Comparison between risk factors profiles of lacunar and non-lacunar ischemic strokes

thesis submitted for partial fulfillment of master degree in neuropsychiatry

By

Moustafa Mahgoub Awad Mohamed

Under supervision of

Prof.Dr.Rezk Khoder

Professor of neurology

Benha faculty of medicine - Benha univeristy

Prof.Dr.Abo Zaid Abd Allah

Professor of neurology

Benha faculty of medicine - Benha univeristy

Prof.Dr.Abd El Naser Mourad

Ass.Professor of neurology

Benha faculty of medicine - Benha univeristy

Prof.Dr.Maged Kamal

Ass Professor of neurology

Benha faculty of medicine - Benha univeristy

Faculty of Medicine

Benha university

(2010)

INTRODUCTION

Stroke is one of the most common neurologic disorders, resulting in functional disorders and a high mortality rate in most developed and developing countries ***(Larry B Goldstine et al., 2006).***

Risk factors of ischemic stroke are classically divided into modifiable and non- modifiable factors. Stroke risk varies widely from one person to another, depending on the number of risk factors possessed by the individual and the relative risk for stroke associated with each ***(Wolf et al., 1991).***

Now that many of the risk factors for stroke have been identified and found to be modifiable, persons at high risk for stroke can be identified and their first stroke can be avoided ***(Gorelick et al., 1999).***

Epidemiological studies have identified several risk factors for ischemic stroke, including hypertension, smoking, diabetes mellitus, and hemostatic factors. However, few prospective studies have characterized risk factors for specific subtypes of ischemic stroke. Because the pathogenesis, prognosis, and treatment differ among subtypes, evaluating risk factors for individual subtypes may contribute to more effective primary and secondary prevention of ischemic stroke **(Tetsuya Ohira et al., 2006).**

Although cerebrovascular disorders may occur at any age, at any time, in either sex, in all families, and in all races, each of these non-modifiable factors affects the incidence of stroke. The strongest determinant of stroke is age. Stroke incidence rises exponentially with age, with most strokes Occurring in persons older than 65. Stroke is less common before age 40, but stroke in young adults is of growing concern because of the impact of early

Disability. As our population ages, the prevalence and public health impact of stroke will UN doubtable increase **(Tetsuya Ohira et al., 2006).**

Stroke incidence is greater among men, those with a family history of stroke, and among certain race-ethnic groups ***(Larry B Goldstine et al., 2006).***

What risk factors for stroke can't be changed?

- **Age** — the chance of having a stroke approximately doubles for each decade of life after age 55. While stroke is common among the elderly, a lot of people under 65 also have strokes. Adams HP Jr, et al. (2007)
- **Heredity (family history) and race** — your stroke risk is greater if a parent, grandparent, sister or brother has had a stroke. African Americans have a much higher risk of death from a stroke than Caucasians do. This is partly because blacks have higher risks of high blood pressure, diabetes and obesity.
- **Sex (gender)** — Stroke is more common in men than in women. In most age groups, more men than women will have a stroke in a given year. However, more than half of total stroke deaths occur in women. At all ages, more women than men die of stroke. Use of birth control pills and pregnancy pose special stroke risks for women. American Heart Association (2008
- **Prior stroke, TIA or heart attack** — The risk of stroke for someone who has already had one is many times that of a person who has not. Transient ischemic attacks (TIAs) are "warning strokes" that produce stroke-like symptoms but no lasting damage. TIAs are strong predictors of stroke. A person who's had one or more TIAs is almost 10 times more likely to have a stroke than someone of the same age and sex who hasn't. Recognizing and treating TIAs can reduce your risk of a major stroke. If you've had a heart attack, you're at higher risk of having a stroke, too. TIA should be considered a medical emergency and followed up immediately with a healthcare professional. Adams RJ, et al. (2003

What stroke risk factors can be changed, treated or controlled?

- **High blood pressure** — High blood pressure is the leading cause of stroke and the most important controllable risk factor for stroke. Many people believe the effective treatment of high blood pressure is a key reason for the accelerated decline in the death rates for stroke.
- **Cigarette smoking** — In recent years, studies have shown cigarette smoking to be an important risk factor for stroke. The nicotine and carbon monoxide in cigarette smoke damage the cardiovascular system in many ways. The use of oral contraceptives combined with cigarette smoking greatly increases stroke risk.
- **Diabetes mellitus** — Diabetes is an independent risk factor for stroke. Many people with diabetes also have high blood pressure, high blood cholesterol and

are overweight. This increases their risk even more. While diabetes is treatable, the presence of the disease still increases your risk of stroke.

