ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24MAY1738

Cardiovascular Stroke Prevention and Management Using the Principles of Cellular Medicine

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Abstract:- Cerebrovascular disease generally refers to the abnormality of the brain, and it is usually caused by the pathologic process of blood vessels. After heart disease and cancer, stroke is the third most common cause of death in the developed world. Stroke can be classified based on the evolution and duration of the symptoms experienced by the patient. From the perspectives of human, family, and the society, stroke is a costly disease. In 2015, the total cost of stroke in the EU was estimated at about €45 Billion. Also, in the same year, the total direct and indirect cost of stroke in the United States of America was calculated as $103.50 billion annually. Meanwhile, stroke can be conveniently classified as two processes, based on pathologic anatomy and pathophysiology. The first process is; hpoxia, ischaemia, and infarction. This is usually caused by the pathology of blood supply and the impairment of oxygenation to the central nervous system (CNS) tissue. The second process is haemorrhage, and this is usually due to the rupture of blood vessels to the CNS. Most of the thrombotic arterial occlusions are caused by atherosclerosis, while primary brain parenchymal haemorrhage is most commonly due to hypertension. Cellular medicine is an approach to healthcare which focuses on the aetiology of diseases and develops treatment for the diseases by studying; biological processes, structures and functions of biomolecules, and cell physiology, in order to understand abnormal biological function at the cellular level. Research in the field of cellular medicine have revealed that atherosclerosis, the main cause of cardiovascular and cerebrovascular diseases, can be reversed using cellular medicine. The research also showed that atherosclerosis is an early form of full blown scurvy, thus both scurvy and atherosclerosis have the same cause, which is vitamin C deficiency.

Keywords:- *Stroke, Cellular Medicine, High Dose Vitamin C, Atherosclerosis, Hypertension, Lipoprotein (A).*

I. INTRODUCTION

A. Definition of Stroke

Cerebrovascular disease generally refers to the abnormality of the brain and it is usually caused by the pathologic process of blood vessels[1]. After heart disease and cancer, stroke is the third most common cause of death in the developed world and most of the severe physical disabilities are usually caused by stroke[2].

Stroke can be classified based on the evolution and duration of the symptoms. Transient ischaemic attack (TIA) is used to describe strokes in which the symptoms experienced by the patient is resolved within 24 hours, from the time of onset. In epidemiological studies, stroke is the term used for neurological disorders in which the symptoms extends beyond a 24 hours duration[2]. Stroke can also be viewed as the clinical designation that applies to the aetiological features of cerebrovascular diseases, especially when the symptoms begin acutely[1].

B. Aetiology

Cerebrovascular disease, from the clinical point of view, include three major categories; thrombosis in situ, embolism from a distant source, and haemorrhage from the rupture of blood vessel. The operational division listed above is useful especially because the management of stroke patients differs greatly in each group. Most of the thrombotic arterial occlusions are caused by atherosclerosis, while primary brain parenchymal haemorrhage is most commonly due to hypertension[1].

C. Epidemiology

Cerebrovascular disease is a form of cardiovascular diseases (CVD) and according to the World Health Organization (WHO), globally, CVD are a major cause of death. The most recent WHO fact sheet on CVD reported that about 18 Million people died from CVD in 2016, which was 31% of all the global deaths in 2016. Meanwhile, 85% of the figure was due to heart attack and stroke[3].

D. Financial & Social Burden of Stroke

From the perspectives of human, family, and the society, stroke is a costly disease. Each year, an estimated 16 million first-ever strokes occur worldwide, which usually results into about 6 million deaths. Stroke is a global epidemic and it is not limited to the high-income countries only. Almost 85% of all stroke death are recorded in low-income and middle-income countries[4]. Unfortunately, about 50% of those that survive stroke have some forms of associated cognitive and physical impairment.

In 2015, the total cost of stroke in the EU was estimated at about €45 Billion. Also, in the same year, the total direct and indirect cost of stroke in the United States of America was calculated as $103.50 billion annually[5].

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II. DISCUSSION

A. Pathophysiology of stroke

Stroke can be conveniently classified as two processes, based on pathologic anatomy and pathophysiology. The first process is; hpoxia, ischaemia, and infarction. This is usually caused by the pathology of blood supply and the impairment of oxygenation to the central nervous system (CNS) tissue. The second process is haemorrhage, and this is usually due to the rupture of blood vessels to the CNS[1]. The first process has been categorized as ischaemic stroke which account for 87% of all stroke, while the second process results in haemorrhagic stroke which make up about 13% of stroke cases[6].

