OBESITY, HYPERLIPIDEMIA, AND HYPERURAECEMIA IN YOUNG AND OLD HYPERTENSIVE PATIENTS

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Background: There is strong correlation among hypertension, obesity, hyperlipidemia and hyperuricemia which are important risk factor for the cardiovascular disease. Objective of this study was to assess and compare the prevalence of obesity, hyperlipidemia and hyperuricemia among young and old hypertensive patients in the local setting. **Methods:** This cross-sectional study was conducted at medical Out-patient Department at Shahina Jamil Teaching Hospital, Abbottabad, from September 2007 to February 2008. Eighty-six patients seen in the medical outpatient department were enrolled in the study. Patients with age 15 years or above and diagnosed as case of systemic hypertension were included. Patients with endocrine disease, pregnancy, coarctation of aorta, and renal disease leading to hypertension were excluded from the study. **Results:** Total eighty-six patients with mean age of 53.7±12.9 years were included in the study. Patients were divided into younger age group (age <46 years) and older age group (age ≥46 years). Mean Body Mass Index (BMI) was 29.7±5.2 in the younger age group and 26.9±4.7 in the older age group, mean serum cholesterol level was 192.2±14.2 mg/dL in younger age group and 190.9±18.3 mg/dL in the older age group, mean serum triglyceride level was 170.5±13.7 mg/dL in younger age group and 166.6±21.4 mg/dL in the older age group and mean serum uric acid levels were 5.6±0.7 mg/dL in younger age group and 5.7±1.2 mg/dL in the older age group. Overweight and obese patients were 70.9% with its higher prevalence in younger (86.2%) as compared to older patients (63.2%). Hypercholesterolemia was found in 27.9% of the patients, with a frequency of 24.1% in younger patients and 29.8% in the older patients. Hypertriglyceridemia was seen in 66.3% of the patients, with a frequency of 69.0% in younger patients and 64.9% in the older patients. Hyperuricemia was present in 37.2% of the hypertensive patients with a frequency of 34.5% in the younger patients and 38.6% in the older patients. **Conclusion:** Hypercholesterolemia, hypertriglyceridemia, and hyperuricemia are not associated with the age of the hypertensive patients. Increased BMI is more frequent in the young as compared to the old hypertensive patients.

Keywords: hypertension, obesity, hypercholesterolemia, hypertriglyceridemia, hyperuricemia

INTRODUCTION

The association between hypertension, obesity and hyperlipidemia is well established. Undoubtedly one of the most important risk factors for hypertension is obesity[1] and all overweight and obese persons are at risk for hypertension, high blood cholesterol, type 2 diabetes, and coronary heart disaes[2]. There is a linear relationship between adiposity and blood pressure[3] but the strength of this association varies among different racial and ethnic groups.[4–7] It has been shown that the increase in blood pressure is closely related to the magnitude of weight gain[8], and even moderate weight gain is associated with an increased risk of developing hypertension[9].

National Health and Nutrition Examination Survey (NHANES) III data has described association between overweight and obesity and the prevalence of high blood pressure and high blood cholesterol levels.[10] Dyslipidemia is strongly associated with hypertension and plays a crucial rule in the development of cardiovascular disease, which has become the leading cause of death in most developed countries as well as in developing countries.[11] It has also been investigated that blood pressure and serum cholesterol both have an effect on cardiovascular disease in Asia-Pacific region.[12] In Pakistan overall prevalence of overweight and obesity is 25% and is independently associated with hypertension, diabetes and increased serum cholesterol.[13]

In this study, the prevalence of increased BMI, hyperlipidemia, and hyperuricemia has been assessed and compared among young and old patients with hypertension.

PATIENTS AND METHODS

This study was conducted at the medical outpatients department of Shahina Jamil Teaching Hospital, Abbottabad, from September 2007 to February 2008.

