ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 11, Iss 12,Dec 2022

Research and Classification of Renal Impairment in Hypertensive Individuals

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ABSTRACT

Background: The harmful effects of hypertension mostly affect the blood vessels, the central nervous system, the retina, the heart, and the kidney, and are frequently detectable using straightforward clinical methods (4). The most significant modifiable risk factor for coronary heart disease, stroke, congestive heart failure, peripheral vascular disease, and end-stage renal illnesses is hypertension.

Aims and Objectives: To investigate and classify Renal dysfunction in hypertensive individuals

Materials & Methods: Patients with a diagnosis of Hypertension who visited the Medicine Department of Santosh Medical College and Hospital, Ghaziabad, between May 2014 and April 2015 were analysed according to inclusion and exclusion criteria (May 2014 to April 2015). At Santosh Medical College and Hospital in Ghaziabad, Uttar Pradesh, a Case-Control research on renal failure in essential hypertension was conducted with 100 patients as cases and 25 patients as controls.

Results: 36 patients (36.0%) had hypertension lasting less than or equal to 1 year, 44 patients (44.0%) had hypertension lasting between 1-5 years, 3 patients (3.0%) had hypertension lasting between 6-1 years, and 17 patients (17.0%) had hypertension lasting between 11-22 years.

Conclusion: the frequency of renal impairment differs amongst populations dependent on population characteristics and examination procedures and protocols. Microalbuminuria implies an enhanced renal endothelial permeability and is therefore seen as an early indicator of widespread endothelial dysfunction. Hypercholesterolemia, hypertriglyceridemia, and elevated LDL are all characteristics of essential hypertension.

Keywords: Hypertension , arteriosclerosis , renal arteries, adenosine, guanosine, purine nucleosides

1. INTRODUCTION

Systolic pressure greater than 140 mmHg and diastolic pressure greater than 90 mmHg describe hypertension in adults (1). Due to the high blood volume, hypertension caused by

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(secondary to) established disease processes, such as kidney disease and arteriosclerosis of the renal arteries, is properly referred to as secondary hypertension (2). Hypertension caused by complicated and poorly understood processes cannot reasonably be referred to as primary or essential (2). (3).

The harmful effects of hypertension mostly affect the blood vessels, the central nervous system, the retina, the heart, and the kidney, and are frequently detectable using straightforward clinical methods (4). The most significant modifiable risk factor for coronary heart disease, stroke, congestive heart failure, peripheral vascular disease, and end-stage renal disease (5) is hypertension (6).

Important clinical examinations of renal function include uric acid, urea, and creatinine for identifying renal failure, diagnosing renal illness, monitoring disease progression, and determining treatment response (7). Uric acid is the primary byproduct of the catabolism of adenosine and guanosine, which are purine nucleosides. Using an enzymatic technique, serum uric acid reference intervals have been reported as 3.5 – 7.2 mg/ dl (208-428 mol/l) for males and 2.6 – 6 mg/ dl (155-357 mol/l) for females (8). Urea is produced in the liver from ammonia liberated by amino acid deamination (9).

It has been shown that elevated blood uric acid is connected with an increased risk of coronary heart disease and is frequently observed in patients with essential hypertension, untreated hypertension, and type-2 diabetes, all of which are associated with coronary heart disease. It is unknown if an increase in serum uric acid raises the risk of hypertension and type-2 diabetes irrespective of recognised risk variables such age, obesity, alcohol intake, and physical activity. (10-12)

Microalbuminuria is defined by the National Kidney Foundation as a Urine Albumin Excretion Rate (UAER) of 30-300 mg/day in at least two of three consecutive samples of non-ketotic, sterile urine.[13] The relationship between microalbuminuria and hypertension has been known for a very long time. [14-16] Parving et al. noted the relationship between microalbuminuria and hypertension severity in 1976.

In India, 5–15% of the adult population has hypertension, compared to 10–12% in the West. 5 to 15% of patients with essential hypertension exhibit clinical proteinuria and a severe decline in renal function. [17-19] The introduction of more sensitive technologies to quantify urine albumin excretion (UAE) has showed a higher prevalence (25-100%) of microalbuminuria in hypertensive patients compared to normotensive individuals.

Hypertension prevalence in India (16) 3.80 to 15.63 percent for men and 2 to 15.38 percent for women in urban areas; 1.57 to 6.93 percent for men and 2.38 to 8.8 percent for women in rural areas (16). According to the sex incidence, both sexes are equally affected; however, few sources indicate that males are afflicted more before the age of 50, while females are affected more after the age of 50.

2. MATERIALS AND METHODS

Patients with a diagnosis of Hypertension who visited the Medicine Department of Santosh Medical College and Hospital, Ghaziabad, between May 2014 and April 2015 were analysed according to inclusion and exclusion criteria (May 2014 to April 2015). At Santosh Medical College and Hospital in Ghaziabad, Uttar Pradesh, a Case-Control research on renal failure in essential hypertension was conducted with 100 patients as cases and 25 patients as controls.

