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Original Research Paper

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STUDY OF BLOOD GLUCOSE AND WHITE BLOOD CELL COUNT COMBINATION IN PREDICTING SHORT TERM OUTCOME OF ACUTE ISCHEMIC STROKE

Dr. Dhruvanandan K	SDUAHER.
Dr. Vishwanath Reddy*	SDUAHER. *Corresponding Author
Dr. Raveesha. A	SDUAHER.
Dr. Sanmita Ram S	SDUAHER.
Dr. Sreenath K Reddy	SDUAHER.

ABSTRACT This study was conducted to analyze the utility of blood sugars and total leukocyte count in combination to judge clinical outcome of acute ischemic stroke. A total of 72 patients were included in the study. Participating subjects were divided into four categories 1. Patients with high blood sugar and high white blood cell count (HSHW)2. Patients with high blood glucose and normal white blood cell count (HSNW) 3. Patients with normal blood glucose and high white blood cell count (NSHW) and 4. Mean age was 62.34 years (± 12.06), with a median NIHSS score at presentation was 14. This study showed that Combination of high blood sugar and high white blood cell count is associated with poor functional outcome as compared to high blood sugar and high white blood cell count alone.

KEYWORDS : combined utility, White blood cell count and blood sugar, acute ischemic stroke

INTRODUCTION

Stroke is one of the leading cause of adult disability reducing the quality of life in all age group. This makes it essential for early assessment and estimation of the probable outcome to decide on better allotment of resources and for effective care. Stress and inflammatory response is considered and studied as factors which can predict severity and outcome in acute ischemic stroke. In a study in US where total of 436 patients were studied it was found that high white blood cell count and high blood sugars were associated with poor outcome. Studies shows that increase white blood cell count and high blood sugars in acute myocardial infarction is associated with poor short term outcome and increased in hospital mortality. But combined utility of white blood cell count and blood sugar in acute ischemic stroke is limited. In the current study we aim to study random blood sugar and white blood cell count in combination to predict short term outcome in patients with acute ischemic stroke.

MATERIALS

This study was conducted on patients admitted in a tertiary care center. 72 participants were included in the study who are aged >18 years and satisfy the definition of acute ischemic stroke as per world health organization using history, clinical data and neuroimaging. The inclusion criteria's being Acute Ischemic Stroke presenting within 24 hrs of the onset of symptoms. Patient's demographic details, risk factors were collected including data of severity of stroke assessed by national institute of health stroke scale (NIHSS), and modified rankin scale was also calculated. Along with it patient's white blood cell count and random blood sugar at the time of admission was calculated. Other data include diagnosis related documents, drugs used in treatment, vascular risk factors, history of diabetes and hypertension, smoking and alcoholic history were also collected. Participating subjects were divided into four categories 1. Patients with high blood sugar and high white blood cell count (HSHW)2. Patients with high blood glucose and normal white blood cell count (HSNW) 3. Patients with normal blood glucose and high white blood cell count (NSHW) and 4. Patients with normal blood glucose and normal white blood cell count (NSNW). High blood sugar was considered when RBS > 140mg/dL, and high white blood cell count was considered when WBC is > 11,000 cells per cumm. Modified rankin scale was calculated and recorded for each individual patient on 7th day after hospital admission and they were assigned to four groups as mentioned above. Data was entered into Microsoft excel data sheet and was analyzed using SPSS 22 version software. Categorical data was represented in the form of Frequencies and proportions. Chi-square test was used as test of significance for qualitative data. Continuous data was represented as mean and SD. ANOVA (Analysis of Variance) was the test of significance to identify the mean difference between more than two groups for quantitative data.

OBSERVATION

Complete data on conventional risk factors and WBC Count and blood glucose levels at admission were available for 72 patients whose mean age was 62.34 years (± 12.06), with a median NIHSS score at presentation was 14. In the study 29.2% had Normal WBC count and Normal Glucose, 20.8% had Normal WBC and High Glucose, 23.6% had High WBC count and Normal Glucose and 26.4% had High WBC and High Glucose. Among 72 patients who were included in the study 9 patients died during the stay in hospital. Among the nine, 6 belong to group of HSHW.

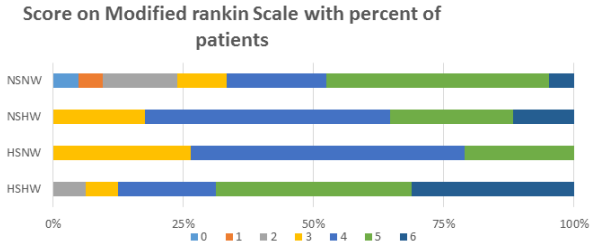

Fig 1 – Comparision of different groups Modified rankin score

In the study there was significant association between Rankin scale score and Four groups. Among NWNG group, majority of subjects had Rankin score of 5 (47.6%), in NWHG group,

majority of subjects had Rankin score of 4 (40%), in HWNG group, majority of subjects had Rankin score of 4 (52.9% respectively) and in HWHG group, majority of subjects had Rankin score of 4 and 6 (31.6% respectively). Among the four participating groups the group of HGHW showed significantly more in hospital death (χ 2 =9.624, df =3, p =0.022*). The group with HSHW was more predictive of poor hospital outcome as compared to patient group with high sugar and high white blood cell count alone.

		NWNG		NWHG		HWNG		HWHG		Total		p value
		Count	%	Count	%	Count	%	Count	%	Count	%	
HTN	Absent	11	52.4%	9	60.0%	9	52.9%	6	31.6%	35	48.6%	0.357
	Present	10	47.6%	6	40.0%	8	47.1%	13	68.4%	37	51.4%	
T2DM	Absent	14	66.7%	3	20.0%	13	76.5%	2	10.5%	32	44.4%	<0.001*
	Present	7	33.3%	12	80.0%	4	23.5%	17	89.5%	40	55.6%	
COPD/ Asthma	Absent	19	90.5%	14	93.3%	16	94.1%	19	100.0%	68	94.4%	0.618
	Present	2	9.5%	1	6.7%	1	5.9%	0	0.0%	4	5.6%	
Smoker	Absent	12	57.1%	7	46.7%	13	76.5%	11	57.9%	43	59.7%	0.372
	Present	9	42.9%	8	53.3%	4	23.5%	8	42.1%	29	40.3%	
Alcohol	Absent	17	81.0%	12	80.0%	15	88.2%	18	94.7%	62	86.1%	0.536
	Present	4	19.0%	3	20.0%	2	11.8%	1	5.3%	10	13.9%	

In the study there was significant association between death and four groups. Among NWNG group, 4.8% had mortality, 11.8% of HWNG had mortality and 31.6% of HWHG had mortality. No significant association was found between diabetes and hypertension with the outcome. Smoking, alcohol and COPD status of the patient was not associated with significant inhospital morbidity and mortality.

CONCLUSION

Combination of high blood sugar and high white blood cell count is associated with poor functional outcome as compared to high blood sugar and high white blood cell count alone.

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DECLARATION

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