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The role of genetic factors in Hypertension among Iraqi citizens

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Abstract— *In this study, 140 patients were collected, and they were divided into two groups (120 patients and 30 control groups). The average age in this study ranged from 25 to 65 years. This paper aims to know the role of genetic factors in hypertension among Iraqi citizens and. This study was designed through cooperation with the hospital for the purpose of withdrawing the information found in the electronic record to patients, which includes primary information from demographic data (age - gender - body mass index - blood samples - smoking - alcohol - clinical history - genetic history and blood pressure. The data and demographic information related to the patients were analysed by relying on the statistical analysis program IBM soft SPSS 22. The results that were found were a collection of 140 patients (no positive result for 30 patients) (and 120 patients with a positive result), and the statistical value and the mean for the age of the patients was 45.2±15.3 as was done. Proportion of Family History with Hypertension patients and patient distribution (parents for 90 patients with 64.2% - siblings for 28 patients with 20% - offspring for 32 patients with 22.8%. Through the statistical analysis, a statistically significant relationship was found between genetic factors and their effect on arterial hypertension, with a p-value of 0.001.*

Keywords— ***Arterial, Hypertension, Patients, Genetic, Family History, BMI.***

I. INTRODUCTION

The determinants of primary arterial hypertension remain unknown despite important advances in understanding the pathophysiology of this disease. Several epidemiological studies have shown that about 30-40% of the interindividual variance in blood pressure between populations is genetically determined [1,2,3,4].

Because of this important contribution of genetics to blood pressure values, a genetic approach appears as the most appropriate to identify (primary causative factors of essential hypertension) [5,6,7].

Studies in families have revealed that the genetic component is very important in the development of hypertension [8,9,10].

Several publications have shown that genes play a major role in its development. The hereditary trait reaches more than 50%. Other studies supporting this data are those in compatible (monozygotic) and incompatible (dizygotic) twins, with which it has also been shown that the genetic component is closely associated with hypertension [11,12].

Until 2009, reports on polymorphisms in candidate genes analysed in HT were few. However, in the mid-2010s, the

number of publications on HT or other diseases in which HT is present has increased dramatically [13,14,15].

The presence of arterial hypertension in close relatives is an important risk factor for the development of arterial hypertension. First-degree relatives are especially at high risk [16,17,18,19].

As the degree of relationship decreases, so does the degree of genetic risk. [20,21] The younger the patient's age at which he developed arterial hypertension, the higher the risk of developing the disease in family members. The genetic predisposition appears especially in puberty, youth, and maturity. In people over 70 years of age, the genetic risk of developing the disease is significantly reduced and practically approaches of the general population [22].

Genetic predisposition to disease development is achieved under the influence of environmental factors, but recognition of the role of external factors in increasing the incidence of arterial hypertension does not reduce the important role of genetic risk factors. [23]

Genetic predisposition to hypertension Arterial hypertension is the most common disease in the adult population of the developed world. In Iraq, hypertension occurs in 39.2% of men and 41.1% of women, and 12-15% of patients develop persistent hypertension.

The frequency of arterial hypertension increases markedly with age - for example, hypertension is observed in 4% of people aged 20-23 years and reaches 50% or more at the age of 50-70 years. [24]

II. MATERIAL AND METHOD

A cross-sectional study was conducted to know the role and contribution of genetic factors in arterial hypertension among Iraqi citizens, where 140 patients were collected from different hospitals in Iraq.

This study was designed through cooperation with the hospital for the purpose of withdrawing the information found in the electronic record to patients, which includes primary information from demographic data (age - gender - body mass index - blood samples - smoking - alcohol - clinical history - genetic history and blood pressure levels were defined as follows

1) Normal blood pressure: systolic blood pressure of less than 120 mmHg and diastolic blood pressure of less than 80 mmHg.

2) Pre-hypertension condition: in which the blood pressure is higher than normal, but it is not sufficient to diagnose high blood pressure, and the person with it becomes more likely to develop the hypertensive disease. Prehypertension occurs with systolic pressure between 120-139 mmHg or diastolic pressure between 80-89 mmHg.

3) Hypertension disease: The disease is diagnosed after taking several blood pressure measurements over several sessions, in which the systolic blood pressure is greater than or

equal to 140 mmHg, or the diastolic blood pressure is greater than or equal to 90 mmHg.

