Review

Hypertension and diabetes mellitus as a predictive risk factors for stroke

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ABSTRACT

Background: Stroke is becoming a major challenge in healthcare systems, and this has necessitated the study of the various risk factors. As the number of people with hypertension, diabetes mellitus and obesity increases, the problem is expected to worsen. This review paper evaluates what can be done to eliminate or reduce the risk of stroke.
Objective: The aim of the research is to evaluate the risk factors for stroke. The paper also aims to understand how these risks can be handled to avoid incidences of stroke.
Method: Published clinical trials of stroke risk factors studies were recognised by a search of EMBASE and MEDLINE databases with keywords hypertension, blood pressure, diabetes mellitus, stroke or cardiovascular disease, or prospective study, and meta-analysis.
Results: The findings of this review are that the prevention of stroke starts with identifying risk factors for stroke, most of the patients diagnosed with stroke have various risk factors. Consequently, it is a very significant to identify all the risk factors for stroke as well as to teach the patient how to dominate them.
Conclusion: after summarising all the studies mentioned in the paper, it can be established that hypertension and diabetes mellitus are a stroke risk factors and correlated in patients with atherosclerosis.

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1. Introduction

There are diverse classifications of risk factors concerning strokes, traditional and new, such as hyperhomocysteinemia and hypercoagulable state. There are also risk factors that are modifiable and non-modifiable. Cerebrovascular illnesses or diseases adhere to risk factors that are non-modifiable for sex-based orientation, age, race or

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ethnic groups, and genotype prior to the myocardial infarction, to the stroke and or TIA, in addition to modifiable risk factors such as diabetes, hypertension and hyperlipidemia [1]. There are also coronary artery diseases along with physical immobility, consumption of alcoholic beverages, cigarette smoking and obesity [2].

Atherosclerosis is a key pathomorphological method that narrows the arterial walls across the body and within the brain, leading to cerebrovascular disease. It is believed that atherosclerosis arises from chronic inflammation and damage to the arterial wall within the peripheral or coronary vascular system. As a reaction to endothelial inflammation and damage, oxidised lipids from LDL (low-density lipoproteins) particles gather in the endothelial region of the vessel wall [2]. The oxidation of these particles may be brought about by angiotensin II. Monocyte then infiltrates the arterial wall and differentiates into macrophages, which accumulate oxidised lipids to form foam cells. After their creation, foam cells encourage spread of macrophage and drawing of T-lymphocytes. These T-lymphocytes consequently bring about smooth muscle propagation within the arterial walls and build-up of collagen. This process results in the creation of a lipid dense atherosclerotic lesion with a fibrous cap. When this lesion ruptures, there is severe vascular infarction which ruptures, causing frequent bleeding in the plaque in diabetic patients (diabetic patients also have a greater perioperative risk of carotid endarterectomy).

Apart from atheroma creation, there is a greater proof of higher platelet adhesion, hypercoagulability, defected nitric oxide production and the higher creation of free radicals, in addition to altered calcium regulation in diabetic patients [3,4].

2. Aim

The aim of this research paper is to evaluate the hypertension and diabetes mellitus as a risk factors associated with stroke. Having understood the risk factors, the research evaluates how these risk factors have been handled in the past and what can be done in the future. The research aims to identify the major problems that have led to increased risks of stroke. This can help in recommending the steps that can be used to deal with the condition.

Based on the information available, it will be possible to offer a guide to people who are already facing high-risk factors, so that they can avoid the worst scenario of suffering a stroke. Additionally, people who have not yet experienced risk factors can learn from this paper, steps that they can take to avoid increasing the risk of suffering from a stroke. The review will highlight gaps in healthcare that need to be closed to ensure that people receive better care and that mortalities resulting from stroke are reduced.

3. Method

3.1. Design and strategy

Published clinical trials of stroke risk factors studies were recognised by a search of EMBASE and MEDLINE databases with keywords *hypertension*; *blood pressure*; *diabetes mellitus*; *stroke or cardiovascular disease*; *or prospective study*; and *meta-analysis*.

Included are clinical trials involved patients with hypertension and diabetes mellitus as a predictive stroke risk factor. Date of birth or age, gender, blood pressure documented at baseline. Randomised controlled trials of hypertension as a stroke risk factor published before 2016 were eligible for inclusion. Random studies distribution of participants to a stroke risk factors lowering drug or placebo; random distribution of participants to different stroke risk factors lowering drugs; and random

distribution of participants to different stroke risk factors lowering targets were eligible. To decrease the risk of small-study effects [5], all studies were needed to have at least 1000 patient-years of follow-up in each study group.

Studies were involved if they were published or information were reachable before 2016, and if they provided information on inclusion criteria, regions and number of randomisation method, trial endpoints, duration of follow-up, trial interventions and methods of analyses. Results were independently extracted and summarised. Nevertheless, no further analyses were directed.

The first step was the selection of relevant references that could be used to complete the research. This was based on the information that the resources provide the background of the authors, the publisher and the year the references were published. After selecting the needed references, the second step was to read through them and get the relevant information that could be useful for the research [6].

The research depended on primary sources that are reliable and address the issue of stroke risks in society. Various reputable organisations have completed research on the issue of stroke, and these resources are important for understanding the issue of stroke and its relationship with hypertension. Journal articles, books and websites were used in collecting reliable data published by authors in this field. Based on these sources, it was possible to make reductions as to how the problem of stroke affects society and how it can be handled.

3.2. Approach

The sources were used in the literature review, where the various sources are critically evaluated to offer information about the topic. The findings from the sources were discussed and summarised in the tables to provide more information on the issue. Based on such findings, it was possible to make conclusions and recommendations [7].

3.3. Ethical considerations

This study was deemed IRB-exempt according to the university's Human Subjects Protection guidelines since data were publicly available and individual patients were not identifiable. The research was based on ethical guidelines for carrying out research.

The references used in the research are well cited and referenced to avoid plagiarism. The sources are paraphrased to ensure that the research is not just a duplicate of the previous research. There are also no incidences where personal ideas that may be biased are included in the research as for facts. This ensures that the research is reliable, hence important to the various targeted users [6].

4. Results and discussion

4.1. Hypertension

Hypertension is the most predominant modifiable risk factor for stroke with a prevalence of about thirty percent in developed nations. Hypertension is exposed more in elderly.

The Framingham Stroke Risk Profile (FSRP) was established to have better and more rapid assessment of stroke risk factors [8]. The developers of FSRP employed information from thirty-six years of follow-up within the Framingham Stroke cohort study then verified them from other cohorts. Sex-specific approximations of the probability of stroke are offered by the FSRP with the help of clinical information [9]. Hypertension was found in the Framingham Heart Research Study concerning specialists who