

Study the Correlation of Renal Dysfunction with Clinical Profile and Complications of Essential Hypertension

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ABSTRACT

Background: 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 (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.

Aims & Objectives: To study the correlation of Renal dysfunction with clinical profile and complications of essential hypertension

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

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

Conclusion: The frequency of renal impairment varies between groups based on demographic factors and evaluation instruments and processes. Hypercholesterolemia, hypertriglyceridemia, and elevated LDL are all characteristics of essential hypertension. The prevalence of hyperuricemia increases with patient age, hypertension duration, and severity. In order to promote better categorization of absolute cardiovascular and renal risk factors, hypertensive subjects should have a more thorough evaluation of their renal function, especially in patients with hypertension that has been present for more than five years.

Keywords: diastolic pressure, plasma concentration, creatinine, Glomerular, filtration, gastrointestinal

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 (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).

Over 75% of non- protein nitrogen is excreted as urea mainly by the kidneys, small amounts are lost through the skin and gastrointestinal (GI) tract (10). Urea measurements are widely available, and have come to be accepted as giving a measure of renal function (8),(10). The reference intervals using an enzymatic method is 15 – 40 mg/ dl (2.5 – 6.6 mmol/l) (4),(8).

Measurements of the plasma concentration of creatinine are often used clinically as an index of kidney function. Creatinine produced as a waste product of muscle creatine, about 1-2 % of the total muscle creatine pool is converted daily to creatinine through the spontaneous, nonenzymatic loss of water (2),(10) . Since it is released into the blood at a constant rate, and since 2 its excretion is closely matched to the Glomerular filtration rate (GFR), an abnormal decrease in GFR causes increase the plasma creatinine concentration (2),(11) .

Thus, a simple measurement of blood creatinine concentration can indicate whether the GFR is normal and provide information about the health of the kidneys (2).The reference intervals for serum creatinine, measured by Jaffe method are 0.9 – 1.3 mg/dl (80-115 μ mol/l) in men and 0.6 – 1.1 mg/dl (53 – 97 μ mol/l) in women(8).

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Thus, a simple measurement of blood creatinine concentration can indicate whether the GFR is normal and provide information about the health of the kidneys (2).The reference intervals for serum creatinine, measured by Jaffe method are 0.9 – 1.3 mg/dl (80-115 μ mol/l) in men and 0.6 – 1.1 mg/dl (53 – 97 μ mol/l) in women(8). The incidence of hypertension in India is 5 –15% in the adult population against 10–12% in the West. Essential hypertension produces clinical proteinuria and a significant reduction in renal function in 5 -15% of patients. The advent of more sensitive methods to quantitate the urinary albumin excretion (UAE) has revealed higher frequency (25-100%) of microalbuminuria in patients with hypertension than normotensive population.[9-11]

A number of cardiovascular, pulmonary and neurological symptoms are found to be associated with hypertensive patients having target organ involvement. Focal neurological deficits, dyspnoea, chest pain, headache, loss of vision, are considered as the commonest symptoms with which patients having hypertension related acute target organ damage present(7). The physician should perform an extensive evaluation in a patient who presents with any of these symptoms and with an elevated blood pressure to exclude target organ damage.

2. METHODS AND MATERIALS

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

Hypertension was diagnosed on the basis of the BP recorded in both the arms with mercury Sphygmomanometer. For out patients, three recordings one week apart were used. BP was taken with the patient sitting relaxed, back supported, for five minutes and arm supported at the level of heart. All the recordings greater than 140/90mmHg were regarded as Hypertension, which was confirmed at other occasions as mentioned above. A detailed case record was prepared for each patient on the basis of specially designed proforma. The important factors considered in history were: the duration of hypertension and treatment; history of smoking; symptoms pertaining to cardiovascular and nervous system which could possibly suggest a target organ damage.

