Section: Physiology

Original Research Article

A PROSPECTIVE STUDY ON PREVALENCE OF HYPERTENSION AND ITS IMPACT ON GLOMERULAR FILTRATION RATE (GFR) IN A TERTIARY CARE HOSPITAL

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Abstract

Background: Finding the prevalence of prehypertension and hypertension in a patient group and its fluctuation in incidence across different age groups is the specific purpose of the current investigation. Its relationship to GFR is sought after. According to certain research, the total prevalence of hypertension in India is 29.8%. **Objectives**: To find the prevalence of hypertension and prehypertension in patients of Tertiary care hospital and its effect on GFR. **Materials and Methods:** It was a prospective study done for a period of 1 year. After taking institutional ethical committee clearance a medical camp was organized in Tertiary care hospital premises. 520 people in total were examined. Age, gender, kidney disease history, diabetes mellitus, and hypertension data were gathered using a Proforma. SPSS was used for analysis. **Results:** The distribution of study subjects shows an increase in the incidence of hypertension as age advances. The overall prevalence of hypertension is found to be 13.9%. The overall prevalence of prehypertension is found to be 26.8%. There is a significant decrease in mean e-GFR in prehypertension and hypertension. ($p<0.05$). **Conclusion:** Kidney function is affected by an increase in blood pressure. The prevalence of hypertension is 13.9%, whereas the prevalence of prehypertension is 26.8%. A group of hypertensives and prehypertensives is observed to have a lower e-GFR.

INTRODUCTION

One of the common problems in clinical practice is systemic hypertension. Numerous investigations are carried out across India to determine the prevalence of prehypertension and hypertension. Additionally, it has been discovered that high blood pressure affects glomerular filtration rate. GFR provides an approximation of how well the kidneys are functioning.[1,2] Finding the prevalence of prehypertension and hypertension in a patient group and its fluctuation in incidence across different age groups is the specific purpose of the current investigation. Its relationship to GFR is sought after. According to certain research, the total prevalence of hypertension in India is 29.8% while the prevalence of prehypertension is 28.8%.[3,4] The prevalence varies in different places. Blood pressure variation is also associated with changes in renal function. In this scenario such a study was done in patients admitted in a tertiary care hospital.

MATERIALS AND METHODS

It was a prospective study done for a period of 1 year. After taking institutional ethical committee clearance a medical camp was organized in Tertiary care hospital premises. 520 people in total were examined. Age, gender, kidney disease history, diabetes mellitus, and hypertension data were gathered using a Proforma. The patient was asked to stand upright with their heels, buttocks, and occiput contacting the wall as the height was measured with a measuring tape. Subjects were instructed to stand up straight without wearing any shoes as weight was measured using a portable weighing machine. Subjects were made to sit comfortably in a chair with a back support and an arm resting at heart level in order to take their blood pressure. A cuff of the proper size was used. The average of three readings was taken five minutes apart. Prehypertensives were those with systolic blood pressure between 120 and 139 mmHg and diastolic blood pressure between 80 and 89 mmHg. Hypertensives were those with systolic blood pressure greater than 140 mmHg and diastolic blood pressure greater than 90 mmHg.

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Adults with normal blood pressure (systolic 120 and diastolic 80 mm Hg), prehypertension (systolic 120–139 or diastolic 80–89 mm Hg), stage 1 hypertension (systolic 140–159 mm Hg or diastolic 90–99 mm Hg), and stage 2 hypertension are classified according to these values in the Joint National Committee on Prevention, Detection, Evaluation.Informed consent was taken 5 ml of blood was drawn under aseptic precaution and was sent to biochemical laboratory. Serum creatinine was assessed using Jaffe's method and calculated by using formula used in few studies.[6,7,8]

Statistical Analysis

Data so obtained were subjected to statistical analysis. Data analysis was done by SPSS software ® version 22.0. Descriptive statistical analysis, which included frequency and percentages, was used to characterize the data. Chi-square test was used for association between factors and p <0.05 was considered statistically significant.

