ORIGINAL ARTICLE

Ophthalmoscopic findings in sub-classification of the eighth joint national committee (JNC 8) hypertension in city of Karachi

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Abstract

Objective: To analyze the ophthalmoscopic findings in hypertensive patients in tertiary care hospitals of Karachi classified according to JNC 8 of hypertension.

Materials and Methods: 1,100 cases were detected as hypertension as per JNC recommendations in outpatient departments of Liaquat National and Dow University Hospital from January 2017 to December 2017**. Among them, 300 patients were selected according to inclusion criteria for ophthalmoscopy and four groups were made. Group-A comprised the white coat or masked hypertension. Group-B were incidental hypertensive, group-C included the known hypertensive on anti-hypertensive therapy and group-D were known hypertensive but not on anti-hypertensive therapy. Ophthalmoscopic findings were recorded in each group according to Keith Wagner's classification. The data were entered in SPSS for statistical analysis.**

Results: Out of 300 cases of hypertension, only 55/300 (18.3%) were found to have normal retina. In group-A which were labeled as white coat hypertensive 14 out of 17(82.5 %) had normal retina, only 3 patients out of 17(5-66%) showed arteriolar narrowing. Group-B was classified as incidental hypertensive, 12 out of 32 (37.5%) had normal retina, while 20 out of 32(63%) showed arteriolar narrowing, only few patients had AV nipping or flame shaped hemorrhage or soft exudates in stage 1 and 2 stage hypertensive. In group-C 28 out of 108 (30%) had normal retina. The most consistent findings were arteriolar narrowing and AV nipping while hemorrhages, exudate and cotton wool spots was seen in less than 10% of cases. This showed the effect of control of hypertension on time by examining the retina. In group-D only one patient out of 143 had normal retina, while most ophthalmoscopic findings were hemorrhages and exudates with arteriolar narrowing and AV nipping. 5 patients had papilledema. This showed how non-compliant badly affects the retina.

Conclusion: Hypertensive retinopathy is the most sensitive peripheral stigma as result of hypertension provided if ophthalmoscopy is done with correct methodology with dilated pupil. The ophthalmoscopic findings are justified with severity of hypertension as classified by JNC 8 in this study.

Keywords: Ophthalmoscopic findings, hypertension, JNC 8 sub classifications, arteriolar narrowing, AV nipping, papilledema

Introduction:

Hypertension is one of the most important causes of morbidity and mortality in developed and developing countries.[1] The other important fact about hypertension is that more than 90 % of the cases are diagnosed incidentally means, it is a silent killer.[2] Another important fact about this disease is if it is controlled appropriately the complications like, stroke, renal impairment and coronary artery events are significantly reduced.[3]

The most sensitive and informative target organ damage (TOD) associated with hypertension is

Eye and more specifically, retinopathy.[4] Eye is the easiest and cost effective method of detection of TOD and has long been regarded as risk indicator for the systematic morbidity and mortality.[5] It has been found in several studies that the retinal changes are sensitive index of hypertension but other risk factors of atherosclerosis e.g., dys-lipidemia does not directly affect retinal vessels.[6] It is also an interesting fact that, arterial narrowing and arteriovenous nipping are found in normotensive population and probably good predictive indicator of future development of hypertension just like HbA1c is higher in normoglycemic persons who are prediabetic.[7]

Recently JNC (joint national conference) highly supported by AHA (American Heart Association) and WHO sub-classified hypertension. The later recognized normo-tensive systolic is less than 119 and diastolic is less than 80mm of Hg. Pre-hypertension was described as systolic between 120-139 and diastolic as 80 – 90mm of Hg. Stage-1 hypertension is labeled when systolic BP is >140 but <160 and diastolic between 90 – 100 and stage 2 hypertension is if systolic is >160 and diastolic is more than 100 mm of Hg. Relaxation is given to those who are more than 60 years, diabetic and renal impairment where more than 150 systolic is regarded as stage 1 hypertension.[8]

The present study has focused on changes in Retina on the basis of sub-classification of hypertension as suggested by JNC 8 and also gives the prevalence of retinal changes in our population as classified by JNC. Aim of the study is therefore to examine the effect of hypertension on retina as per sub-classification of JNC 8 in the patients visiting eye and medical out patients departments of tertiary care hospitals in Karachi.

Materials and Methods:

This analytical cross-sectional study is done in two leading tertiary care hospitals, Dow University Hospital and Liaquat National Hospital of Karachi, Sindh from January 2017 to December 2017. Randomly selected patients after taking their informed consent were taken from the eye and cardiology outpatients departments.

The inclusion criteria were as follows:
(a) known hypertensive but not on drugs
(b) hypertensive but controlled on drugs
(c) incidental
(d) ages between 15 – 75years
(e)no other comorbid or known ophthalmological illness.

Exclusion criteria were as follows:
(a) ages less than 15 years and more than 75 years
(b) known comorbid or any other systematic illness that can affect hypertension
(c) secondary causes of hypertension
(d) white cataract. The selected patients were interviewed for demography, past history of ophthalmologic and systemic diseases of hypertensive origin whether controlled or not.