All parameters were examined using SPSS programme. Utilizing the ANOVA test, all parameters were compared. Cases and controls were compared using the chi-square test and

ISSN PRINT 2319 1775 Online 2320 7876

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the t test on independent samples, and the p value was obtained. All data are shown as mean Standard Mean Error (SEM).

3. RESULTS

Table 1 : No. of male patients were 71 and female patients 29 in case group

S.No.	Variable	CONTROL		CASE		P- Value
		MEAN	SD	MEAN	SD	
1	Age	40.36	9.56	56.31	10.47	< 0.001
2	Systolic BP	120.48	7.17	148.66	7.54	< 0.001
3	Diastolic BP	79.2	3.10	94.26	2.66	< 0.001
4	TC	178.23	21.23	248.41	64.05	< 0.001
5	TG	127.56	14.44	175.2	54.11	< 0.001
6	HDL	45.28	6.05	32.66	1.154	< 0.001
7	LDL	112.04	13.89	122.14	19.32	0.015
8	Uric acid	6.144	2.53	7.28	2.66	0.056
9	Serum creatinine	0.968	0.213	1.43	0.58	0.0002
10	Blood urea	29.92	5.41	65.37	15.36	< 0.001
11	Serum K^+	4.292	0.439	4.26	0.621	0.809
12	Serum Na^+	141.08	3.76	139.75	4.75	0.196
13	Microalbuminuria	21.44	5.47	33.18	25.99	0.027
14	Creatinine clearance	83.59	25.98	71.63	36.64	<0.001

Table 2: Age distribution of patients

AGE (in Years)	CONTROL		CASE	
	No.	PERCENT	No.	PERCENT
30-40	16	64.0%	10	10.0%
41-50	5	20.0%	26	26.0%
51-60	2	8.0%	40	40.0%
61-70	2	8.0%	24	24.0%
Total	**25**	**100.0%**	**100**	**100.0%**
Mean ± SD	**40.36 ±9.56**		**56.31 ±10.47**	

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The table 2 shows 40.0% cases in the 5th decade of life where as 26.0% of cases in their 4th decade of life and maximum number of controls are present in their 3rd decade of life (64.0%).

Table 3: Duration of hypertension

DURATION OF HYPERTENSION (in yrs)	CONTROL		CASE	
	No.	PERCENT	No.	PERCENT
Nil	25	100.0%	0	0.0%
≤ 1	0	0.0%	36	36.0%
2-5	0	0.0%	44	44.0%
6-10	0	0.0%	3	3.0%
11-22	0	0.0%	17	17.0%
TOTAL	**25**	**100.0%**	**100**	**100.0%**

The table 3 shows that in cases 36 (36.0%) patients had hypertension below or equal to 1 year, 44 (44.0%) had hypertension in between 1-5 years, 3 (3.0%) patients between 6-1 years and 17 (17.0%) patients had hypertension between 11-22 years.

4. DISCUSSION

Globally, hypertension is a major public health concern. 5-15% of Indians suffer from hypertension, compared to 10-12% in the West. Hypertension is a degenerative disease that affects the blood flow to target organs such as the heart, kidney, and liver. These injuries are referred to be Target organ injury.

This study investigates the prevalence of renal failure in essential hypertension, as well as the relationship between renal dysfunction and the clinical profile and complications of essential hypertension. In our study, the incidence of hyperuricemia was 16% in the control group and 30% in the case group.

There is an association between elevated SUA levels and an increased risk of cardiovascular disease. Enhanced platelet aggregation and inflammatory stimulation of the endothelium are putative ways by which SUA may directly increase cardiovascular risk. In a few investigations, such as the Framingham Heart Study (1985) [18] and the ARIC study (1996), the link between SUA and cardiovascular disease remained equivocal after multivariate correction, whereas in others, the association remained certain and substantial.

A study by Sharma V K et al revealed a prevalence of 24%. (12 out of 50 patients). Sabharwal R.K. et al. demonstrated a prevalence of 33.3%. (58 out of 174 cases). In 1991, Stefano Bianchi et al. conducted the first large investigation on the prevalence of microalbuminuria in hypertensives; they discovered that 35 percent of hypertensives had the

ISSN PRINT 2319 1775 Online 2320 7876

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condition. [14] Palatini et al. found a prevalence of 8-15% in the HARVEST study and PREVEND-IT (Prevention of Renal and Vascular End Stage Disease- research conducted in the Dutch city of Groningen).

5. CONCLUSION

Globally, hypertension is a major public health concern. It is one of the most prevalent cardiovascular and renal risk factors. Therefore, a comprehensive evaluation is required to appropriately identify patients who are at risk. The prevalence of renal impairment differs between populations based on demographic characteristics and evaluation tools and protocols. Microalbuminuria implies an enhanced renal endothelial permeability and is therefore seen as an early indicator of widespread endothelial dysfunction. Hypercholesterolemia, hypertriglyceridemia, and elevated LDL are all characteristics of essential hypertension.

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ISSN PRINT 2319 1775 Online 2320 7876

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