RESULTS

Table 1: Age wise Prevalence of Hypertension

Age Group	Normal Blood Pressure		Hypertensive	
	Number	%	Number	%
<30	25	95.2	0	0
31-40	54	73.8	4	5
41-50	72	59.1	18	14.2
51-60	70	54.5	15	12.2
61-70	46	45.6	25	24.3
>70	42	61.5	11	15.4
TOTAL	309	59.3	72	13.9

As per table 1 there is a wide variation in the distribution of study subjects. It shows an increase in the incidence of hypertension as age advances. The overall prevalence of hypertension is found to be 13.9%.

Table 2: Age wise Prevalence of Pre-Hypertension

Age Group	Prehypertensive	
	Number	%
<30	1	4.8
31-40	17	21.2
41-50	34	26.8
51-60	41	33.3
61-70	31	30.1
>70	15	23.1
TOTAL	139	26.8

Table 2 shows the prevalence of prehypertension of the subjects who attended the camp. It shows an increase with advancing age decades. The overall prevalence of prehypertension is found to be 26.8%.

Table 3: Blood Pressure Effect on Glomerular Filtration Rate (GFR)

Variables	No. of Subjects	Mean GFR (MDRD) ml/min	Standard Deviation
Normal	309	63.49	18.7
Prehypertensive+ Hypertensive	211	57.36	16.32*

As per table 3 there is a significant decrease in mean e-GFR in prehypertension and hypertension. (p<0.05).

DISCUSSION

The emergence of kidney disease, cardiovascular disease, and stroke are all linked to systemic hypertension. Numerous research have been carried out all over the nation to determine the prevalence of hypertension and prehypertension in various regions. According to a study by Anchela1, the prevalence of hypertension was found to be 14.5% in rural northern India, 31.7% in eastern India, 18.1% in western India, and 21.1% in southern India.[2,3,4] In India, hypertension was reported to be prevalent in a country-wide rate of 29.8%. In a study on the prevalence of hypertension in patients from rural areas, V.R. Kutty discovered that it was 18%. 20% of people in Chennai were found to have systemic hypertension. In our study, 13.9% of participants had hypertension. Prevalence of hypertension increases as age increases According to the NHANES study, people aged 40 to 59 had a 6-fold greater prevalence of hypertension than those aged 18 to 39, while people aged 60 and beyond have a 27-fold higher prevalence.[9,10] In our study, the prevalence of both hypertension and prehypertension also rises with advancing years. Clearly, the risk of problems is reduced by early detection and effective treatment of hypertension. Therefore, it is crucial to carefully assess and categorize hypertensive patients in order to provide them with a specific course of treatment. It is

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important to pay close attention to the presence of risk factors and to the fundamental cause of secondary hypertension, especially if it is treatable. A complete dietary history and drug history should be obtained.[11]

Renal vasculature is exquisitely sensitive to damage induced by elevated arterial pressure. It produces benign arterial nephrosclerosis. In early phase of hypertension GFR is normal, but abnormalities occur in renal blood flow.[8,10,11] GFR estimation provides a rough estimate of the number of functional nephrons. When acute kidney illness first manifests, RIFLE criteria aid in determining renal function.[12] According to studies, the combined effect of risk alleles from six genes involved in blood pressure control results in a 3 ml/min/1.73 m2 drop in GFR and a 4 ml/min/1.73 m2 rise in GFR.[13] e-GFR is a reliable indicator of the start of hypertension in the general population and independently predicts hypertension. While acute tubular necrosis is caused by salt and water retention, acute renal insufficiency is caused by vascular and glomerular disease.[14]

CONCLUSION

Kidney function is affected by an increase in blood pressure. The prevalence of hypertension is 13.9%, whereas the prevalence of prehypertension is 26.8%. A group of hypertensives and prehypertensives is observed to have a lower e-GFR. Normal participants' mean e-GFR was found to be 63.69 ml/min, whereas hypertensives and prehypertensives' mean e-GFR was found to be 57.56 ml/min.

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