AN OVERVIEW ON MODIFIABLE RISK FACTORS OF STROKE: A REVIEW UPDATE

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ABSTRACT: Stroke is a heterogeneous, multifactorial disease regulated by modifiable and non-modifiable risk factors. Stroke is classified into ischemic and hemorrhagic stroke based on different etiological factors due to thrombus formations or heart-related problems (emboli the moving clots) and some aneurysm formations or AVM. Stroke is the second leading cause of death. These mainly discuss the modifiable risk factors. Modifiable risk factors like hypertension, diabetes mellitus, alcohol consumption, smoking, cardiac problems, migraine, and dyslipidemia. The modifiable risk factors can be prevented by regular follow-up and lifestyle modification. For modifiable factors like hypertension and diabetes mellitus regular check-ups and medication adherence is also important. On average, there is a stroke-related death approximately every three minutes. In this review, the modifiable risk factors of stroke are discussed.

KEYWORDS: Stroke, Ischemic stroke, Hemorrhagic stroke, Modifiable risk factors hypertension, Diabetes Mellitus.

DEFINITION:
Stroke can be defined as the rapid emergence of clinical indicators of focal (or global) disruption in cerebral function, lasting for more than 24 hours or resulting in death, without any evident cause except of vascular origin. The condition is classified into three main types: hemorrhagic, ischemic, and Transient Ischemic Attacks (TIA) (1).

EPIDEMIOLOGY:
Based on stroke statistics from 2005 and information provided by the American Heart Association Heart Disease, it was observed that the majority (88%) of strokes have an ischemic origin, while approximately 12% of strokes are of the hemorrhagic type (2). As per the World Health Organization, stroke has been identified as the second leading cause of death during the period 2002-2012. Furthermore, in the year 2004, approximately 5.7 million deaths were attributed to stroke, accounting for 9.7% of all recorded fatalities (3). In a study conducted in Saudi Arabia in 2010, it was found that male patients exhibited a higher risk compared to the female group (3). The correlation between sex and stroke risk varies with age. In younger age groups, women face comparable or even higher risk of stroke compared to men, while in older age groups, men tend to have a slightly higher relative risk (4).

RISK FACTORS:
A risk factor is defined as any characteristic, attribute, or exposure that raises the probability of experiencing an injury or disease. The risk factors for stroke are categorized into non-modifiable and modifiable factors.

1. Non-modifiable risk factors: Age, gender, race and ethnicity, family history, previous stroke, and transient ischemic stroke (5).

2. Modifiable risk factors: Uncontrolled Diabetes mellitus, uncontrolled Hypertension and Hyperlpidemia, Atrial fibrillation, Carotid stenosis, Lifestyle factors: excessive alcohol drinking, cigarette smoking, physical inactivity, obesity. The utmost significance lies in the modifiable risk factors since implementing intervention strategies to reduce these factors can subsequently lower the risk of stroke. It is imperative to identify and modify these risk factors early on (6).

Hypertension: Hypertension stands as the foremost controllable risk element for stroke, exhibiting a robust, direct, and continuous correlation between blood pressure levels and the likelihood of experiencing a stroke. Managing hypertension, whether by utilizing medication or implementing lifestyle adjustments, continues to be one of the most potent approaches to lowering the likelihood of experiencing a stroke (7).

Diabetes mellitus: Diabetes presents as a stand-alone risk factor for stroke, leading to a twofold rise in stroke risk among diabetic patients. Additionally, strokes contribute to approximately 20% of fatalities in individuals with diabetes. Furthermore, pre-diabetic individuals also face an elevated risk of experiencing a stroke (8,21).

Physical activity: Lack of physical activity is linked to numerous adverse health outcomes, including stroke. Engaging in regular physical activity lowers the risk of stroke and stroke-related deaths compared to individuals who lead sedentary lifestyles. This connection between physical activity and stroke risk may be attributed to the accompanying decrease in blood pressure, reduced likelihood of diabetes, and overall weight management (9,27).

