Study of Association Between Obesity with Improved Survival Functional Outcome and Recurrence of Ischemic Stroke in Elderly Hypertensive Patients

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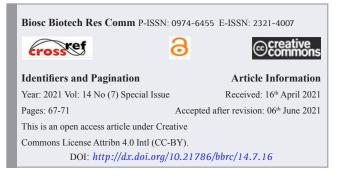*Corresponding author email: kotecharaunak2015@gmail.com*

ABSTRACT

The goal of this study is to see how BMI impacts the functional outcome of elderly hypertension individuals who have had an ischemic stroke. Ischemic stroke is the third most prevalent cause of disability and death, and obesity is the most important risk factor for cardiovascular and cerebrovascular disease. Hypertension also acts as individual risk factor for ischemic stroke and is 5th most common cause of life years with disability.

KEY WORDS: BODY MASS INDEX, CEREBROVASCULAR DISEASE, CARDIOVASCULAR DISEASE, ISCHEMIC STROKE, OVERWEIGHT, OBESITY AND HYPERTENSION.

INTRODUCTION

Hypertension is the leading cardiovascular risk factor and the fifth most common cause of life years with disabilities worldwide. Hypertension is considered to be one of the most important risk factor for cardiovascular disease and cerebrovascular diseases including ischemic stroke and haemorrhagic stroke, IHD, peripheral arterial disease and heart failure(1). Environmental, genetic and social determinants such as low diet, alcohol intake, overweight, excessive sodium intake, low potassium intake, insufficient physical activity leads to Hypertension.

The prevalence of hypertension is high and continuously increasing worldwide. The global prevalence of hypertension is 31 percent which is calculated by systolic blood pressure/diastolic blood pressure cut off of 140/90 mm hg, affecting to 1.4 billion adults. According to the American Heart Association/American College of Cardiology 2017 guidelines, the global prevalence of hypertension is expected to rise to 45.6 percent (103.3 million people).(3). Hypertension is complex disorder in which blood pressure affects different genes and/or gene combinations. There is complex relation between obesity and hypertension; hypertension is closely related to obesity which is determined by (BMI). Obesity is one of the most significant risk factor for hypertension.

Stroke is the world's third leading cause of disability and second leading cause of death. Although the incidence, frequency, and mortality of stroke have all decreased significantly during the 1990s, the overall burden of stroke continues to rise in proportion to the total number of individuals affected. In lower age groups, men have a larger stroke rate than women, while in older age groups, especially after 75 years of age, women have a greater stroke rate. Incidence of stroke varies due to difference in race and sex group and due to risk factor associated with stroke mainly hypertension(9). Result from 30 studies concludes that hypertension is most prevalent risk factor for stroke and found as contributory factor for stroke in 64 per cent of stroke patient.

The frequency of risk factors among stroke patients is lower in low-income countries, but hospital mortality is

higher, either because of delays in the presentation of acute stroke or because of differences in health-system response and acute stroke therapy. Acute ischemic stroke occurs when an intracranial or cervical artery is occluded, resulting in blood and oxygen loss in the brain. An arterial occlusion leads to hypo perfusion in larger areas of brain due to formation of central ischemic lesion in brain which can be prevented by early recanalization therapy. In acute ischemic stroke patients antihypertensive therapy is indicated either in patients with severe hypertension or in patients treated with recombinant tissue type plasminogen activator.

When systolic blood pressure is > 185 mm hg and diastolic blood pressure is 110 mm hg before therapy and systolic blood pressure is 180 mm hg and diastolic blood pressure is 105 mm hg for the first 24 hours following therapy, antihypertensive medication is recommended (13). One of the most major risk factors for cardiovascular disease is obesity (14). Obesity is linked to a higher risk of stroke in the general population, according to an epidemiological study. Most of the Studies conclude that body mass index (BMI) acts as independent predictor for lower mortality after a stroke or transient ischemic attack (TIA). The prevalence of obesity in stroke patients is 18%-44% as defined by body mass index (BMI) and 36% as defined by central steps. A various study concludes that higher number of health indicators such as a typical BMI were associated with lower incidence and prevalence of cardiovascular and non-cardiovascular disease. (18) Increase in body mass index (BMI) leads to increasing prevalence of hypertension. (19) Body mass index (BMI) is most commonly used anthropometric measure but in recent times the question has arisen about its ability to predict risk of hypertension and cardiovascular disease (CVD).