- **Carotid or other artery disease —** the carotid arteries in your neck supply blood to your brain. A carotid artery narrowed by fatty deposits from atherosclerosis (plaque buildups in artery walls) may become blocked by a blood clot. Carotid artery disease is also called carotid artery stenosis. **Peripheral artery disease** is the narrowing of blood vessels carrying blood to leg and arm muscles. It's caused by fatty buildups of plaque in artery walls. People with peripheral artery disease have a higher risk of carotid artery disease, which raises their risk of strokeAdams RJ (2008). AHA/ASA science advisory.

- **Atrial fibrillation** — This heart rhythm disorder raises the risk for stroke. The heart's upper chambers quiver instead of beating effectively, which can let the blood pool and clot. If a clot breaks off, enters the bloodstream and lodges in an artery leading to the brain, a stroke results. Sacco RL, et al. (2006)

- **Other heart disease** — People with coronary heart disease or heart failure have a higher risk of stroke than those with hearts that work normally. Dilated cardiomyopathy (an enlarged heart), heart valve disease and some types of congenital heart defects also raise the risk of stroke.

- **Sickle cell disease** (also called **sickle cell anemia**) — This is a genetic disorder that mainly affects African-American and Hispanic children. "Sickled" red blood cells are less able to carry oxygen to the body's tissues and organs. These cells also tend to stick to blood vessel walls, which can block arteries to the brain and cause a stroke.

- **High blood cholesterol —** People with high blood cholesterol have an increased risk for stroke. Also, it appears that low HDL ("good") cholesterol is a risk factor for stroke in men, but more data are needed to verify its effect in women.

- O'Regan C, et al. (2007). Statin therapy in stroke prevention

-

- **Poor diet —** Diets high in saturated fat, Trans fat and cholesterol can raise blood cholesterol levels. Diets high in sodium (salt) can contribute to increased blood pressure. Diets with excess calories can contribute to obesity. Also, a diet containing five or more servings of fruits and vegetables per day may reduce the risk of stroke.

- **Physical inactivity and obesity** — Being inactive, obese or both can increase your risk of high blood pressure, high blood cholesterol, diabetes, heart disease and stroke. So go on a brisk walk, take the stairs, and do whatever you can to make your life more active. Try to get a total of at least 30 minutes of activity on most or all days. Lee CD, et al. (2003). Physical activity and stroke risk

What are other, less well-documented risk factors?

- **Geographic location** — Strokes are more common in the southeastern United States than in other areas. These are the so-called "stroke belt" states.

- **Socioeconomic factors** — there's some evidence that strokes are more common among low-income people than among more affluent people.

- **Alcohol abuse** — Alcohol abuse can lead to multiple medical complications, including stroke. For those who consume alcohol, a recommendation of no more than two drinks per day for men and no more than one drink per day for no pregnant women best reflects the state of the science for alcohol and stroke risk.
- **Drug abuse** — Drug addiction is often a chronic relapsing disorder associated with a number of societal and health-related problems. Drugs that are abused, including cocaine, amphetamines and heroin, have been associated with an increased risk of stroke.

Ischemic stroke are classified according to the causal conclusion into 5 main categories:

1. Macro angiopathy (Large artery atherosclerosis): Macro angiopathy is defined as the presence of an occlusion or stenosis with > 50% diameter reduction of a brain supplying artery corresponding to clinical symptom and with location and morphology typical of atherosclerosis on Doppler ultrasound or angiography. Cardiogenic embolism had to be excluded.

2. Cardio embolism: is defined as the presence of a high or medium risk source of cardiac embolism, potential large artery atherosclerotic sources of thrombosis or embolism had to be absent.

3. Micro angiopathy (Small vessel disease): defined as the presence of one of the traditional lacunar syndromes (e.g.: pure motor stroke pure sensory stroke sensorimotor stroke, ataxic hemiparesis, and dysarthria with Clumsy hand syndrome) infarction size < 1.5 cm of diameter or normal CT and MRI examination, and absence of acute cerebral cortical dysfunction. Potential source of cardiac embolism should be absent and evaluation of large extra cranial arteries should not demonstrate a stenosis of > 50% in an ipsilateral artery.

4., Other determined etiologies like vasculitis, hematologic disorders coagulopathies or other not - further - specified disease these diagnoses had to be refined by specific diagnostic studies .

5. Undetermined etiologies (despite an extensive studies) (Goldstein ***LB et al., 2001))***