Statistical Analysis

The data and demographic information related to the patients were analyzed by relying on the statistical analysis program IBM soft SPSS 22, where the chi-square value was extracted to know the differences in the patients' ages. The type of relationship between genetic factors and hypertension by extracted p-value with 0.05 and then logistic regression value was calculated to know the factors that constituted the risk to the patients

III. RESULTS

Table 1- Characteristics baseline demographic results of the patient

Variable	**Value**	**p-value**
Age (MEAN±SD) years	45.2±15.3	0.66
BMI (kg/m2) (MEAN±SD)	29.34±3.9	0.87
Smokers (%)	69 (49.2)	0.74
Alcohol N (%)	10 (7.1)	0.001
cardiovascular disease N (%)	55 (39)	0.44
DBP (mmHg)	85±8.8	0.5
SBP (mmHg)	140±10.1	0.79
Sex		
Male N (%)	60 (42)	0.32
Female N (%)	80 (57.1)	
Education		
Illiteracy N (%)	20 (14.2)	0.45
High School N (%)	40 (28.5)	
College N (%)	60 (42.8)	
High education N (%)	20 (14.2)	
Occupation		
physical	33	0.021
mental	39	
freelance	18	
NO WORK	50	

Table 2- Patients' laboratory results

	mean	sd
Blood glucose (mg/dl)	105	18.8
Total cholesterol (mg/dl)	212	29.9
Triglycerides (mg/dl)	133.3	87.9
HDL cholesterol (mg/dl)	50.5	8.8
LDL cholesterol (mg/dl)	139.3	33.1
S-potassium (mg/dl)	4.13	0.31
S-sodium (mg/dl)	139	1.8

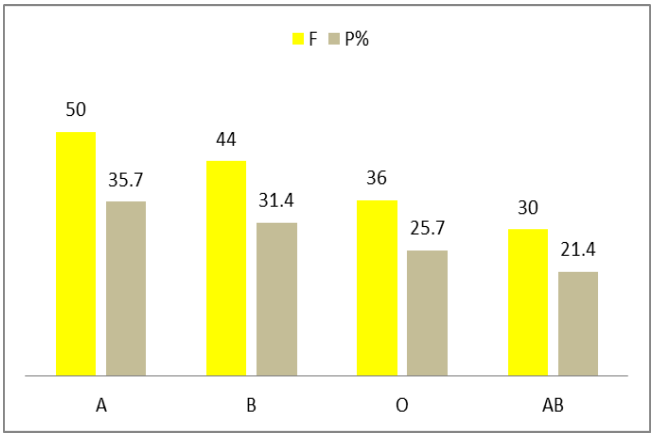

Fig 1- Distribution of patients according to blood type

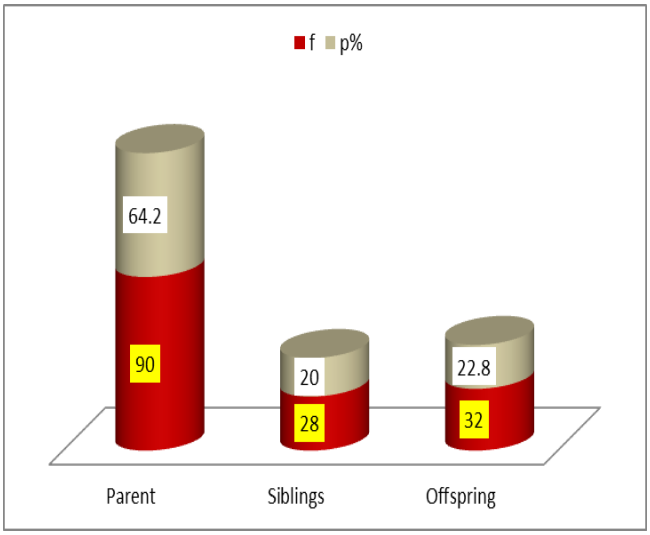

Fig 2- Proportion of Family History with Hypertension patients

Table 3- A logistic analysis of the study of the association between family history and hypertension.

Family history	Case	OR	95% CI
No positive result	30	1.00	0.88-1.11
positive result in one generation	120	3.98	1.88–8.98

