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DETERMINING THE LEVEL OF GLYCOSYLATED HEMOGLOBIN (HBA1C) IN PATIENTS AFTER ACUTE ISCHEMIC STROKE

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Abstract:

Concomitant risk factors associated with stroke are predictors of poor outcomes in stroke patients. Various risk factors, including high blood pressure, heart disease, diabetes (DM), smoking, alcohol consumption, stress, and depression, may account for 90% of the risk of stroke, as suggested by an international multicenter study. DM is considered to be an independent risk factor for ischemic stroke, with an estimated incidence of 21-44.4% in acute ischemic stroke patients. Several studies suggest poor functional outcomes in stroke patients with elevated blood glucose levels. Recent studies have shown poor results in patients with pre-diabetes and denovo diabetes in acute ischemic stroke. Therefore, based on the above findings, this study was designed to test the level of glycosylated hemoglobin (HbA1C) in patients after acute ischemic stroke.

Methods: *This study was planned at the Department of General Medicine Nishter Hospital Multan for one-year duration from August 2019 to August 2020. 200 people with stroke participated in this study. A CT scan was performed in all cases within 3 days of the onset of symptoms to confirm the diagnosis and determine the type of stroke (ischemic / hemorrhagic) and the size of the stroke (small, medium or major).* ***Results and Conclusion:*** *The data in this study suggest that hyperglycemia in non-diabetic patients after acute stroke is a stress response reflecting more severe neurological damage. Management of hyperglycemia in patients with and without diabetes mellitus is an important aspect of the emergency management of stroke. Further studies with larger samples and long-term outcome measures would be desirable to establish a definite association between in-hospital hyperglycemia and short- and long-term outcomes after stroke.*

Key words: *glycosylated hemoglobin, HbA1C, acute ischemic stroke, etc.*

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INTRODUCTION:

A stroke is a medical condition in which poor blood flow to the brain causes cell death. There are two main types of stroke: ischemic due to lack of blood flow and hemorrhagic due to bleeding. Both result in a part of the brain malfunctioning [1-2]. Signs and symptoms of a stroke may include being unable to move or feel on one side of the body, trouble understanding or speaking, dizziness or loss of vision to one side. Signs and symptoms often begin soon after a stroke occurs [3-4]. If symptoms last less than one or two hours, it is a transient ischemic attack (TIA) or mini stroke. A hemorrhagic stroke can also be associated with a severe headache. The symptoms of a stroke can be permanent. Long-term complications can include pneumonia or loss of bladder control. The main risk factor for stroke is high blood pressure. Other risk factors include smoking, obesity, high blood cholesterol, diabetes, previous TIA, and atrial fibrillation. An ischemic stroke is usually caused by a blockage of a blood vessel, although there are less common causes as well [5-6]. A hemorrhagic stroke is caused by bleeding directly into the brain or into the space between the brain's membranes. Bleeding may occur due to a ruptured brain aneurysm. Diagnosis is usually based on a physical examination and is backed up by medical images such as CT or MRI scans. A CT scan can rule out bleeding, but does not necessarily rule out ischemia, which is not usually seen on a CT scan at first [7-8]. Other tests, such as an electrocardiogram (EKG) and blood tests, are performed to identify risk factors and rule out other possible causes. Low blood sugar can cause similar symptoms. Prevention includes diminishing risk factors and possibly aspirin, statins, surgery to open arteries into the brain in people with problematic stenosis, and warfarin in people with atrial fibrillation. A stroke or TIA often requires immediate attention. An ischemic stroke, if detected within three to four and a half hours, can be treated with a drug that can break down the clot. You should use aspirin. For some hemorrhagic strokes, surgery is beneficial [9]. Treatment to restore lost function is called post-stroke rehabilitation and is ideally performed in a stroke unit; however, they are not available in most countries of the world. In 2013, approximately 6.9 million people had an ischemic stroke and 3.4 million people had a hemorrhagic stroke. In 2015, there were approximately 2.4 million people who had a previous stroke and were still alive. Bleeding can develop in areas of ischemia, a condition known as a "hemorrhagic transition". It is not known how many hemorrhagic strokes actually start as ischemic strokes. In the 1970s, the World Health Organization defined stroke as "a neurological deficit of a cerebrovascular cause that lasts more than 24 hours or is interrupted by death within 24 hours," although the word "stroke" is centuries old. This definition was intended to reflect the reversibility of tissue damage and was developed for this purpose, with an arbitrary choice of the 24-hour time frame. The 24-hour limit separates a stroke from a transient ischemic attack, which is associated with stroke symptoms, which resolve completely within 24 hours. With treatments available that can reduce the severity of stroke when given early, many now prefer alternative terminology such as brain attack and acute ischemic syndrome (modeled after myocardial infarction and acute coronary syndrome, respectively) to reflect the urgency of the symptoms of stroke and the need for quick action[9-10]. They cause tissue damage by compressing the tissue from an expanding hematoma or hematomas. In addition, pressure can lead to a loss of blood supply to the affected tissue, resulting in a heart attack, and the blood released from a cerebral hemorrhage appears to have a direct toxic effect on the brain tissue and vascular system. Inflammation contributes to secondary brain damage after hemorrhage. Concomitant risk factors associated with stroke are predictors of poor outcomes in stroke patients. Various risk factors, including high blood pressure, heart disease, diabetes (DM), smoking, alcohol consumption, stress, and depression, may account for 90% of the risk of stroke, as suggested by an international multicenter study. DM is considered to be an independent risk factor for ischemic stroke, with an estimated incidence of 21-44.4% in acute ischemic stroke patients. Several studies suggest poor functional outcomes in stroke patients with elevated blood glucose levels. Recent studies have shown poor results in patients with pre-diabetes and denovo diabetes in acute ischemic stroke. Therefore, based on the above findings, this study was designed to test the level of glycosylated hemoglobin (HbA1C) in patients after acute ischemic stroke.