Blood pressure was recorded on both arms. Consultant ophthalmologist noted the visual acuity and performed ophthalmoscopy of both eyes for condition of retinal vessels, arteriovenous nipping, hemorrhages, micro aneurysms and papilledema.

After this workout four groups had been made according to presentation. Group-A consist of white coat or masked hypertension such that the recorded B.P was higher on first occasion or at second reading, but after sitting for few hours in opd the subsequent reading was normal. Group-B were subset of patients with incidental hypertension such that there was no previous history of hypertension and not taking any medications. Group-C comprises the known hypertensive for more than 6 months and were on prescribed therapy. Group-D had known hypertensive but not taking any type of therapy. All these groups were further classified on the basis of JNC 8, such that normotensive, pre-hypertensive, stage-1 and stage-2 hypertensive. Detailed ophthalmoscopic examination had been done and retinal changes noted. All information was entered in SPSS 19 version for statistical analysis. Chi square is applied where needed, and prevalence of p-value < 0.0009 was regarded as statis-

Table-1: Showing retinal changes in Incidental Hypertensive Group B. Total patients: 32

Classification of hypertension	Pre-Hypt 8/32	Stage 1 19/32	Stage 2 5/32	Total 32/32
Normal retina	**7**	**3**	2	12
Arterial narrowing only	1	9	0	10
Arterial narrowing and AV nipping	0	3	0	3
Arterial narrowing, AV nipping and hemorrhages	0	2	2	4
Exudates	0	1	2	3
Cotton wool spots	0	1	1	2
Papilledema	0	0	0	0
Total	8	19	7	34

Table-2: Showing results of ophthalmoscopy in known hypertensive on drugs Group C: Total Patients 108

Classification of hypertension	Stage 1 72/108	Stage 2 36/108	Total 108
Normal retina	**21**	7	28
Arterial narrowing only	35	10	45
Arterial narrowing and AV nipping	11	9	20
Arterial narrowing, AV nipping and hemorrhages	2	5	7
Exudates	2	3	5
Cotton wool spots	1	2	3
Total	72	36	108

Table-3: Showing results of ophthalmoscopy in known hypertensive not using drugs Group D: Total patients 143

Classification of hypertension	Stage 1 82/143	Stage 2 61/143	Total 143
Normal retina	1	0	1
Arterial narrowing only	5	7	12
Arterial narrowing and AV nipping	8	11	19
Arterial narrowing, AV nipping and hemorrhages	44	20	64
Exudates	21	13	34
Cotton wool spots	2	6	8
Papilledema	1	4	5
Total	82	61	143

tical significant for the problem.

Results:

1,100 patients were found to be hypertensive from January 2017 to December 2017, attending ophthalmology outpatients departments of Liaquat National Hospital and medical/ cardiac departments of Dow University of Health Sciences, Karachi. 300 cases have been selected as per inclusion criteria. The proportion of males was 59.7% (179/300) and females were 39.3% (121/300). The mean age was 53.03±11.92 years. Overall 55 out of 300 (18.3%) had normal retina. Four groups, (A, B, C, D) had following ophthalmoscopic findings. The group-A, 14/17 (82.3%) had normal retina, only 3 patients (3/17) i.e., 5.66% showed arteriolar narrowing. The ophthalmoscopic findings of groups B, C and D were shown in table 1-3. In almost one third 35.3% (106/300) were included in stage-1 hypertension, 36.0% (108/300) were labeled as pre-hypertensive and 9.0% (27/300) were found to have stage-2 hypertension. 70% (210/300) of the cases were on anti-hypertensive treatment, while 30.0% (90/300) were not taking any therapy for their hypertension. Regarding the special pathologies on eye after the effect of stage-1 and stage-2 hypertension we found statistical relationship (Pearson chi square p value = .003) between above grading and the pathologies in eyes.

Discussion:

The recommendations as given by JNC 8 for the diagnosis, classification and management of systemic hypertension has made revolution in morbidity and mortality of this silent killer.[9] As retina is the most sensitive peripheral stigma appeared as the result of persistent high pressure in arteries,[10] the present study focused on the retinal changes detected in subsets of classification of hypertension as suggested by JNC 8. In our study the gender, V/A, profession and residence did not influence the severity of hypertension or associated retinal changes. Age and duration of hypertension had linear relationship with retinal changes. Group-A Hypertensive who were white coat hypertensives had normal retina in 90% of cases, while remaining showed only arteriolar narrowing without others features. These patients may develop frank hypertension in future and should practice primary prevention. These observations are supported by the study done in 2012 by Triantafyllou and co-workers.[11] Group-B patients were incidental hypertensives 37.5% had normal retina 63% showed retinal changes.

Arterial narrowing was the dominant finding in both pre-hypertensive and stage-1 hypertensive while in addition flame shaped hemorrhages were demonstrated in stage-2 hypertensive.