Atrial fibrillation: Several cardiac diseases have been demonstrated to elevate the likelihood of stroke. Among them, atrial fibrillation (AF) stands out as the most potent and manageable cardiac condition that precedes a stroke. As individuals grow older, the occurrence and prevalence of AF progressively rise. Notably, with each decade beyond the age of 55, the incidence of AF doubles (10,22).

Carotid stenosis: Carotid stenosis refers to the narrowing of the carotid arteries, which are crucial blood vessels responsible for carrying oxygenated blood from the heart to the brain. This condition poses a significant risk for stroke and potential brain damage. A study conducted by Rothwell et al. in 2000 demonstrated a clear correlation between the degree of carotid artery stenosis and the occurrence of ischemic stroke, indicating that the risk of stroke increases with the severity of artery constriction (11,30).
Hypercholesterolaemia: Hypercholesterolaemia plays a significant role as a modifiable risk factor for coronary heart disease, but its association with ischaemic stroke remains uncertain. The data convincingly demonstrate a positive correlation between total and LDL cholesterol levels and a protective effect of HDL cholesterol concerning extracranial carotid atherosclerosis (12,20).

Smoking: Cigarette smoking is associated with an almost twofold increase in the risk of ischemic stroke, and this correlation exhibits a clear dose-response relationship (13).

Alcohol Consumption: Intensive alcohol consumption raises the relative risk of experiencing any type of stroke, whereas consuming alcohol in light or moderate amounts may offer a protective effect against ischemic stroke (14).

The most effective approach for reducing the burden of stroke is through prevention.

SOME OF THE PREVENTIVE MEASURES INCLUDE:

Lowering blood pressure is advised for individuals who have experienced an ischemic stroke or transient ischemic attack (TIA) and have surpassed the initial 24-hour period. This measure is suggested to prevent recurrent stroke and other vascular events (15,16). Numerous lifestyle changes have been linked to lowering blood pressure and are considered a reasonable component of a comprehensive antihypertensive treatment plan. These changes encompass limiting salt intake, achieving weight loss, adopting a diet abundant in fruits, vegetables, and low-fat dairy products, engaging in regular aerobic physical activity, and moderating alcohol consumption (17,18).

Patients who have experienced a stroke or TIA are advised to follow the established guidelines for glycemic control and blood pressure targets in diabetes management (19,33).

Patients with ischemic stroke or transient ischemic attack (TIA), who show evidence of atherosclerosis, have an LDL-C level ≥100 mg/dL and do not have known coronary heart disease (CHD), are advised to undergo statin therapy with intensive lipid-lowering effects. This approach is recommended to decrease the likelihood of stroke and cardiovascular events (24,25).

Smoking should be prohibited for the prevention of stroke (36). Healthcare providers must strongly recommend that any patient who has experienced a stroke or TIA (transient ischemic attack) within the last year and has a history of smoking should cease smoking immediately.

Alcohol consumption should be reduced for the prevention of stroke. Moderate alcohol intake, defined as no more than 2 drinks per day for men and 1 drink per day for non-pregnant women, could be considered acceptable. However, it is crucial to emphasize that individuals who do not drink alcohol should not be encouraged to begin drinking (37).

Individuals who can participate in physical activity should aim for at least 30 minutes of moderate-intensity exercise, which is typically described as vigorous enough to induce sweating or elevate the heart rate noticeably (35,38). This exercise routine, performed 1 to 3 times a week (e.g., brisk walking, using an exercise bicycle), may be considered beneficial in reducing risk factors and comorbid conditions that elevate the chances of stroke.

Conclusion: There are several modifiable risk factors of stroke-like hypertension, diabetes mellitus, smoking, alcohol consumption, obesity, heart diseases, etc which can be preventable and managed to reduce the risk of stroke - medication adherence and lifestyle modification by taking healthy walk, alcohol and smoking cessation. Finally, maintain healthy blood pressure to prevent stroke because hypertension is a major modifiable risk factor among the others.

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