B. Risk Factors

According to the American Heart Association (AHA), stroke and heart disease risk factors include; core health behaviours and health factors. The major health behaviours are; diet, smoking, weight and physical activity. The main health factors are; glucose, blood pressure and cholesterol control[7]. Meanwhile, WHO list the following as known risk factors which are specific to stroke; hypertension, diabetes, hyperlipidemia, unhealthy diet, etc[3].

C. Clinical Features

The symptoms and signs of stroke depends on the arterial territory involved, that is; the middle cerebral, the internal carotid, the anterior cerebral, the posterior cerebral, and the vertebra-basilar arterial systems[8]. The area(s) of the brain that is affected determines if the patient will develop hemiplegia, or be asymptomatic, have sensory defect, is blind, have aphasia, or exhibit some other defects.

When the onset of the illness occurs during sleep, or on arising from sleep, thrombosis of an artery is likely to be the cause of the stroke. On the other hand, when the disease starts during exertion, a haemorrhage is more likely. The presence of headaches, stupor or coma, severe hypertension, and seizures usually suggest cerebral haemorrhage[8].

Most time, there are no symptoms of an underlying disease of the blood vessel. But, the major symptoms of stroke are: dizziness; sudden weakness of the face; sudden weakness of the leg or arm; numbness of the face, arm or leg; confusion; difficulty in speaking; etc.

D. General Prevention of Stroke

According to the WHO and the AHA, managing the underlying medical conditions such as; hypertension, hyperlipidemia, diabetes, obesity, and lifestyle change such as; stopping of tobacco smoking, less alcohol intake, more physical activity and healthy diet, are generally effective in preventing stoke[3,7].

E. Cellular Medicine Definition & Overview

Cellular medicine is an approach to healthcare which focuses on the aetiology of diseases and develops treatment for the diseases by studying; biological processes, structures and functions of biomolecules, and cell physiology in order to understand abnormal biological function at the cellular level[l9]. Cellular medicine contributes to the field of medicine knowledge from the disciplines of biochemistry and biology, as it relates to the importance of vitamins in cells functions and cellular metabolism[10].

Diseases usually starts at the cellular level and whether we remain healthy or fall sick is determined at the cellular level, which is usually composed of billions of cells that form our tissues and vital organs. Cellular nutrients are therefore vital for proper cells metabolism and they are also the main supplier of energy for metabolism in cells, without which life would be impossible[10].

In all the body cells, cellular nutrients are required for various biochemical processes and reactions. Infact, a continuous deficiency of cellular nutrients is the main cause of poor cellular functions and the major cause of diseases like stroke, heart diseases and cancer[10].

Cellular nutrients are natural substances and the most important ones are; vitamins, mineral elements, trace elements, etc.[10]. Vitamins can be defined as a group of organic nutrients which are usually needed in small quantities for various biochemical functions. Generally, vitamins cannot be synthesized by the body and are therefore to be supplied through food. Also, mineral elements required by the body in order to function properly must be supplied through diets. Meanwhile, anytime the intakes of vitamins and (or) mineral elements are insufficient, a form of deficiency symptom may occur and in situations where they are supplied in excess, some forms of toxicity symptoms may be experienced[11].

F. Stroke Prevention & Management through Cellular Medicine

Vitamin C has been found to be the most important single substance out of all the cellular nutrients. Vitamin C is known to prevent CVD and it also performs a key role in the management of cancer and some immune deficiency diseases[10]. Vitamin C is very important to the health of human beings and most primates. Meanwhile, other animals synthesize vitamin C as part of the uronic acid pathway, during the metabolism of glucose. So, in the species for which it is a vitamin and that must be supplied through diet, there is a block in the glucose metabolic pathway. It should however be noted that both the dehydroascorbic acid and ascorbic acid posses vitamin activity[11].

Research in the field of cellular medicine have revealed that atherosclerosis, the main cause of cardiovascular and cerebrovascular diseases, can be reversed using the principles of cellular medicine. The research showed that atherosclerosis is an early form of full blown scurvy. Thus, both scurvy and atherosclerosis have the same cause, which is vitamin C deficiency[10].

