Barrier and exciter filters were then inserted and control photographs were taken.

RESULTS:

Table 1: Age distribution

Age distribution (yrs.)	No. of BRVO patients	No. of CRVO	Ischaemic	Non-ischaemic
31-40	2(3.33%)	1(1.66%)	0	1(1.66%)
41-50	5(8.33%)	6(10%)	1(1.66%)	5(8.33%)
51-60	18(31.66%)	6(8.33%)	2(3.33%)	3(5.00%)
61-70	8(13.33%)	6(10%)	2(3.33%)	4(6.66%)
71-80	2(3.33%)	5(8.33%)	0	5(8.33%)
81-90	1(1.66%)	-	-	
Total	36(60%)	24(40%)	5(8.33%)	19(31.66%)

Largest number of patients 24(40%) were in the age group 51-60.

Table 2: Sex distribution

Age groups	Males	Females
31-40	1(1.66%)	2(3.33%)
41-50	5(8.33%)	6(10%)
51-60	17(28.33%)	7(11.66%)
61-70	9(15%)	5(8.33%)
71-80	4(6.66%)	3(5%)
81-90	1(1.66%)	0
Total	37(61.66%)	23(38.33%)

More number of male patients 37(61.66%) was found to have RVO.

Table 3: Clinical Presentation

Presenting symptoms	No. Of cases	Percentage (%)
Dimness of vision	60	100
Metamorphopsia	52	86.66
Floaters	4	6.66
Mild pain	5	8.33
Severe pain	1	1.66

Dimness of vision was present in all 60(100%) patients followed by Metamorphopsia in 52(86.66%) patients.

Table 4: Fundus findings

Fundus findings	No. of eyes Total No. of eyes=62	Percentage %
Diffuse retinal haemorrhages	24	40
Localised haemorrhages	36	60
Hard exudates	42	70
Cotton wool spots	18	30
Disc edema	16	26.66
NVD	5	8.33
NVE	4	6.66
Macular edema	45	75
Macular haemorrhages	24	40
Vitreous hemorrhages	3	5

Macular edema was found in 45 (75%) patients followed by hard exudates and haemorrhages.

Table 5: FFA findings

FFA findings	CRVO	BRVO
Capillary dilatation	24(100%)	36(100%)
Delayed venous filling	24(100%)	27(75%)
Leakage of dye	22(91.66%)	2(5.5%)
NVD	4(16.66%)	0
NVE	5(20.9%)	0
CME	12(50%)	9(25%)
Areas of capillary drop out	5(20.9%)	1(2.77%)
Collaterals	5(20.83%)	19(52.77%)

Table 6: OCT findings

OCT findings	CRVO	BRVO
Macular edema	24(91.66%)	14(58.33%)
ERM formation	8(33.33%)	1(2.77%)
SRF accumulation	5(20.83%)	0

DISCUSSION:

Incidence of BRVO was found to be 60% and CRVO was 40% in the present study. Mahoney *et al*[4] found an incidence of 47.6% for CRVO and 52.1% for BRVO. Mitchel *et al*[5] found an incidence of 69.5% in cases of BRVO and 25% in cases of CRVO. Thus, our findings correlate with their findings. The larger number of the patients 24 (40%) in our study were in the age group of 51-60 years (Table 1). Rubinstein and Jones[6] reported the mean age of involvement to be 56 and 63 years for male and female respectively. M.D. Tsalomus *et al*[7] found a mean age of 64.6 in CRVO group and on BRVO group it was 63.76. Thus, our study was significant with the above studies. From the literature of Rubinstein and Jones[6] it is seen that males suffer almost one decade earlier than females in both central and branch vein occlusions. However, in our study we could not find such difference in mean age of presentation between male and female. Tsaloumas *et al*[7] found 52% affection of males and 48% of female. Ouinlan *et al*[8] found 56% and 44% of males and females respectively. We have encountered similar prevalence of male (61.66%) in our study (Table 2).

A sudden deterioration of vision was predominant complain of the patients with RVO, which was also observed in many studies. Examination of fundus of 60 patients of RVO revealed diffuse retinal haemorrhages and dilatation of all the retinal branch veins in 24 eyes(40%), sectoral haemorrhage either flame shaped or dotted was found in 36 eyes (60%), hard exudates were found in 42 eyes (70%), cotton wool spots were found in 18 eyes (30%), macular edema in 45 eyes (75%), disc neovascularization in 5 eyes (8.33%) and disc edema in 16 eyes (26.66%) (Table 4). Similar findings were reported by Prilucket *et al*[9].

OCT AND FFA FINDINGS IN RVO PATIENTS:

In our study, certain discrepancies were found between the OCT and FFA features in the RVO cases and it was found that the specificity of OCT was less than FFA in detecting RVO lesions (Table 5 & 6). OCT is highly sensitive in detecting any structural change and so subretinal fluid accumulation could not be detected in FFA. Indeed as leakage is very well detected in FFA, so 5 cases which appeared to be subretinal fluid accumulation in OCT came out to be leakage from neovascular vessels in FFA. Similar results were reported by Antoine Catier*et al*[12] and Zhang *et al*[13]. Jittpoonkuson *et al*[14] found that OCT was more sensitive than FFA for the diagnosis of CME, and diagnosis of CME was missed in 18.52% of cases and SRF accumulation was missed in 54.55% of cases by FFA. Zhang et al[13] found sensitivity of OCT for detecting CME as 98.6% and specificity as 100%, while FFA had sensitivity of 86.1% and specificity of 100%.

CONCLUSION:

RVO is a multifactorial disease that affects a large segment of the population and research to date has yielded some preventive measures but few effective treatments. Our study aimed at finding the role of diagnostic modalities- OCT and FFA in the diagnosis of the various presentations of this disease. Thus, FFA and OCT play an important role in the diagnosis of RVO.

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