

Role of angiotensin converting enzyme (ACE) insertion/deletion polymorphism in sudden cardiac arrest.

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Abstract

Objective: To investigate the relationship between Angiotensin Converting Enzyme (ACE) insertion/deletion polymorphism and sudden cardiac arrest.

Methods: A total of 232 patients who were received in department of cardiology were involved in this study. Genotype frequencies of the first two groups were investigated and compared. After determination of ACE I/D polymorphism, all patients were further divided into new three groups as the II homozygotes, ID heterozygotes, and DD homozygotes to investigate relationship ACE I/D polymorphism and other risk factors of SCA. Statistical analysis was used to analyse the data.

Results: Frequencies of DD genotype in SCA group was higher than the coronary disease group, $P < 0.05$, and the D allele frequencies in SCA group compared with coronary disease group, $P < 0.05$. Results of distribution of patients' characteristics according to the genotypes of the ACE I/D polymorphism showed no significant differences among all characteristics except for percentage of patients survival after SCA in which patients with II genotype had significant higher percentage, $P < 0.05$, and patients died of SCA in which DD genotype had significant higher percentage, $P < 0.05$.

Conclusion: The DD genotype is associated with a higher prevalence of SCA and may be a risk factor of survival rate of sudden cardiac death.

Keywords: Angiotensin converting enzyme, I/D polymorphism, Sudden cardiac arrest.

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Introduction

Sudden Cardiac Death (SCD) remains to be a health threat worldwide leading to almost 4-5 million deaths every year [1-3]. It is thought to be sudden and unexpected for cardiac etiology and an inevitable outcome for most patients with Sudden Cardiac Arrest (SCA) [4]. SCA is a final manifestation of a lethal arrhythmia, for example coronary ischemia, ventricular fibrillation, ventricular tachycardia or a severe bradyarrhythmia [5,6]. Symptoms such as dyspnea, chest pain or palpitations usually appear in very short time when SCA occurs, leading to a very low average survival rate even in developed countries [7,8]. Studies have proved that lots of risk factors are associated with SCA. Despite cardiovascular factors such as Coronary Artery Disease (CAD) or congestive HF [9-13] or other traditional risk factors such as inflammation [14], more and more novel possible factors possibly associated with SCA were studied recently, such as renal dysfunction [15] or epilepsy [16,17]. However, lots of studies showed different results in different regions and there are few researched focusing on risk factors of SCA in China. The human Angiotensin-Converting Enzyme (ACE) is a an extensively glycosylated protein and a membrane-bound monomeric zinc metallopeptidase of 170 kDa which is involved in lots of physiological process such as hypertension, heart failure, diabetes and so on [18]. Lots of studies have shown that the

ACE gene locating in chromosome 17q23.3, is one of the risk factors of cardiovascular diseases that genetic epidemiological studies paid attention to, especially for the Insertion/Deletion (I/D) polymorphism which contains a 287 bp Alu repeat sequence in the intron 16 of ACE gene [19-21]. Studies showed that the different three genotypes: D/D of whom individuals have the highest levels of ACE, I/I of whom individuals have the lowest levels, and I/D of whom individuals have an intermediate levels [22]. The DD genotype have been associated with various of cardiovascular diseases, including myocardial infarction, essential hypertension, left ventricular hypertrophy and so on [23,24]. Though there are lots of studies focusing on effects of Insertion/Deletion (I/D) polymorphism of ACE on different kinds of cardiovascular diseases, to our best knowledge, so far there is no studies about Insertion/Deletion (I/D) polymorphism of ACE on sudden cardiac arrest, which we tried to discuss in this paper.

Methods and Materials

Patients

A total of 232 patients who were received in department of cardiology in the Shengli Oilfield Central Hospital during 01, 2002~2008, 2016 were involved in this study. All patients were first divided into two groups, the SCA group (mean age 56.15