In their 2015 study[12], Mathias Rath et. al. found that Lipoprotein(a) {Lp(a)} is the main genetic risk factors for CVD like stroke and myocardial infarctions. Meanwhile, Lp(a) is made up of low-density lipoprotein (LDL) molecule and a high molecular weight glycoprotein called apolipoprotein(a) {apo(a)}. But, the apo(a) is bounded to the

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primary structural protein of LDL called apolipoprotein B-100 (apoB-100) through the disulfide bonds.

The study also showed that Lp(a) builds up inside atherosclerotic plaques and it thereafter binds to the extracellular cellular matrix (ECM), which includes; fibronectin, laminin, etc. Moreso, apo(a) has been shown to increase cell replications in smooth muscles. Apo(a) has also been shown to bind strongly to fibrinogen and fibrin, thereby diplaying strong antifibrinolytic properties. So, in essence, research has found Lp(a) as the "missing link" between thrombogenesis and atherogenesis[12].

Also in the same study, it was observed that whenever ECM impairment takes place, due to a long period of micronutrients deficiency, the presence of the apo(a) macromolecule with its high binding preference to ECM components will function as a repair molecule which then compensate for the structural ECM impairment caused by hypoascorbemia[12].

In most mammals, naturally occurring atherosclerosis is not common. But, in humans atherosclerosis is a major cause of death. Meanwhile, in the genetics of human metabolism, two main features have been identified in the development of CVDs. The first is the loss of our ability to synthesize ascorbate endogenously, thereby leading to a deficiency. The second is the accumulation of Lp(a). So, again, Lp(a) is an important repair molecule to reduce the potentially deadly effect of ascorbate deficiency in the ECM[12].

From the research finding, Lp(a) performs the functions of a mobile repair molecule by depositing at the sites of vascular lesions formed due to ascorbate deficiency. This also explains the strong binding of the apo(a) molecule to ECM components, in order to prevent the impairment of structural matrix caused by hypoascorbemia. The observations were in line with previous research findings on human atherosclerosis[12].

III. CONCLUSION AND SUGGESTION

As previously stated above, ischaemic stroke primarily results from atherosclerosis, while haemorrhagic stroke primarily results from hypertension. And research have shown that atherosclerotic deposits are the body mechanism providing a make-shift repair to stabilize artery walls. Therefore, an intake of vitamin C and other cellular nutrients, within an optimum limit, will keep the artery walls functioning perfectly and thereby prevent atherosclerosis formation[10]. That is, the prevention and (or) reversal of atherosclerosis will lead to the prevention and (or) reversal of; thrombi, emboli, hypertension and ultimately stroke.

Unfortunately, in this new age of civilization, most diets barely contain enough vitamin C to prevent hypoascorbemia. But, the consumption of adequate vitamin C through food or other means is required to keep our artery walls stable. So, a total exhaustion of vitamin C in the body will lead to the breakdown of connective tissues in the body, including blood vessels[10]. Also, many of the signs of vitamin C deficiency have been attributed to a deficient collagen synthesis[11] and a regular intake of optimum vitamin C is known to enable the proper functioning and production of collagen.

Research have also shown that clinicians can now prevent and reverse coronary artery disease using affordable, non-toxic and non-invasive interventions. Also, the interventions can monitor the progress being made from the treatment, through a continuous and non-invasive method[13]. With this approach, a significant reduction in stroke and heart attack can be achieved for the general populace, so also a reduction in the other complications of atherosclerosis. Meanwhile, this is not a new discovery as these findings have been reported as far back as 1954 and published in peer-reviewed medical literature[13].

Therefore, a supplementary intake of vitamin C not less than 3 grams per day in adults will help in preventing and (or) reversing atherosclerosis[14]. Also, combining the vitamin C with amino acids such as lysine (3 grams per day) and proline (1.5 grams per day) will produce a significantly better results due to synergy. Meanwhile, the consumption of refined sugar should be avoided, or reduced, for faster and optimum result[14].

Finally, considering that millions of life are at stake[3,7] and considering the social and financial burden of stroke[4,5], in relation to the potential benefits stated above, it is therefore worth using the cellular medicine approach to stroke prevention and management. Also another advantage of this approach is that vitamin C is easily accessible, since it is not a prescription drug and there are no known toxicity or side effect associated with it[15]. Especially, when compared to the side effects and potential toxicity associated with the other standard pharmaceutical drugs generally prescribed for stroke prevention and management[16].

ACKNOWLEDGMENT

None.

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