These facts are supported by in 2016 by Olulege and colleagues in their study.[12] In group-C which included the known hypertensive on therapy showed specific ophthalmoscopic changes as described in classification by Keith and Weigner. Very few patients had normal retina but arteriolar narrowing, AV-nipping were considerable findings in the majority of type-1 hypertensives and these findings were almost doubled in stage-2 hypertensives which also showed flame shaped hemorrhages and cotton wool spots. This indicated that majority of them were non-compliant or had resistant hypertension. These findings are supported in a study done in 2015 by Cuspidi and co-researchers.[13] In group-D in which the patients of unknown hypertension of more than 6 months without any sort of therapy showed maximal retinal changes. Most of them had arteriolar narrowing plus AV-nipping with hemorrhages, one fourth of these patients showed soft exudates, while few showed cotton wool spots and papilledema in stage-1 hypertension. These findings were almost doubled in stage-2 hypertension. These observations are supported in study done by Khan and his co-workers.[14]

Conclusion:
Retinal changes in hypertension as described by Keith and Wegner are justified in sub classification of JNC-8. More is the duration; severity and non-adherence to treatment more are the Ophthalmoscopic changes. Ophthalmoscopy should be done in every known hypertensive and is a sensitive tool in screening of our population who are so called "normo-tensives".

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Role and contribution of authors:
Dr. Abdul Hameed Siddique, overall management, selection of the patients, literature search and ophthalmoscopy with interpretation of the results.

Dr. Syed Ali Haider Naqvi, conceived the study, history and clinical examination with classification of hypertension and making the groups, literature search and writing of manuscript.

Dr. Sahira Wasim, blood pressure recording of the patients, ophthalomoscopy of selected patients and record entry in SPSS, the software for statistical package.

Dr. Munir Ahmed Shaikh, literature search and statistical analysis of the data.

References:

1. Genevois O, Pagues M. Hypertensive Retinopathy. J Rev Prat 2010; 60:21-4.
2. Born VHB, Caroline AA, Hulsman, Joast BL, HoekstroRenier O. Value of routine fundoscopy in patients with hypertension. Systematic review.Bmj 2005; 331:7508.
3. Ong TY, Wong T, Klein R, Klein EKB, Mitchell P, Richev A. Hypertensive retinopathy and risk of stroke novelty and significance. Hypertension 2013: 62(4):706-11
4. Kabedi NK, Kayembe DL, Mwonza JC, Lepira FB, Kayembe TK. Hypertensive retinopathy and its association with cardiovascular, renal and cerebrovascualr morbidity in Congolese patients. Cardiovasc J Afr 2014; 25(5):228-32.
5. Grosso A, Veglio F, Porta M, Grignolo FM, Wong YT. Hypertensive retinopathy revisited, some answers, more questions. BJ Opthal 2005; 89(12:1646-54.
6. Akoudad S, Portegies ML, Koudstaal PJ, Haffman A, Von der Lugt A, Ikram MA et al. Cerebral microbleeds are associated with increased risk of stroke. The Rotterdom study. Circulation 2015; 132:509-16.
7. Mondal RN, Singh BR, Islam FM,Matin AM,Rani M,Hussain ZM,Shaha CA, et al. Prevalence and risk factors of hypertensive retinopathy in hypertensive patients. J Hypt 2017; 6:241-44.
8. Aissopou EK, Papothanassiou M, Nasothimiou EG, Konstantonis GD, Tentolorris N, Theodossiadis PG et al. The Keith Wegeners Borker and Mitchell Wong grading system for hypertensive retinopathy associated with target organ damage in individuals before 55 years. J Hypt 2015; 33:2303-9.
9. Sholomai G, Grassi G, Grossman E, Manica G. Assessment of target organ damage in the evaluation and follow up of hyperttensive patients: Where do we stand? Clin Hyperten (Greenwich) 2013; 15:742-47.
10. Faheem RM, Moizuddin. Diagnosing hypertensive retinopathy through retinal images. Biomed Research and Therapy 2015; 2 (10):385-88.
11. Trianlafyllou A, Doumas M, Anyfanti P, GkaliogKousi E, Zabulis X, Petidis K, Gavriilaki E et al. Divergent retinal vascular abnormalities in normotensive persons and patients with never treated, masked white coat hypertension. Am J Hyperten 2013; 26(3):318-25.
12. Olulege TS, Olusanya AB, Adeoye AM. Retinal vascular changes in hypertensive patients in Ibadan – sub-Saharan Africa. Int J Gen Med 2016; 9:285-90.
13. Cuspidi, Cesare, Sala, Carla, Grossi, Guido. Updated classification of hypertensive retinopathy. Which role of cardiovascular stratification? J Hyperten 2015; 33:2204-06.
14. Khan UA, Hussain ZM, Tariq MK, Qadir A, Iqbal M. Frequency of different grades of retinopathy in hypertensive patients at military hospital, Rawalpindi. Pak Armed Forces Med J 2012; 62:452-57.