



RETINAL MANIFESTATIONS IN PATIENTS WITH CARDIOVASCULAR DISORDERS. – A STUDY OF 100 CASES.

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ABSTRACT

The role of carotid artery disease and ischemic heart disease in the development of various types of ocular arterial and venous disorders has often been reported. 100 patients with cardiovascular diseases are studied to observe the various retinal manifestations like CRAO, CRVO, BRVO, NAAION etc and analyzed statistically to understand their prevalence.

Objective: To study 100 patients with cardiovascular disorders and Examine for Retinal abnormalities in these patients like CRVO, BRVO, ARMD, AION, NAION, Transient ischemic attacks like Amaurosis fugax, Ocular Ischemic Syndrome etc and study their prevalence.

Materials and methods: 100 cases with Cardiovascular diseases who were already diagnosed in the department of Cardiology of which 50 cases of Carotid artery stenosis, 50 cases of Ischemic Heart Disease were selected and taken up for observation and analysis of their retinal manifestations.

Duration of study: The study was carried over a period of 1 year from January 2016 to December 2016.

Results: The prevalence of Retinal manifestations in cardiovascular patients in the present study is 17 %. Out of the hundred patients examined 17 patients showed retinal manifestations.

Conclusion: The Prevalence of ARMD is higher than other retinal manifestations like BRVO, CRVO, AION, CRAO, OIS, NTG, etc., in patients with cardiovascular disease. There is a minor male predominance and maximum prevalence is seen in the age group of 60-69 years.

KEYWORDS : Retina, CRVO, CRAO, ARMD

INTRODUCTION:

Retinal microvascular signs, like generalized retinal arteriolar narrowing, focal arteriolar narrowing, arteriovenous nicking, retinal haemorrhages, microaneurysms and cotton wool spots are common fundus findings in the general population; even in individuals without hypertension or diabetes¹.

Retinal venous and arterial occlusions are among the most common serious ophthalmic conditions presenting acutely in patients with cardiovascular diseases. They present as transient retinal Ischemic attacks, retinal artery occlusion, Ocular Ischemic syndrome. The various other manifestations include, Normal tension glaucoma , Anterior ischemic optic neuropathy , Age related macular degeneration and Ocular Ischemic syndrome. Retinal microvascular signs may reflect susceptibility, vulnerability or damage of cerebral small vessels. Although such damage may be attributed to hypertension, retinal findings may be providing more information than just the degree of changes in blood pressure².

Central retinal artery occlusion (CRAO) is an ophthalmic emergency and the ocular analogue of cerebral stroke. Best evidence reflects that over three-quarters of patients suffer profound acute visual loss with a visual acuity of 20/400 or worse³. The incidence is estimated to be 1 in 100 000 people and accounts for 1 in 10 000 ophthalmological outpatient visits⁴. RVO is an obstruction of the retinal venous system that may involve the central retinal vein (central retinal vein occlusion [CRVO]) or a branch retinal vein occlusion [BRVO]). In the vast majority of cases, BRVO occurs at arterio-venous crossing sites where the artery is positioned anterior to the vein⁵. In a cohort study, CRVO was associated with an increase in mortality, which was attributed to cardiovascular disorders and diabetes⁶.

Age-related macular degeneration (ARMD) is one of the top four causes of blindness in elderly which is a progressive disease of the central area in the ocular posterior segment (the macula lutea), which leads to a gradual deterioration in central vision and severe disability to affected individuals⁷. The main risk factors for the development and progression of ARMD include increasing age, smoking and ethnicity⁷. Anterior Ischemic Optic Neuropathy is an acute painless optic neuropathy occurring predominantly in patients over 50 years of age and manifests in two types arteritic and non-arteritic (AAION & NAAION respectively). Ample evidence that AAION results from short posterior ciliary artery vasculitis and the resultant optic nerve head infarction exists⁸. Ocular ischemic syndrome(OIS) is a rare

condition, which is caused by ocular hypoperfusion due to stenosis or occlusion of the common or internal carotid arteries¹⁰. Ocular ischemic syndrome is manifested as visual loss, orbital pain and, frequently, changes of the visual field, and various anterior and posterior segment signs¹⁰. Normal-tension glaucoma (NTG), defined as glaucoma without a clearly abnormal IOP. It has been pointed out in many works that hemodynamic parameters such as reduced ocular blood flow and fluctuations in ocular perfusion pressure, nocturnal fall of blood pressure, autoregulation dysfunctions, and migraines, might be the reason for ischemia and optic nerve damage¹¹.

