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ORIGINAL ARTICLE

Microalbuminuria as a risk factor for ischemic cerebrovascular diseases in essential hypertension- a case control study.

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ABSTRACT… Objectives: To determine whether Microalbuminuria, is a risk factor for ischemic cerebrovascular diseases, in our patients with essential hypertension. **Study Design:** Case Control study. **Setting:** Department of Medical, Khyber Teaching Hospital, Peshawar. **Period:** 28th July, 2022 till 28th February, 2023. **Material & Methods:** The patients were divided into two groups, one without cerebrovascular disease (CVD) and other with CVD. Data of all patients was recorded on a predesigned proforma. **Results:** Amongst the total of 200 patients enrolled, 58(29%) patients' age was in range of 16-40 years and 142(71%) patients' age was in range of 41-120 years. Mean age of our patients was 53 years with standard deviation ± 20.12. As far as gender is concerned, 110(55%) patients were males and 90(45%) patients were females. Approximately 83(41.5%) patients had microalbuminuria and 110(58.5%) patients had no microalbuminuria. Only hypertension but no CVD was present in 145(72.5%) patients, while 55(27.5%) patients had hypertension and CVD, 47.47% of these, had microalbuminuria. **Conclusion:** Amongst the hypertensive patients, microalbuminuria was present in significantly higher number of patients with ischemic Cerebrovascular Disease as compared to patients who had no cerebrovascular disease.

Key words: Essential Hypertension, Ischemic Cerebrovascular Disease, Microalbuminuria.

INTRODUCTION

Approximately one billion people globally are suffering from Hypertension, and about 7.1 million people die directly or indirectly due to hypertension annually.[1] Microalbuminuria in hypertensive patients reflects the presence of target organ damage e.g. that of peripheral arteries, coronary arteries and renal arteries due to generalized endothelial dysfunction. Optimization of blood pressure may delay the onset and rate of progression of atherosclerotic complications.[2,3] Blood pressure is regarded normal if it is less than 120/80 mmHg, taken as elevated if it is 120-129/less than 80 mm Hg, 130-139/80-89 mm Hg is defined as Stage 1 hypertension and Stage 2 hypertension is equal to or greater than 140/90 mm Hg.[4,5] About 90 % of all the hypertensive patients have no definable cause, and are termed as having primary, essential or idiopathic hypertension.[6] Amongst the risk factor for atherosclerotic disorders in South Asia, hypertension occupies position three.[7] The number of hypertensive patients is unfortunately increasing.[8] Up to 30mg of albumin is excreted in urine normally, more than 300mg/day can be detected by conventional dipstick method. Microalbuminuria (MA) is defined as the presence of albumin in the urine from 31 mg/d to 300 mg/d. It indicates increased permeability of the glomeruli for albumin. Both a spot urine sample or 24-hour urine collection may be used for determination of microalbuminuria.[9] Microalbuminuria reflects the cardiovascular outcomes in both diabetic and nondiabetic patients.[10,11] Microalbuminuria reflects local injury to the endothelium and smooth muscles of blood vessels due to continuous shear stress injury.[10] Resulting in changes in concentration of a variety of local cytokines and nitric oxide that lead to cellular proliferation and increased vascular permeability.[12,13] Microalbuminuria has also been reported to be positively associated with

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thickness of intima, media and atherosclerosis of carotid artery and atherothrombotic (ischemic) strokes.[14] Microalbuminuria is one of the markers of hypertension-mediated organ damage, insulin resistance in T2DM, hypertrophy of left ventricular and myocardial ischemia.[14] It is also associated with double risk of peripheral arterial disease, renal failure and stroke (both ischemic and hemorrhagic). Some of the studies have reported that risk for development of stroke in patients with microalbuminuria is increased up to 13 times.[15,16] Hence early diagnosis and appropriate management of hypertension may delay the onset of and slow down the progressive increase of microalbuminuria and thus delay the target organ damage.[8,14] With this background, we decided to find out whether or not microalbuminuria is a risk factor for ischemic cerebrovascular accidents in our patients suffering from essential hypertension.

MATERIAL & METHODS

After taking ethical approval from IREB (738/DME/KMC), this case control study was carried out in the Department of Internal Medicine, in a tertiary care hospital of district Peshawar called Khyber Teaching Hospital, from 28/7/2022 till the 28th of February 2023. We included 200 patients in our study, who were enrolled on consecutive basis and were fulfilling our inclusion criteria.