METHODOLOGY:

This study was planned at the Department of General Medicine Nishter Hospital Multan for one-year duration from August 2019 to August 2020. 200 people with stroke participated in this study. A CT scan was performed in all cases within 3 days of the onset of symptoms to confirm the diagnosis and determine the type of stroke (ischemic / hemorrhagic) and the size of the stroke (small, medium or major). All patients received informed consent. They were given the purpose and purpose of the work. Prior to conducting this study, approval was obtained from the institutional ethics committee. The inclusion and exclusion criteria for this study are as follows.

Inclusion Criteria: All cases of acute ischemic stroke in men and women. Patients over 18 years of age.
Exclusion criteria: Patients under 18 years of age, hemorrhagic stroke, heart disease.

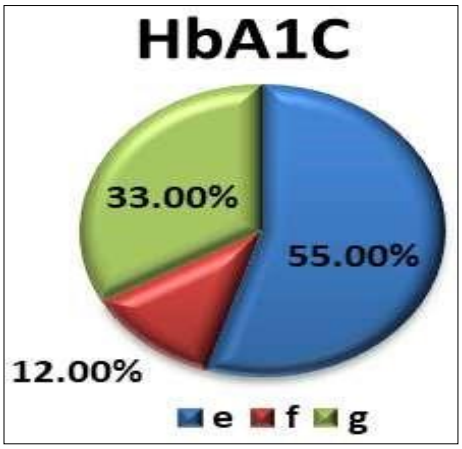
RESULTS AND DISCUSSION:

Stroke remains the leading cause of morbidity and mortality, and the leading cause of adult disability. Stroke is defined as "Rapidly developing clinical signs of a focal (or global) brain dysfunction, with symptoms lasting more than 24 hours or leading to death with no apparent cause other than of vascular origin. Despite advances in diagnostics and pharmacotherapy, stroke remains one of the major neurological diseases, often causing severe disability and death.

Table 1: ADA-2019: Criteria for screening and diagnosis of diabetes-

Diabetes			
	Normal	Pre-diabetes	Diabetes
HbA1C	<5.7	5.7-6.4	≥6.5
Symbol used	e	f	g

According to the WHO, stroke is considered the second most common cause of death over the age of 60 and the fifth most common cause of death in the 15 to 59 age group. old man, it is estimated that 15 million people worldwide suffer stroke each year, of which 5.5 million die and 5 million remain permanently disabled. or recurrent stroke, in 2011, a stroke caused 1 in 20 deaths in the US. Developing countries such as India face an enormous burden of cardiovascular disease, with stroke being one of the emerging causes of disability and death.



