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A Study on Genetic Causes behind Sudden Cardiac Arrest, Common Road to Death on 21rst CENTURY!!!

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ABSTRACT:
Sudden cardiac death is the unexpected death of the individuals due to certain cardiac defects without any symptoms,within a short period of time. Currently sudden cardiac death is becoming one among the major reasons behind the increasing fatality rate in the world. Haplessly around 70% of the victims comes under the age of 50, to be precise between 30 to 45. It would very shocking to hear that cardiac arrest deaths are seen in children too. Many researches have been conducted on this deadly phenomena, based on various parameters like genetics, lifestyle variations, health conditions etc.
This review presents how genetics pave the way to death of an individual by triggering sudden cardiac arrest.

INTRODUCTION:

WHAT IS CARDIAC ARREST???

Cardiac arrest is the sudden loss of blood flow resulting from the failure of the heart to pump effectively. It is a very fatal medical emergency in which immediate CARDIAC PULMONARY RESUSCITATION should be done until further treatment is provided.

The causes of cardiac arrest are coronary heart disease,heart failure, low potassium level, lack of exercise or intense physical exercise, unhealthy food habits and lifestyle which leads to hypercholesteremia and hypertension, and the last and most important cause is genetic factors,which is on its toddler stage of research.

HOW GENETICS PLAYS THE ROLE:

According to American Heart Association's studies, 17% of the cardiac arrest survivors had a pathogenic gene mutation identified(60% arrythemia related and 40% cardiomyopathy related).Also it was found that if a first degree relative of an individual have died or experienced sudden cardiac arrest then chances for him/her to experience the same is higher.

According to the studies there are several genes which are responsible for cardiac diso rders. Many studies have been conducted inorder to stabilize this theory and hopefully many gave positive results.Even a single mutation in a gene can cause severe issues.For example, A single genetic variation can make a protein to alter its function and can develop higher cholesterol formation which can lead to arterial block and thereby cardiac arrest.

The gene, called CDH2, causes arrhythmogenic right ventricle cardiomyopathy (ARVC), which is a genetic disorder that predisposes patients to cardiac arrest and is a major cause of unexpected death in seemingly healthy young people.[1]

A group of German genetic scientists has researched and found that there are 6 genetic variants of genes which are responsible for cardiac arrest; like MTHFD1L, PSRC1, MIA3, SMAD3, CDKN2A/CDKN2B, and CXCL12 genes.[2]

GWAS studies have suggested that few genes that encode proteins with unknown function but highly expressed in the heart, may also harbor critical DNA variants that influence the probability of sudden cardiac death.

The evidence that common DNA variants located in genes that cause Long QT Syndrome and Brugada Syndrome, namely KCNQ1 and SCN5A, predispose to SCD the general population is quite intriguing and certainly deserves more investigation. The observation that polymorphisms in the gene NOS1AP, that is the strongest modifier of QT interval duration, are critically associated with augmented risk of SCD in the general population represents a major finding that, if confirmed in prospective studies, may change our approach to risk stratification for SCD.[3]

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FUTURE ASPECTS TO AVOID SUDDEN CARDIAC DEATH:

Many reserchers are associated with various genetic testing labs and many studies are conducted nowadays.

As usual clinical laboratory analysis genetic analysis are also becoming popular.It is stated that through genetic examination we would be able to rule out the probable diseases caused through hereditary,including cardiac disorders.

Genetic testing identifies a **pathogenic variant** in a significant proportion of unexplained cardiac arrest survivors. Prior syncope and family history of sudden death are predictors of a positive genetic test.

Genetic testing in survivors of sudden cardiac arrest (SCA) with a suspicious cardiac phenotype is considered clinically useful, whereas its value in the absence of phenotype is disputed. The test conducted by American heart association was useful to identify or confirm an inherited heart disease, with an important impact on the patient care and first-degree relatives at risk.[4]

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