Aim And Objectives
Aim:
- Study of association between obesity with improved survival functional outcome and recurrence of ischemic stroke in elderly hypertensive patients.
- Objectives:
- Determine the prevalence of obesity in hypertensive older people.
- Determine the prevalence of ischemic stroke in hypertensive older people.
- To investigate the relationship between BMI and blood pressure.
- To look into the relationship between BMI and Ischemic Stroke in elderly hypertensive patients.

Need Of Research: It is proved that obesity has been consistently associated with increased risk of hypertension and ischemic heart disease however the mounting evidence supports that high BMI is associated with less (30%) cardiac morbidity and mortality compared with normal BMI known as OBESITY PARADOX but in elderly person (>55 years) BMI decreases with increasing age so that risk for ischemic heart disease should decrease. So I want to study that either obesity acts as risk factor or protective factor for ischemic heart disease in elderly

patients with hypertension.

MATERIAL AND METHODS

Study Setting: This study will be conducted in the Dept. of General Medicine in collaboration with clinical central laboratory of Jawaharlal Nehru Medical College, AVBRH Sawangi (Meghe), Wardha.

Duration of study: The duration of study will be from May 2020 to October 2021

Study Design: This is unmatched Cohort Study.

Participants:
Study Group: Elderly (>55 years) Hypertensive patients attending outpatient department (OPD)/admitted in Inpatient department (IPD) of Medicine department AVBRH, Sawangi (Meghe) fulfilling the diagnostic criteria.

Inclusion Criteria: Cases fulfilling the WHO criteria of hypertension as follows:
- Age: more than 55 years.
- Diagnosed case of hypertension (primary and secondary).
- Willing to participate in study.

Exclusion Criteria:
- Patient with past history of Stroke and TIA.
- Patients having HIV.
- Patients with Endocrinopathy.
- Patients having Immunocompromised Disorder.

Sample Size:
n = 128 (64: Exposed and 64: Unexposed)

METHODS

The patients, diagnosed as hypertensive as per WHO criteria were evaluated for detail history taking, clinical examination and were subjected to following investigations.
Height: in cms
Weight: in kgs
BMI: Body mass index or Quetelet index is defined as body weight divided by square of body height in meters, it is expressed in unit kg/m^2.

Table 1. WHO Categories of Body Mass Index (BMI) for Asia-Pacific Region

Categories	BMI range-kg/m^2
Under weight	<18.5
Normal weight	18.5-24.9
Obese	>25

Investigations:
- Complete Blood Count is to be done by Cell Counter.

- Liver Function Test is to be done by Biochemistry Auto Analyzer.
- Kidney Function Test is to be done by Biochemistry Auto Analyzer.
- Random Blood Sugar is to be done by Biochemistry Auto Analyzer.

- Lipid Profile is to be done by Dry Chem Fully Auto Analyzer.
- TC is to be done by CHOD-PAP method.
- TG is to be done by glycerol phosphate oxidase (GPO) - Tinder method 24).
- HDL is to be done by Precipitation method.