PATIENTS AND METHODS:

Patients suffering from cardiovascular disease attending the department of Cardiology, at Alluri Sitarama Raju Academy Of Medical Sciences, ELURU were taken up for this study from Jan 2016 to Dec 2016. A total of 100 cases were taken for the study, Out of which 50 cases of Carotid artery stenosis, 50 cases of Ischemic Heart Disease were selected.

INCLUSION CRITERIA:

1. Patients suffering from Ischemic Heart Disease
2. Patients with carotid Artery Stenosis

EXCLUSION CRITERIA:

1. Patients with congenital Heart disease
2. Patients with pre existing Ocular pathology

Target population is 100 patients of age group above 40 years, both sexes suffering from Ischemic Heart disease and Carotid Artery Stenosis. Guidance and permissions were taken from the Institutional Ethics Committee (IEC) of the hospital for undertaking the study according to the norms and ethics of clinical research.

All patients were examined for the following parameters:

1. Visual Acuity
2. Slit Lamp Examination of Anterior Segment
3. IOP/ Gonioscopy
4. Direct Ophthalmoscopy , Indirect Ophthalmoscopy, Slit lamp Bio microscopy with 78D lens.
5. Fundus Fluorescence Angiography.
6. Fundus photography
7. Systemic clinical examination
8. Biochemical and radiology tests.

OBSERVATIONS AND RESULTS:

The study group included cardiovascular patients attending outpatient and inpatient Departments of Cardiology at ASRAM HOSPITAL, ELURU. 50 patients of ischemic heart disease and 50 patients of Carotid artery stenosis in the age groups of above 40 of both sexes were examined from the period from January 2016 to June 2017. At the end of the study the prevalence of ARMD is the most common presentation (35.29%) followed by BRVO (17.64%) in this study group.

Table 1: Prevalence of Retinal Manifestations

SL.NO.	Type of manifestation	No. of cases	prevalence in percentage
1.	CRVO	02	11.76
2.	BRVO	03	17.64
3.	DRY ARMD	06	35.29
4.	NAION	01	5.88
5.	NTG	02	11.76
6.	CRAO	02	11.376
7	OIS	01	5.88
TOTAL	17	100.00	

Figure 1: Prevalence of Retinal Manifestations

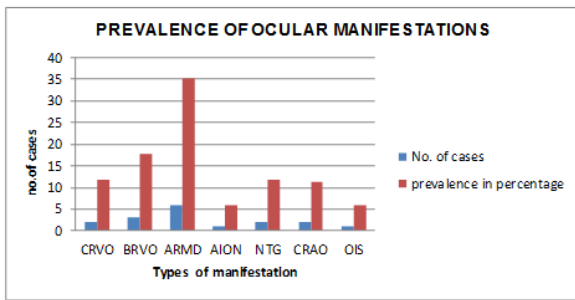


Table 2: RISK FACTORS ASSOCIATED WITH IHD (No.of patients: 13)

SL.No	RISK FACTOR	NO.PATIENTS	PERCENTAGE
1	DM	1	7.67
2	HYPERTENSION	6	46.15
3	DM + HTN	5	38.46
4	HYPER CHOLESTROLEMLA(HC)	1	7.67
5	HYPER TRIGLYCERIDEMIA (HTG)	4	30.76
6	HC+HTG	6	46.15

Out of 50 patients with IHD, 13 patients had ocular manifestations.

- Isolated Hypertension and Hypercholesterolemia with hypertriglyceridemia was found to be the major risk factor among all.
- Hyper triglyceridemia is the major risk factor when compared to hypercholesterolemia.
- Isolated Hypertension is the major risk factor when compared to DM.

Fig: 2

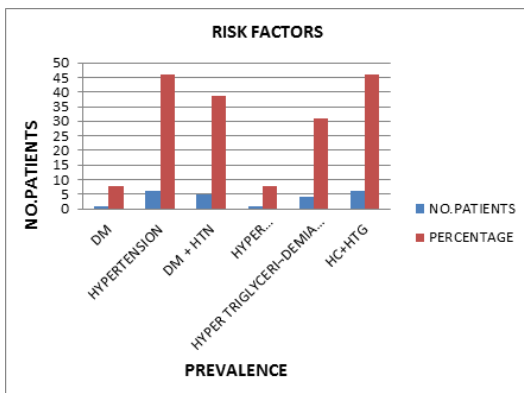


Table 3: RISK FACTORS ASSOCIATED WITH CAD (No.of Patients: 4)

SL.NO.	RISK FACTOR	NO.PATIENTS	PERCENTAGE
1	DM	1	25
2	HYPERTENSION	1	25
3	DM + HTN	1	25
4	HYPER CHOLESTROLEMI A(HC)	1	25
5	HYPER TRIGLYCERIDEMIA(HTG)	1	25
6	HC + HTG	0	0

Out of 50 patients of Carotid Artery Stenosis, 4 patients had ocular manifestations. All the risk factors are contributing equally.