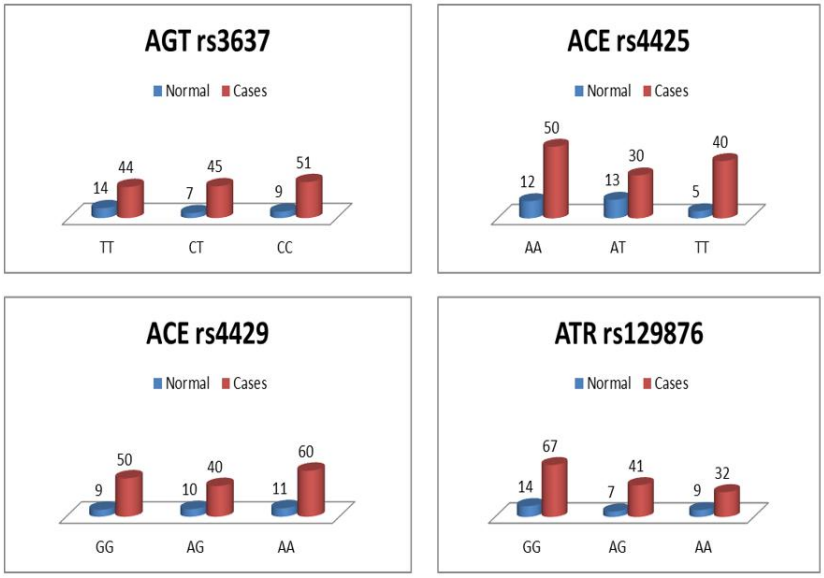

Fig 3- Genotyping results and their relationship to the risk of hypertension

IV. DISCUSSION

A retrospective study was conducted for the purpose of a comprehensive evaluation of the various systemic factors of Iraqi patients receiving dental implants.

V. DISCUSSION

In this study, 140 patients were collected, and they were divided into two groups (120 patients and 30 control groups). The average age in this study ranged from 25 to 65 years.

The mean S.D. to age was 45.2±15.3. It was also observed that the body mass index increased for the ages ranging from 50-60 years.

This study showed a high percentage of smokers, with 49.2% of cardiovascular disease 55 patients were found with 39%.

Patients were distributed according to gender, and the number of female patients was more than males, for 80 patients with 57.1% and 60 male patients with 42.8%, as shown in Table 1.

Increased systolic pressure may play a greater role in left ventricular hypertrophy and stroke than diastolic hypertension, and there is significant evidence to support that high systolic blood pressure may be a good indicator of a patient's future cardiovascular risk.

As for isolated high diastolic pressure, there is little of published evidence about the high risk posed by its infection. It is also considered a low-value indicator in predicting the risk of developing cardiovascular diseases in the future, which has led to the suggestion not to measure diastolic blood pressure, except for cases suspected of having diastolic hypertension.

In the current study, we obtained data that confirms the true role and genetic factors for patients with arterial hypertension at ages ranging between 20-30 years in Iraq, and Iraqi citizens have a genetic burden, according to scientific studies that confirm the genetic role of evolution

The risk of developing high blood pressure in men at an early age increases 2.5 times with the presence of those with hypertension in a relative of the first generation

Among the many pathogenic mechanisms that can lead to arterial hypertension, the main ones are those whose effect is mediated through the renin-angiotensin-aldosterone system. May affect the cardiovascular system through vasoconstriction and water and sodium retention.

Renin acts on angiotensinogen (encoded by the AGT gene) and converts it into angiotensin I. Moreover, angiotensin-1 is exposed to angiotensin-converting enzyme, which has effects intended to increase or maintain blood pressure.

This protein acts through the angiotensin receptors, and there are two types of receptors:

Angiotensin II plays an important role in the pathogenesis of arterial hypertension, as it acts on the smooth muscles of blood vessels, causing them to spasm, increasing peripheral resistance, and in addition to causing left ventricular hypertrophy in hypertension.

Thus, the genetic analysis that assesses the risk of developing hypertension includes the study of genetic markers, which allows to identify of a violation of the regulation of blood pressure, myocardial activity, and blood supply

The presence of arterial hypertension in close relatives is an important risk factor for the development of arterial hypertension, and this means that first-degree relatives (e.g., father and son) are particularly at high risk.

As the relationship score decreases, the genetic risk score also decreases. The younger the patient at which he developed arterial hypertension, the higher the risk of developing the disease in his family members.

Genetic predisposition appears particularly in puberty, youth and maturity.

In people over 70 years of age, the genetic risk of developing the disease is significantly reduced and is practically close to that of the general population.

Genetic predisposition to disease development is realized under the influence of environmental factors, but recognition of the role of external factors in the increased incidence of arterial hypertension does not reduce the important role of genetic risk factors.

Preventive genetic testing in the absence of traditional risk factors would be beneficial for everyone because genetic factors that lead to high blood pressure are very common.

VI. CONCLUSION

Based on the results of a comprehensive study of 140 patients, which allows us to know the type of relationship and the role of genetic factors in high blood pressure in Iraqi citizens

Hypertension is one of the most important social diseases associated with mutations in the human genome, and this study identifying the genes associated with this disease will provide a mechanism for classifying hypertension phenotypes and will allow the creation of diagnostic markers for individual patients and families.

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