Inclusion Criteria

Adult patients from age 15 years and above, of either gender, having essential Hypertension of any grade with or without Cerebrovascular Disease,

Exclusion Criteria

Patients having any of the following conditions which can act as confounders were excluded from the study.

1. Urinary tract infection,
2. Renal diseases,
3. Fever (current or in last 30 days),
4. History of NSAIDS intake,
5. Congestive heart failure, and
6. Diabetes Mellitus.

After taking detailed history and performing clinical examination, all the patients were admitted in the medical ward and were provided a plastic jar for urine collection for 24 hours which was sent to laboratory for determination of microalbuminuria. All information obtained including name, age, gender, BMI, blood pressure, Diabetes Mellitus, smoking, presence and absence of microalbuminuria & address were recorded on a predesigned proforma. We calculated Mean and SD for quantitative variables for example age. While for categorical variables for example gender, percentages & frequencies were calculated. We divided our patients into two groups, one without CVD and other with CVD. Percentages of microalbuminuria, was calculated in both of the groups. Tables were used for presentation of results. The data analysis was done using SPSS 20. Odd ratio and p values were calculated.

RESULTS

Amongst the total of 200 patients enrolled, 58(29%) patients' age was in range of 16-40 years and 142(71%) patients' age was in range of 41-120 years. Mean age of our patients was 53 years with standard deviation ± 20.12. As far as gender is concerned, 110(55%) patients were males and 90(45%) patients were females. Approximately 83(41.5%) patients had microalbuminuria and 110(58.5%) patients had no microalbuminuria, Table-I. Only hypertension but no CVD was present in 145(72.5%) patients, while 55(27.5%) patients had hypertension and CVD, 47.47% of these, had microalbuminuria, Table-II.

DISCUSSION

At the time of presentation, our patients' mean age was 53 years with standard deviation ± 20.12. As far as gender distribution is concerned, the number of our male patients was 110(55%), while female patients were 90(45%). The mean age of the patients of Nabbaale J et al was 54.3±6.2 years, the females were accounting for (162, 63.3%) but males were only 36.7%.[18]

As far as age is concerned our patients were comparable to Nabbaale J's patients, but in our study males were predominant i.e. 55% compared to Nabbaale J's patient in whom females were

predominant ie 63.3 percent.

Variables	Frequency (%)
Age	
16-40 years	58 (29%)
41-80 years	142 (71%)
Gender	
Male	110 (55%)
Female	90 (45%)
CVA	
With CVD	55 (27.5%)
Without CVD	145 (72.5%)
Microalbuminuria	
Present	83 (41.5%)
Absent	117 (58.5%)

Table-I. Clinical and demographic status, of our patients.

Micro Albuminuria	Without CVD (%)	With CVD (%)	P-Vale	Odd Ratio
Present	54 (37.5)	29 (52.7)	0.047	0.532 (0.284-0.996)
Absent	91 (62.8)	26 (47.3)		

Table-II. Frequency of microalbuminuria in patient with vs. without CVD

The reason being may be because of different populations involved in both the studies. Only 37.5% of our Patients without CVD had microalbuminuria, while Bhole P et al[6] has reported microalbuminuria in 57.7% patients, one major cause of this difference, may be a population difference and another significant reason may be late presentation of patients of Bhole P et al.[7] Our findings correlate with study conducted by Maggon RR et al[17], who have reported microalbuminuria in 44% of patients with primary hypertension. On the other hand microalbuminuria was present in 47.3% out of 55 patients who presented with CVA,. This figure is quite high as compared to 29% patients presenting with stroke having Microalbuminuria (P<.001) reported.[19] The probable reason is a different population group involved as compared to our patients. Nancy B et al have reported that patients who presented with cerebrovascular disease and microalbuminuria, had higher risk of recurrent stroke; after adjusting for other risk factors (P<.06), so proved that microalbuminuria is an independent risk factor for development of stroke (P<.01).[19] Thus, we should screening of all patients with essential hypertension for microalbuminuria, for the evaluation of cardiovascular, cerebrovascular and renal complications.

CONCLUSION

Our study concludes that microalbuminuria was commoner in patients who presented with essential hypertension and cerebrovascular disease as compared to patients who presented with essential hypertension without cerebrovascular disease.

LIMITATIONS

As this case control study was carried out in only one tertiary care hospital, on a single population, so more studies are needed to be conducted at multicenter, multinational level before making final conclusion.

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