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Short Communication

Relationship between Parathyroid Hormone and High Blood Pressure among Local Population of Pakistan

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ABSTRACT

Introduction: Depression affects 350 million people around the world with a lifetime risk of 7%. Depression is likely to cause a 5.7% increase in the global burden of disease by 2020 and is to become the leading cause of disability worldwide by the year 2030.

Objective of the study: The main objective of the study is to analyse the relationship between parathyroid hormone and high blood pressure among local population of Pakistan.

Methodology of the study: This cross sectional study was conducted at Allama Iqbal Medical College, Lahore during June 2019 to June 2020 with the permission of ethical committee of hospital. The data was collected from 200 hypertensive patients who visited the OPD of the hospital regularly. All those patients who have the history of smoking were excluded from this study. 5 mL of fasting blood sample was taken and analysed for serum calcium, phosphorous, albumin, PTH, and haemoglobin. Serum calcium, phosphorous, and albumin were measured. BP was obtained using an automatic BP monitor. Three measures were taken at rest in a sitting position, with intervals of 5 min between the measurements. The average from the last two measurements was taken for analysis.

Results: The data were collected from 200 hypertensive patients. The mean age of the entire population was 45.7 ± 11.2 years. An overwhelming amount of the population was either unemployed (n=296, 72%), married (n=388, 94%), had a monthly income of less than PK Rs. 20,000, and were in the "low" category of the socioeconomic status (n=321, 78%). Amongst the educational status, most of the population had received primary or no education (n=277, 67%).

Conclusion: It is concluded that underlying causes of depression need to be addressed and community programs need to be initiated to raise awareness regarding long-term complications of untreated depression, especially in hypertensive patients.

Key words: Recurrent implantation failure, IL-1; IL-10, Interferon, Thin endometrium

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INTRODUCTION

Depression affects 350 million people around the world with a lifetime risk of 7%. Depression is likely to cause a 5.7% increase in the global burden of disease by 2020 and is to become the leading cause of disability worldwide by the year 2030. Similarly, hypertension is one of the leading causes of global mortality and disability (Everts ME, *et al.*, 1996). In 2010, it had been estimated that a 31.1% of the global population was hypertensive. Accountable for 9.4 million deaths annually, hypertension is responsible for a variety of diseases, such as cardiovascular diseases, renal failure, and stroke (Davis PI, *et al.*, 2009).

Numerous studies in humans and experimental models have shown that alterations in calcium homeostasis are associated with an increased risk of cardiovascular complication. In particular, changes in systemic calcium metabolism are thought to play an important role in the regulation of blood pressure (Fommei E and Lervasi G, 2002). Thyroid gland along with the parathyroid glands and heart share a close relationship arising in embryology. In ontogeny, the thyroid and heart migrate together (Streeten DH, *et al.*, 1988). There is a strong physiological relationship between the two organs, which is affirmed by predictable changes in cardiovascular functions across the entire range of thyroid disease states. Many symptoms and signs recognized in patients with overt hyperthyroidism and hypothyroidism are due to increased or reduced action of thyroid hormone on the heart and the vascular system, respectively (Nilsson IL, *et al.*, 2005).

Increases in parathyroid hormone (PTH) have been associated with changes in the vascular tone and renin angiotensin system. Hyper functioning parathyroid glandular disorders have been for long associated with an increased risk of hypertension, though a causal relationship is still not established (Bergus GR, *et al.*, 1999).

Objective of the study

The main objective of the study is to analyze the relationship between parathyroid hormone and high blood pressure among local population of Pakistan.

METHODOLOGY OF THE STUDY

This cross sectional study was conducted at Allama Iqbal Medical College, Lahore during June 2019 to June 2020 with the permission of ethical committee of hospital. The data was collected from 200 hypertensive patients who visited the OPD of the hospital regularly. All those patients who have the history of smoking were excluded from this study. 5 mL of fasting blood sample was taken and analysed for serum calcium, phosphorous, albumin, PTH, and haemoglobin. Serum calcium, phosphorous, and albumin were measured. BP was obtained using an automatic BP monitor. Three measures were taken at rest in a sitting position, with intervals of 5 min between the measurements. The average from the last two measurements was taken for analysis.

Statistical analyses

The data were collected and analysed using SPSS version 21.0. Comparisons between the two groups were done using the t test or the chi-square, where appropriate.

RESULTS

The data were collected from 200 hypertensive patients. The mean age of the entire population was 45.7 ± 11.2 years. An overwhelming amount of the population was either unemployed (n=296, 72%), married (n=388, 94%), had a monthly income of less than PK Rs. 20,000, and were in the "low" cat-

egory of the socioeconomic status (n=321, 78%). Amongst the educational status, most of the population had received primary or no education (n=277, 67%). High BP was present in 34% of the whole sample, and another 16% were taking medication for hypertension (Table 1).

Table 1: Analysis of relationship hypertension and parathyroid hormone

Variable	Total Score (p-value)	Depression Class (p-value)
Sex	0.009	0.026
Age	-	0.005
Marital status	0.355	0.438
Educational status	0	0
Employment status	0.003	0.047
Monthly income	-	0.003
Socioeconomic status	0.008	0.027
Average systolic blood pressure	0.148	0.175
Average diastolic blood pressure	0.006	0.009
Severity of hypertension	0.604	0.847
Dietary	0.119	0.233
Physical activity	0.025	0.016
Smoking	0.017	0.031
Years since smoking	-	0.168
Alcohol consumption	0.049	0.095
Prescription for medicine	0.902	0.858
Compliance with medicine	0.344	0.164
Number of medicine taken	0.566	0.455
Family history of hypertension	0.022	0.028
Family history of depression	0.002	0.002

DISCUSSION

A number of studies have investigated the effects of subclinical hyperthyroidism on the heart, showing that this condition may be associated with various abnormalities of cardiac structure and function. The cardiovascular disorders associated with subclinical hyperthyroidism may be a direct effect of thyroid hormone disturbance or may reflect an increased arterial pressure level in these patients (Allon M, *et al.*, 1990). There are no consistent studies proving that arterial BP rises in such patients. Recent meta-analyses of five large studies evaluating the incidence of hypertension in these patients did not reveal increased BP levels in individuals with suppressed serum TSH levels and free thyroid hormones within the reference range (Skowsky WR, Kikuchi TA, 1978).

The more consistent abnormalities found in patients with subclinical hyperthyroidism are increased heart rate, prevalence of supraventricular arrhythmias, endothelial dysfunction and increased LV mass. This enhancement of LV mass is often associated with rise in systolic function and impaired myocardial relaxation. The rise in LV mass is due to concentric remodeling and is related to the duration of subclinical hyperthyroidism rather than to levels of circulating thyroid hormones (Bergus GR, *et al.*, 1999). A greater percentage of hypertensives with depression (40.1%) were found in our study, as opposed to depression patients with hypertension (21.2%) by Grimsrud, *et al.* in South Africa suggestive of depression being more likely to develop as a comorbid of hypertension than vice versa (Franklin SS, *et al.*, 2001). The deductible reasons for this high prevalence of depression amongst hypertensive patients include the possible mental impact of being aware of having such a lifelong condition and vicious cycle of economic constraints in low socioeconomic settings, health care costs, the resultant stresses, and further disability (Gifford RW, Prisant LM, 2005).

CONCLUSION

It is concluded that underlying causes of depression need to be addressed and community programs need to be initiated to raise awareness regarding long-term complications of untreated depression, especially in hypertensive patients.

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