THE RELATION BETWEEN HYPERTENSION AND ANGIOTENSIN CONVERTING ENZYME GENOTYPE IN IRAQI


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ABSTRACT

The source of most common chronic condition attributed to high blood pressure or hypertension, which affect about 20%-30% of the adult males and female’s population. The present study aimed to determine the association, of angiotensin converting enzyme genotype with Iraqis’ hypertensive patients. The study was carried out on 30 Iraqi patients having hypertension and 30 healthy subjects as control. Blood samples were collected from both patients and the healthy subjects. DNA from the patients and control specimens were isolated. Detecting of ACE insertion deletion genotype was done by polymerase chain reaction. The results show association between ACE genotype with hypertension DD genotype was increase in patients than control. The present study reported the relation between angiotensin converting enzyme genotype among Iraqis’ hypertensive patients.

Keywords: essential hypertension; (ACE I/D); Iraqis’ hypertensive patients.

INTRODUCTION:

Hypertension represents a severe public health problem in Iraq. It is one of the main contributory factors for heart attacks and stroke that found the main causes of mortality in the country (Borlay et al., 2017; Rukavina Mikus, et al., 2018).

In Iraq, the prevalence of high blood pressure among the adult population (25 years and above) and the use of medication to control it, was found to be 40% in 2008 (WHO, 2008). Record (90–95 %) hypertension is idiopathic and actually all types (essential and secondary hypertension) are responsible for kidney and heart diseases (Carre-tero et al., 2000). Genes are responsible about 30 % of hypertension; however, the role of gene-environment interactions and gene-gene interactions still indefinite (Zhu et al., 2003, Ehret, 2010). The renin-angiotensin system controls sodium homeo-stasis and blood pressure (Konoshita, 2011). Angiotensin converting enzyme is responsible for for-ming of angiotensin II from angiotensin I and also deactivating bradykinin. There is a 187bp Alu repeat insertion/deletion (I/D) polymorphism in the Angiotensin converting enzyme gene predicts the half-life ACE in the serum (Rigat et al., 1990).

Expecting the effect of a certain antihypertensive mediator in persons is a problematic task. To overwhelm this problem, investigators are presently studying which genes impact the respond to different antihypertensive medication (Taverne et al., 2010). Several studies have studied the effect of the insertion and deletion gene polymorphism of angiotensin converting enzyme gene on blood pressure response in patients suffering from heart disease treated with ACE inhibitors (ACEIs) (Hermida et al., 2011, Arnett et al., 2005). Some researchers found that the deletion allele have bigger effect in lowering blood pressure (Schelle-man et al., 2006, Chung et al., 2010), while a few revisions failed to find the relationship between angiotensin converting enzyme genotype and dropping the high blood pressure (Yu et al., 2003, Schelleman et al., 2005). The present study was planned for detection the association between high blood pressure and angiotensin converting enzyme gene polymorphism in hypertensive Iraqi patients.

MATERIALS AND METHODS

Thirty Iraqi patients suffering from hypertension were choosing in this study, while in vice versa of healthy subjects as control. Both groups were taken blood samples, and the healthy subjects by vein puncture then 2.5 ml of blood were treated with in EDTA anticoagulant tubes and kept in -20°C. The DNA extraction from whole the blood using ReliaPrep Blood Genomic Miniprep System from (Promega, USA) according to manufacturer instruction, then it electrophoresis was performed under electrical power (100 volt) for 10 minutes and 5 volt for 1 hour by using Agaro Power™ instrument (Bioneer, Korea) and photo’d by gel documentation system.

Detecting of ACE insertion deletion polymorphism was carried out by polymerase chain reac-tion using the same specific primers used by Deepika et al. (2013).

PCR reactions for the healthy subjects as well as patients were done using GO Taq Green master mix (Promega, USA), using a final reac-tion volume 25 μl/having: 1μl of both forward and reverse primers, 5 μl of the DNA. PCR amplifica-tion was performed in a Applied biosystem ther-mocycler with same condition of Deepika et al. (2013). PCR products were seperated on 2% agar-ose gel with the use of 100bp DNA ladder H3 (Genedirex, Korea) as
RESULTS AND DISCUSSION

Presence of bands with size of 490 bp only shows the homozygous genotype of insertion (II genotype), bands with size 190bp only shows the homozygous genotype of deletion (DD genotype), while the presence of 490 and 190bp band toget-her point to heterozygous genotype (ID genotype). The PCR amplification results in different patterns of DD, ID, and II gene polymorphism for both patients besides the healthy subject these patterns represented in Figure 1 and table 1.

ACE gene polymorphism of the genetically analyzed 30 patients compared with the healthy subjects shown in Table 1. ACE gene different genotype with hypertension showing increase in the DD genotype in the patients. Our finding agrees with similar studies done in other population including Iranian and Japanese showing increase in hypertension and DD polymorphism of ACE gene (Higashi et al., 2000, Nakhjavani, et al., 2007).

Renin-Angiotensin System (RAS) shows a significant part in regulating the pressure level of the blood through by regulating fluid homeostasis. Genes coding the constituents of renin-angiotensin system like angiotensinogen (AGT), Angiotensin converting enzyme (ACE), angiotensinogen II type -I receptor (AGTR1) have been expansively considered in many populations as genetic determining factor of essential hypertension (Rigat et al., 1990, Thiel et al., 2000, He et al., 2015). Subjects having the deletion genotype of angiotensin converting enzyme have been shown to have increase in the angiotensin converting enzyme activity in seum (Rigatet al., 1990, Tsukada et al., 1997), however the T235 AGT variant has been related to raising angiotensin levels (Miller and Scholey,2004). Fayyad and Aziz (2015) reported an association between, a mutation changing of adinine to cytocine A-20C in the promoter of the AGT and hypertension in Iraqi patients.

Conclusion
This work provides the main related with either angiotensin converting enzyme gene insertion/deletion polymorphism and hypertension in Iraq. The genotype DD increase in patients with hypertension while the genotype ID showed increase in the control groups which may refer that ID genotype may act as a protective agent against hypertension.

REFERENCES


WHO, Iraq celebrates World Health Day under the theme of hypertension (http://www.emro.who.int/irq/iraq/events/world-health-day.html).