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 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

VARIABLES	FEMALE (N= 29)		MALE (N= 71)		p- Value
	MEAN	SD	MEAN	SD	
Age	55.00	10.25	53.93	8.91	0.603
BMI	29.40	2.10	29.38	1.61	0.959
systolic BP	152.83	10.14	152.85	10.04	0.993
Diastolic BP	97.86	5.40	96.51	5.21	0.248
TC	217.41	54.69	216.52	55.35	0.942
TG	160.97	49.16	164.54	42.36	0.716

HDL	39.66	5.02	38.08	5.74	0.199
LDL	117.16	22.67	120.09	25.59	0.593
Uric Acid	7.84	3.00	7.05	2.51	0.181
Serum creatinine	1.16	0.40	1.08	0.44	0.399
Blood Urea	39.86	15.00	40.82	19.52	0.813
Seum K ⁺	4.22	0.52	4.28	0.66	0.663
Serum Na ⁺	139.47	5.95	139.87	4.21	0.705
Micro albuminuria	34.31	27.10	32.72	25.71	0.783

Table 2 : Gender Distribution of patients

SEX	CONTROL		CASE	
	No.	PERCENT	No.	PERCENT
MALE	16	64.0%	71	71.0%
FEMALE	9	36.0%	29	29.0%
TOTAL	25	100.0%	100	100.0%

4. DISCUSSION

Kinsey in his study with 400 hypertensive patients reported a 46% incidence of hyperuricemia in hypertensives. Kolbe in his study of 46 hypertensive patients found 26 to be having increased SUA levels (56%). [11]

Breckenridge showed 274 of 470 patients on antihypertensive treatment (58%) had raised SUA levels and 90 of the 333 patients (27%) attending the clinic for the time had hyperuricemia.[15-18] It certainly is possible that uric acid may be an earlier and more sensitive maker of decreased renal blood flow than serum creatinine. It has been recently suggested that since uric acid may play a role in the formation of free radicals and oxidative stress, the increased risk of hypertension in subjects with raised serum uric acid levels might be associated with this increased generation of free radicals. In our study the prevalence of microalbuminuria was 21% (21 out of 100 patients). In 2008, Hitha B et al studied 150 cases of essential hypertension of which 40 (26.6%) had microalbuminuria.

Hypertension is a major public health problem all over the world. The incidence of hypertension in India is 5-15% as compared to 10-12% in the West. Hypertension is a degenerative process, taking place in blood vessels affecting blood supply to target organ like heart, kidney and liver. Damage of these organs are called Target organ damage. The present study is regarding the prevalence of renal dysfunction in essential hypertension and correlation of renal dysfunction with clinical profile and complication of essential hypertension.[19-21]

There is a significantly lower proportion of people among the treated group had microalbuminuria. This observation may be due to the bias in classification of Hypertensive

patients to treated & untreated groups based on the treatment history; though many patients are on drug therapy, adequate control was not achieved in many.[22] In this study, serum TC, TG, and LDL concentrations are significantly higher in hypertensive patients than in normotensive subjects, total cholesterol found increase in 24 (24%) patients above the normal value and LDL in 26 (26%) patients above the normal value. Dyslipidemia is more common in untreated hypertensives than normotensives, and lipid levels increase as BP increases. Though no specific pattern of dyslipidemia has been consistently reported among hypertensive individuals, many studies have shown that total 102 cholesterol (TC), triglycerides (TG), and virtually all fractions of lipoproteins tend to be more frequently abnormal among hypertensive patients than in the general population. Hypertension is known to be associated with alterations in lipid metabolism which gives rise to abnormalities in serum lipid and lipoprotein levels. It has also been documented that presence of hyperlipidaemia substantially worsens the prognosis in hypertensive patients.

Hausmann et al. in their intravascular ultrasound studies demonstrated that patients with low HDL cholesterol and high TG levels have more extensive coronary atheromas than those with an isolated elevation of LDL cholesterol. Halperin et al. had also shown that dyslipidemia in apparently healthy individuals leads to hypertension.[23-25] Lepira et al. and Kesteloot et al. who reported that the TC, TG, and LDL-C of newly diagnosed hypertensive patients did not differ significantly from that of control subjects, though the newly diagnosed hypertensive tended to have a higher level of LDL, TG and TC. Therefore the study has shown a significant relation between essential hypertension and renal function test.

5. CONCLUSION

The prevalence of renal impairment differs between populations based on demographic characteristics and evaluation tools and protocols. Hypercholesterolemia, hypertriglycemia, increased LDL all are seen in essential hypertension. Prevalence of Hyperuricemia increases with age of the patients and the duration and severity of hypertension. More extensive screening for renal function should be performed in hypertensive subjects to facilitate better stratification of absolute cardiovascular and renal risk factor, especially in patients with hypertension of more than five years duration. In Patients with moderate to severe hypertension, renal function test is a valuable tool to identify a subgroup of patients with increased renal complications as compared to the patients with mild hypertension.

6. REFERENCES

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