Patients, who were ≥15 years of age, diagnosed as case of systemic hypertension, were included in the study. Patients with endocrine disease, pregnancy, coarctation of aorta, and renal disease were excluded. Consent was taken from the patients to record the data that include age, sex, systolic blood pressure, diastolic blood pressure, pulse rate, height and weight of patients, BMI, serum cholesterol, serum triglyceride and serum uric acid. All the data was

recorded on pre-designed proforma. Blood pressure was taken as an average of 2 readings taken after the participants were seated quietly with their backs supported without crossing their legs and with arms supported at heart level for 5 minutes. Blood pressure was measured by a doctor using a standard and regularly tested aneroid sphygmomanometer. The weight and height of all the included patients were measured by using health scale ZT-120. The patients were weighed with minimum clothes on the body and without shoes. Body mass index was calculated by using the Quetelet formula: weight (kg)/height (m^2). Patients were considered of normal weight if BMI was 18.5–24.9 and overweight/obese if BMI was ≥25. All patients were investigated for fasting serum cholesterol, serum triglyceride and serum uric acid levels. These investigations were done on chemistry analyzer MATROLAB 1600. High serum cholesterol was defined as total serum cholesterol level >200 mg/dL[14], high serum triglyceride was defined as serum triglyceride level >155 mg/dL[15], and high serum uric acid was defined as serum uric acid level >5.8 mg/dL in female and >7.4 mg/dL in males. Patients were divided into two groups, young age group (<46 years) and old age group (≥46 years).

It was analytical (cross-sectional) study. The data was stored and analyzed by using SPSS version 14. Independent-samples *t*-test was used to compare the means of variables between two groups of hypertensive patients. Chi-square test was used to see the association of BMI, hyperlipidemia and hyperuricemia with age of the patients and differences were regarded significant when *p*-value was ≤0.05.

RESULTS

Eighty-six hypertensive patients were assessed for systolic and diastolic blood pressure, pulse rate, BMI, serum cholesterol, serum triglyceride and serum uric acid.

Table-1 shows means with standard deviation of different variables of the patients. Mean age of the patients was 53.7±12.9 years. Mean systolic and diastolic blood pressure was 162.7±27.7 mm Hg and 99.8±13.4 mm Hg respectively, mean pulse rate was 87.5±12.2 per minutes, mean height and weight of the patients was 1.5±0.0 cm and 71.8±13.1 kg respectively, mean BMI was 27.9±5.0, mean serum cholesterol, serum triglyceride and serum uric acid levels were 191.4±16.9 mg/dL, 167.9±19.2 mg/dL, and 5.6±1.0 mg/dL respectively.

Table-2 shows comparison of means of variables among two groups. Mean BMI of the young hypertensive patients was 29.7±5.2 while the older patients had BMI of 26.9±4.7 with a *p*-value of 0.01 which was statistically significant. Mean total serum cholesterol in young hypertensive patients was 192.2±14.2 mg/dL and 190.9±18.3 mg/dL in older patients with no statistically significant difference (*p*=0.74). Mean triglyceride in younger patients was 170.5±13.7 mg/dL and in older patients was 166.6±21.4 mg/dL with no statistically significant difference (*p*=0.37). Mean uric acid in young patients was 5.6±0.7 mg/dL and in older patients was 5.7±1.2 mg/dL with no statistically significant difference (*p*=0.79).

Table-3 shows association of variables with age among hypertensive patients. Among eighty six hypertensive patients, 70.9% (61/86) were over weight and obese. In patients with young age, 86.2% (25/29) were overweight and obese while in patients with old age, 63.2% (36/57) were overweight and obese. This difference was statistically significant (*p*=0.02). Overall 27.9% (24/86) were having high serum cholesterol level, with 24.1% (7/29) in patients with young age and 29.8% (17/57) in patients with old age with no statistical significant (*p*=0.57). High serum triglyceride level was found in 66.3% (57/86) of patients, with 69.0% (20/29) in patients with young age and 64.9% (37/57) in patients with old age. This difference was also not statistically significant (*p*=0.70). Similarly, high serum uric acid level was present in 37.2% (32/86) of the hypertensive patients with 34.5% (10/29) in patients with young age and 38.6% (22/57) in patients with old age and this difference was also not significant as *p*-value was 0.70.