It is estimated that the adjusted incidence of stroke is around 84-262 / 100,000 in rural areas and around 334-424 / 100,000 in urban areas of India. According to recent population studies, the incidence rate is around 119-145 / 100,000. Estimates from the Indian Council of Medical Research - ICMR show that among noncommunicable diseases (NCDs), stroke contributes to approximately 41% of deaths and 72% of disability-adjusted life years (DALY). Of the 200 AIS patients, 66 (33%) diabetic patients (HbA1c ≥6.5%), 24 (12%) in the pre-diabetic range (HbA1c 5.7-6.4%) and 110 (55%) were without diabetes. (HbA1c <6.4) HbA1c. History of diabetes was present in 36% of all patients. Hjalmarsson et al. The study suggests that poor glycemic control (baseline HbA1c) prior to ischemic stroke is an independent risk factor for poor survival and a marker of increased stroke severity and adverse long-term functional outcome. Johnston et al. noted that infarct volume significantly predicted the NIHSS score on admission. Kamouchi et al. who studied 3,627 patients, the results showed that the neurological improvement was less significant with age and gender, and higher with blood HbA1C on admission. Toumilehto j et al. The study found that diabetes was the highest risk factor for death from stroke in both men and women. Men with baseline diabetes had a six-fold greater risk of death from stroke. The exact mechanism by which elevated glucose levels deteriorate outcomes in stroke patients is not fully understood. Proposed mechanisms to explain the hypothesis of hyperglycemia on stroke include increased acidosis at the site of brain injury, increased oxidative stress causing further damage at the site of brain injury, impaired thrombolysis, disrupting recanalization and causing reperfusion

injury. A recent study involving 120 patients with T2DM showed that mean HbA1c was significantly higher in diabetic patients with silent myocardial ischemia. Total glycemic disturbance can be estimated by measuring HbA1c levels, which includes basal and postprandial hyperglycemia. The measurement of HbA1c is well standardized and the biological variability is lower and does not require starvation. Furthermore, glucose levels are not affected by sharp changes. Hyperglycaemia is common in patients with acute stroke, occurs in 60% of patients, and is thought to exacerbate cerebral ischemia. It leads to intracellular acidosis, accumulation of extracellular glutamate, brain edema, disruption of the blood-brain barrier and a tendency to hemorrhagic changes. It has been observed that 20 to 40% of patients admitted to ischemic stroke have hyperglycemia, often without diagnosis of diabetes, which may be due to stress hyperglycemia or unrecognized diabetes mellitus at risk of an acute episode. Diabetes mellitus remained an independent risk factor even after adjusting for age, high blood pressure, smoking, and left ventricular hypertrophy. In a meta-analysis of 13 prospective cohort studies, for each one percentage point increase in glycosylated hemoglobin (HbA1c), the relative risk for each cardiovascular event was 1.18. Interventional studies have established that cardiovascular complications are mainly or partially dependent on persistent chronic hyperglycaemia and diabetic dyslipidaemia. Diabetes mellitus is considered a highly "vascular disease" with both microvascular and macrovascular complications. Macrovascular complications develop well before overt diabetes develops. Hyperglycemia is an independent risk factor for cardiovascular disease. Hyperglycemia accelerates the process of atherosclerosis by creating glycated proteins and advanced glycation end products that act by exacerbating endothelial dysfunction. HbA1c can be considered a good marker of glycated proteins, and its determination has been used as a measure of glycemic control in several landmark studies. The Framingham study found that cardiovascular mortality is twice as high in diabetic men and four times in diabetic women, compared to their non-diabetic counterparts. HbA1c levels above 7% are associated with a significant increase in the risk of cardiac events and death. Interestingly, this correlation between higher HbA1c levels and increased cardiovascular morbidity occurs even before clinical diabetes is diagnosed. Stroke is the second leading cause of death worldwide and one of the leading causes of disability. The most common cause of stroke is cerebral ischemia, with approximately 80% of strokes due to ischemic infarction and 20% due to cerebral hemorrhage. The incidence and prevalence of cerebrovascular disorders in India is increasing due to the rapid escalation of risk factors including high blood pressure, diabetes, smoking and obesity, affecting a large proportion of the adult population. The combination of stroke and diabetes is associated with poorer post-stroke outcomes, severe disability, and recurrent stroke. About 20% of diabetic patients die of stroke. There are many patients in our society who suffer from diabetes but remain undiagnosed. Many of them were diagnosed with diabetes during a cardiac emergency. Early diagnosis and treatment of diabetes could help prevent these emergencies. Hence, regular screening for diabetes should be carried out in the general population, especially in people over the age of 40 with a family history of diabetes. Patients with diabetes and higher levels of glycosylated hemoglobin have a higher incidence of acute coronary syndromes and worse outcomes. Close control of your diabetes helps to prevent acute cardiac complications in people with diabetes.

CONCLUSION:

The data in this study show that hyperglycemia in nondiabetic patients after acute stroke is a stress response reflecting more severe neurological damage. Management of hyperglycaemia in patients with and without diabetes is an important aspect of the emergency management of stroke. Further studies on a larger sample and long-term outcome measures would be desirable to establish a definite association between hospital admission hyperglycemia and short- and long-term stroke outcomes.

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