DISCUSSION & CONCLUSION:

The prevalence of Retinal manifestations in cardiovascular patients in the present study is 17 %. Out of the hundred patients examined 17 patients showed retinal manifestations related to the inclusion criteria. The study is a Cohort Study and all the cases were already diagnosed in the department of Cardiology and taken for observation and analysis of retinal manifestations.

Hayreh and Zimmerman carried out a cohort study to compare the prevalence of CAD and its various manifestations with specific types of ocular arterial occlusive disorders¹² and, found that the incidence of carotid artery stenosis and plaques, cardiac embolic source, transient ischemic attack (TIA)/stroke, and myocardial ischemia (MI) differ among various ocular arterial occlusive disorders³. In particular they reported 17 CRAO cases among 628 eyes which is approximately 2.8%. But among the number of cases with all other vascular occlusive manifestations of retina, they came up to 15%¹². In the present study out of 100 patients 2 patients were diagnosed with CRAO. Out of a total of 17 cases diagnosed with retinal manifestations 2 cases are CRAO. This is 11.76% of CRAO cases out of various cases of all retinal manifestations. Hayreh's study has 2.8% of CRAO cases and this study has 2% of all the cases. Hayreh's study reported 18% among all of the cases with retinal manifestations while this study has 11.76%. In 2015, Ponto et al published the Gutenberg Health study. The investigation included 15,010 participants (aged 35-74 years) determining the prevalence of RVO (CRVO and BRVO) for the local population by assessing fundus photographs of 12954 (86.3%; 49.8% women and 50.2% men) participants¹³. The prevalences of RVO, CRVO, and BRVO were 0.40%, 0.08%, and 0.32%, respectively. Of persons with RVO, 91.5% had one or more cardiovascular risk factor or disease vs. 75.9% of persons without RVO¹³. The present study done in our hospital also assessed the RVOs and their risk factors. Of the 100 cases with cardiovascular diseases 2 cases of CRVO and 3 cases of BRVO are diagnosed. The greater frequency in the superotemporal quadrant is explained by the higher number of A-V Crossings. Hypertension has been associated with RVO in this study. 4 of the 5 cases diagnosed with RVOs are hypertensive patients. Out of the 17 cases diagnosed with retinal manifestations 6 are with dry ARMD (35.29%). As observed in the previously mentioned studies, there is a significant increase in the number of ARMD cases observed in patients diagnosed with cardiovascular diseases. In particular, ARMD is seen more significantly in cases with IHD. The associations of risk factors for heart diseases like Hypertension, Hyperlipidemia, Diabetes Mellitus etc is somehow inter related. Some studies have observed the risk factors separately and found that Hyperlipidemia in particular has more association with ARMD. In the present study all the 6 patients with ARMD have hypertension (100% association) but 4 out of the 6 ARMD cases have Diabetes Mellitus. Hyperlipidemia has a strong association with ARMD in this study. All 6 cases reported have high lipid values suggesting a 100% association.

Other disorders are having prevalence rates like OIS (5.88%), NAAION (5.88%), NTG (11.76%) among the 17 cases examined. Out of the 100 patients examined 17 of them are having a retinal condition. Among the remaining 83 patients also some of them are having changes in their retinal picture pertaining to their conditions like HTN, DM or hyper lipidemia. A clear association of hypertension and hyperlipidemia with patients diagnosed retinal manifestations has been established. The predictability of stroke looking at a retinal picture in a patient with cardiovascular disease is one of the newer

directions where a lot of research is going on. Measuring the length diameter ratio of vessels is one parameter in this investigation. With the ongoing advancement in technology and research newer mechanisms of investigation might be able to help patients by looking at the retinal picture rather than invasive procedural investigations.

CONCLUSION:

The Prevalence of ARMD is higher than other retinal manifestations like BRVO, CRVO, AION, CRAO, OIS, NTG, etc., in patients with cardiovascular disease.

There is a minor male predominance for changes occurring in the retina in patients suffering from cardiovascular disease, probably due to the effect of Nicotine which needs further study. IHD with hypertension has strongest association to retinal changes compared to other risk factors. Hyper triglyceridemia is found to be the major risk factor compared to hyper cholesterolemia. This study can be concluded saying that all patients with cardiovascular disease should be screened for retinal changes periodically.

An even earlier screening for retinal changes in patients with risk factors for cardiovascular disease as well as vascular abnormalities in the retina can help in prevention of vision threatening complications.

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