Table 2. World Health Organization Cut off Points		
Indicator	Cut off Point	Risk of Metabolic Complication
Waist Circumference	>94 cms(M),>80 cms (F)	Increased
Hip Circumference	>102 cms(M),>88 cms(F)	Substantially Increased
Waist Hip Ratio	>0.90 (M),>0.85 (F)	Substantially Increased

Expected Results: In our study we are expecting that overweight or extreme obesity will be the predictor of good survival and functional outcome in patients with ischemic stroke, especially in elderly patients as compared to patients with normal BMI or underweight (BMI < 25 kg/m2). Underweight may be associated with highest risk of mortality and high dependency after stroke. Patients were categorised as underweight (BMI < 18.5), normal weight (BMI 18.5-25), overweight (BMI >25-30), obese (BMI 30 to <35), with expecting that mortality risk was lower in overweight patients, lowest in obese patient compared with patients with normal body mass index. Functional and survival outcome follows the same inverse pattern i.e. underweight patient had worst outcome and overweight patients had better outcome than normal BMI patients.

DISCUSSION

Han, Minghu (2017) conducted a study and evaluated the association between cardiovascular disease and stage 1 hypertension. Study includes 3212447 patients and 65945 events. Patients with stage 1 hypertension have high risk of cardiovascular disease than the patients with normal blood pressure. Study concludes that stage 1 hypertension is associated with various cardiovascular and cerebrovascular diseases like coronary artery disease; stroke, cardiovascular disease morbidity and cardiovascular disease mortality and more than 10% of cardiovascular events can be prevented by effective control of stage 1 hypertension Bager (2019) conducted a study and compared risk of cardiovascular disease in elderly patients with high blood pressure and low blood pressure. 31740 patients of 40- 90 years of age were included in study and followed up for 2 years. Study revealed significant risk of cardiovascular disease in elderly patients with high systolic blood pressure than in patients with younger age group. The study concludes that lowering systolic blood pressure in elderly patients is beneficial and lowers the risk of cardiovascular disease.

Krzysztof Narkiewiczs (2005) conducted a study for evaluating the relationship between hypertension and obesity. The study predicts that total number of hypertensive patients may rise to 1.56 billion by 2025.

Obesity is considered to be the most important risk factor for developing cardiovascular disease, hypertension and chronic kidney disease. Evidence suggests that obesity and associated metabolic disorders accelerates renal complications in patients with essential hypertension. Study concludes that weight reduction is good prognostic factor in patients with hypertension and other cardiovascular disease. Richard N.Re (2009) studied obesity related hypertension. Obesity acts as proven risk factor for hypertension. The most common sequelae of hypertension includes Cerebrovascular Disease, Coronary Artery Disease, Atherosclerosis, Atrial fibrillation, Congestive heart failure, Left ventricular hypertrophy. Study concludes that obesity acts as predisposing factor for hypertension and alters the course of cardiovascular disease in hypertensive patient and Weight reduction must be considered as 1st line of therapy for control of hypertension. Pharmacotherapy also plays vital role in controlling hypertension and its sequelae.

In a study published in 2013, Yilong Wang looked at the link between hypertension and stroke recurrence. In this one-year study, 11560 individuals with ischemic stroke were included, 2050 of them had recurrent stroke and 8409 of them had hypertension. When comparing the small artery occlusion subtype to the large artery occlusion subtype, the study found a substantial link between hypertension and stroke recurrence. According to the findings, hypertension is a major risk factor for stroke recurrence in patients with small artery occlusion subtype and the most important risk factor for stroke recurrence within one year in patients with small artery occlusion subtype.

Walter N.Kernans in his study evaluated the role of obesity control for prevention of stroke. Prevalence of obesity varies considerably in different countries as follows U.S (34%), India (31.3 %), Canada (24%), Germany (23%) and China (4%).Research revealed different themes like measure of central obesity is better predictor of obesity as compared to BMI. The risk of stroke associated with obesity is lower in elder patients as compared to middle aged patients. The obesity equally increases the risk of both ischemic stroke and intra parenchymal haemorrhage. The hypertension and hyper lipidaemia

are risk factor for obesity associated stroke. The study concludes that weight loss act as most important tool in obese and overweight patients for prevention of primary and secondary stroke. A number of related studies on obesity (32-34) and different types of stroke (35-40) were reported. Related studies from Global Burden of Disease Study were reviewed.

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