Table-1: Variables of hypertensive patients (n=86)

Variables	Mean±SD
Age	53.7±12.9
Systolic BP	162.7±27.7
Diastolic BP	99.8±13.4
Pulse rate	87.5±12.2
Weight	71.8±13.1
Height	1.5±0.0
BMI	27.9±5.0
Total cholesterol	191.4±16.9
Triglyceride	167.9±19.2
Uric acid	5.6±1.0

Table-2: Comparison of means of variables among two groups

	Age (years)	n	Mean±SD	*p*-value
BMI	<46	29	29.7±5.2	0.01
	≥46	57	26.9±4.7	
Total cholesterol	<46	29	192.2±14.2	0.74*
	≥46	57	190.9±18.3	
Triglyceride	<46	29	170.5±13.7	0.37*
	≥46	57	166.6±21.4	
Uric acid	<46	29	5.6±0.7	0.79*
	≥46	57	5.7±1.2	

*Non-significant

Table-3: Comparison of frequency of variables among hypertensive patients

Variables	Age		Total (n=86)	*p*-value
	Young hypertensive (n=29)	Older hypertensive (n=57)		
Overweight and obesity	25 (86.2%)	36 (63.2%)	61 (70.9%)	0.02*
Hypercholesterolemia	7 (24.1%)	17 (29.8%)	24 (27.9%)	0.57
Hypertriglyceridemia	20 (69.0%)	37 (64.9%)	57 (66.3%)	0.70
Hyperuraecemia	10 (34.5%)	22 (38.6%)	32 (37.2%)	0.70

*Significant

DISCUSSION

Hypertension is an important risk factor for cardiovascular disease and it becomes even more important when associated with other risk factors like obesity and hyperlipidemia. These factors are assessed among hypertensive patients in this study. The mean age of the included hypertensive patients was 53.7±12.9 years. Mean BMI of the hypertensive patients in our study was 27.9±5.0 while the study done by Ezeanyika LUS and his colleagues showed that BMI of the hypertensive patients in their study was 24.75±3.94.[16] Mean serum cholesterol and triglyceride levels were 191.4±16.9 mg/dl and 167.9±19.2 mg/dl. Burchfiel and his colleagues found mean serum cholesterol 189±3.3 mg/dL, and mean serum triglyceride 147±8.9 mg/dL.[17]

It was found that the overweight/obesity was more associated with younger age of hypertensive patients as compared to older age. There were 70.9% overweight/obese hypertensive patients, which is much higher as compared to found in study done by Baloch AA and his colleagues. They studied association of hypertension and obesity in low socioeconomic population of Karachi and found that 46% of the hypertensive patients were overweight and obese.[18] We found that increased BMI was associated with the age of the hypertensive patient and 86.2% of the patients with increased BMI were under age of 46 years, this is supported by the study done by Brown and his colleagues who found increased prevalence of high blood pressure in young obese patients.[19]

High level of serum cholesterol was present in 27.9% of hypertensive which was much lower than found by Shaikh MA his colleagues; because they defined high serum cholesterol in their hypertensive patients if the serum cholesterol level was >180 mg/dL and found 46% of the patients were having high serum cholesterol level.[20] Hypertriglyceridemia was found in 66.3% of the patients. That is much higher than that found by Sattar RA and his colleagues; they found hypertriglyceridemia in 22% of the patients.[21] This difference was because of different defined level of hypertriglyceridemia, as they defined hypertriglyceridemia in their patients if the serum triglyceride levels was >250 mg/dL but in our study it was defined if serum triglyceride level was >155 mg/dL. Hyperuricemia was found in 37.4% of hypertensive patients which is correlated with study done by Rehman A and his colleague. They found hyperuricemia in 40.3% of hypertensive patients.[22] Although, we found differences in the percentage of hypercholesterolemia, hypertriglyceridemia and hyperuricemia among the young and old hypertensive patients but these were not statistically significant (*p*-value >0.05).

CONCLUSION

It is concluded from this study that there is no association between hypercholesterolemia, hypertriglyceridemia, and hyperuricemia with the age of the hypertensive patients except the increased BMI. Young hypertensive patients have increased frequency of overweight and obesity as compared to older hypertensive patients. It is important to investigate BMI, hyperlipidemia and hyperuricemia in hypertensive patients and these should be appropriately treated to prevent further complications.

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