



**ORIGINAL RESEARCH PAPER**

**Ophthalmology**

**RETINAL VASCULAR CHANGES IN ESSENTIAL HYPERTENSION IN RELATION TO ELEVATED BLOOD PRESSURE**

**KEY WORDS:** Hypertensive, Arteriosclerotic Retinopathy, Systolic Blood Pressure

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**ABSTRACT**

To study the vascular changes in patients with essential hypertension and to identify the risk factors associated with it. Even though hypertensive retinopathy is seen by ophthalmologist in daily practice, this study is done to look for the possible correlation of hypertensive and arteriosclerotic retinopathy with factors such as age, sex and duration of elevated blood pressure after eliminating known risk factors which could cause other forms of hypertension. This study was done to find out whether these factors can influence the severity of retinopathy.

**INTRODUCTION**

The study of retinal changes in association with systemic vascular disease is of importance as it acts as a window which directly visualizes the retinal vascular changes which mirrors the changes in cerebrovascular system and the corresponding changes which occurs in renal and coronary vessels. Hypertension and arteriosclerosis have been the most common inter related systemic problems with definitive vascular changes. The main retinal evidence of arterial disease is usually associated with vasosclerosis and increased by hypertension.

**Pathogenesis**

There is an important series of signs at the points where the retinal arteriole cross the venules and in 70% they cross anteriorly to them. These crossing changes occur at many places in fundus. Normally at the crossing of vessels there is no evidence of their depression or elevation or change in direction, diameter or a colour but a slight humping or loss of venous reflex. The causes of this phenomenon at AV crossing is that the two vessels share a common adventitial sheath surrounded by usual insulating mantle of glia while the basement membrane surrounding the muscular layers are fused, providing an intimacy which makes early pathological changes evident. Focal (segmental and sectoral) narrowing of retinal arterioles is a vascular change in the fundus related to the level of diastolic pressure. General attenuation and straightening of retinal arterioles is a sign of tonic contracture and also of a generalized arteriolar sclerosis. Vascular reflex which appears as a thin longitudinal bright streak running along the convexity of an arteriole is due to light reflected partly by the blood column and partly by the vessel walls in which the main reflecting element is media, in sclerotic condition the latter element alters. Sheathing of vessels has been described as fibrotic perivasculitis of a reactive and compensating nature strengthening the vessels against undue strain. Spasm of arterioles occurs when the blood pressure rises in healthy young adults.

**Aim of the study**

- To find out the retinal vascular changes in patients with elevated blood pressure.

**MATERIAL AND METHODS**

Patients attending hypertension clinic from Aug.-2018 to Dec.-2018 were screened. Physician opinion was taken for hypertension and complete work had already been done. The cases which obviously had causes like PIH and renal hypertension were eliminated from the study. Fundus examination was done under Tropicamide / Cyclopentolate eye drops using Heine direct and Indirect Ophthalmoscope. Ocular fundus findings were graded using Keith Wagner and Scheie's classification. The findings were recorded in the proforma.

**Data analysis**

**Table – 1: Hypertensive Retinopathy by Systolic Blood Pressure**

S.B.P.	Normal		Grade I		Grade II		Grade III	
	n	%	n	%	n	%	n	%
<150	63	94.0	-	-	4	6.0	-	-
150 – 200	50	86.2	2	3.4	5	8.6	1	1.7
>200	1	33.3	1	33.3	1	33.3	-	-

**Table – 2: Arteriosclerotic Retinopathy by Systolic Blood Pressure**

S.B.P.	Normal		Grade I		Grade II		Grade III	
	n	%	n	%	n	%	n	%
<150	38	56.7	10	14.9	18	26.9	1	1.5
150 – 200	30	51.7	10	17.0	16	27.6	2	3.4
>200	1	33.3	-	-	1	33.3	1	33.3

**Table – 3: Hypertensive Retinopathy by Diastolic Blood Pressure**

D.B.P.	Normal		Grade I		Grade II		Grade III	
	n	%	n	%	n	%	n	%
90-100	92	90.2	2	2.0	7	6.9	1	1.0
100-110	18	85.7	1	4.8	2	9.5	-	-
>110	4	80.0	-	-	1	20.0	-	-

**Table – 4: Arteriosclerotic Retinopathy by Diastolic Blood Pressure**

D.B.P.	Normal		Grade I		Grade II		Grade III	
	n	%	n	%	n	%	n	%
90-100	56	54.9	17	16.7	26	25.5	3	2.9
100-110	12	57.1	3	14.3	5	23.8	1	4.8
>110	1	20.0	-	-	4	80.0	-	-

**DISCUSSION**

The incidence of hypertensive retinopathy in relation to systolic blood pressure (Table-1): is significant with  $p < 0.001$ . With regard to diastolic blood pressure the incidence of hypertensive retinopathy was not significant (Table-2) with  $p = 0.901$ . With advancing age the arteriosclerotic retinopathy sets in, its correlation with systolic and diastolic blood pressure was not significant table 3 and 4 with  $p = 0.109$  and  $p = 0.265$  respectively.

**CONCLUSION**

In our screening for hypertensive and arteriosclerotic retinopathy among essential hypertension patients, there was significant incidence of hypertensive retinopathy in relation to elevated systolic blood pressure and with increased duration.

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