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Research Article

A COHORT SERIES TO ASSESS THE CORRELATION BETWEEN POOR OUTCOMES AND INCREASED HIGHER SENSITIVITY LEVELS OF TROPONIN T AFTER ACUTE ISCHEMIC STROKE

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Abstract:

Background: In this study raised levels of higher sensitivity cardiac troponin T to happen within a substantial proportion of patients with severe ischemic stroke and can forecast poor mortality and result after stroke. Whether high levels of hs-cTnT can also forecast prognosis or hemorrhagic transformation in patients of ischemic stroke remains unclear.

Objective: The study was conducted for the assessment of the association among poor outcomes with elevated high sensitivity troponin T after the acute ischemic stroke.

Methods: This cohort research was carried out at Jinnah Hospital, Lahore from March 2017 to October 2017. A total number of 100 patients were enrolled in the study. For analysis of serum hs-cTnT level, blood samples were taken from all participants patients. the hospital duration of all patients was noted. the outcome was labeled as poor if the patient died in fifteen days after the admission.

Results: Among 25 patients (25%) outcome was observed as poor. Among the Patients with raised Hs-TnT level 18 patients (36%) outcome was poor and among the patients with normal Hs-TnT levels only 8 patients (16%) outcome was poor. The relative risk of 1.602 indicated that patients with elevated Hs-TnT value were having 2.26 times more poor outcome chances as in comparison with the normal Hs-TnT level patients. This trend was the same in both genders, all age groups and within patients having a family history of MI.

Conclusion: An elevated level of Hs-TnT is linked with the poor outcome within patients presenting with severe ischemic stroke.

Keywords: High sensitivity troponin T, Poor outcome, Acute ischemic stroke

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INTRODUCTION:

Among the causes of death, stroke is the 3rd most common cause as well as the major reason of disability within developing countries [1]. The stroke occurrence is reducing in Western countries but the disease burden within Pakistan, Sri Lanka, Bangladesh, and India (South Asian countries) is prone to be increased in the near future [2]. In our country very limited studies have been conducted to expose the estimated annual occurrence of stroke within Pakistan is 25/10000, which indicates 350,000 new cases per year.

The reported Stroke specific fatality is between seven percent and twenty percent within various research studies within Pakistan [3, 4]. Approximately 62% of stroke patients develop complications and about nine percent can perform normal activities in their daily living [4]. Several factors have been examined regarding the stroke prognosis. At present, interest is observed within cardiac troponin T in ischemic stroke investigation. Serum level of CK-MB (creatinine-kinase myocardial fraction), LDH (lactate dehydrogenase), and cTnT (cardiac troponin T) are high within myocardial damage. The cardiac troponin T is very sensitive and myocardial injury's specific marker as in comparison with CK-MB which helps within diagnosing serious myocardial infarction [5]. An Increase within levels of cTnT has been stated after myocardial damage. An increased cTnT has also been described happening within 5 to 34% of patients with critical ischemic stroke [6]. Rise of cTnT was observed in many studies and it has a link with stroke severity at the time of hospital admission, short- and long-term clinical outcome increased risk of mortality, indicating the prognostic significance of increased cTnT, insular cortex lesions, in acute ischemic stroke [7, 10]. At present, a generation of highly sensitive troponin assays has been developed and it allows for the detection of concentrations 5 to 10 times lower than those measurable with conventional assays [11]. A research study revealed that with high Hs-TnT, 27.8% patients while 6.4% with lower Hs-TnT had mortality, $P < 0.01$. The average hospital stay of patients with high Hs-TnT was twelve days while the average hospital stay of lower Hs-TnT patients was seven days, $P < 0.001$ [12]. Therefore, this new hs-cTnT (highly sensitive cardiac troponin T) elevation may be more valuable as compared to conventional assays furthermore, it may help to better predict the association between hs-cTnT elevation on in-hospital mortality after acute ischemic stroke. In this study, the focus is on hs-cTnT elevation in ischemic stroke patients and the connection of hs-cTnT elevation will

be calculated. This study is conducted to help the patients for implementing the screening of Hs- TnT within ischemic stroke patients and to prevent them from mortality through altering treatment and medication.

METHODS:

This cohort research was carried out at Jinnah Hospital, Lahore from March 2017 to October 2017. Patients of both genders within the age range from 40 to 65 years, diagnosed with serious ischemic stroke, presented within one day of onset of symptoms, confirmed with CT scan, indicating hypo-dense part within CT scan brain within one day of weakness onset, in parts of the body. AIS patients with high Hs-TnT and without high HS-TnT were named as Group A and Group B respectively. Patient with pregnancy, who presented with central chest at presentation, with weakness improved within one day of onset (transient ischemic attack), having previous stroke's past history, having MI within past 30 days, having diagnosed distortion within previous medical records and with diagnosed creatinine higher than 1.2mg/dl (chronic renal disease) were excluded from the study. A total number of 100 patients fulfilling inclusion criteria were included in the study. Half of the patients (50%) were with high Hs-TnT and 50% without high Hs-TnT. The study held at Medicine Department, Mayo Hospital, Lahore. Informed consent was obtained from the patients. Demographical data including name, gender, and age was noted. Patients' blood sample was obtained for laboratory for analysis through 3 cc venous blood sample within a disposable syringe within one day of onset of symptoms and high level of serum hs-cTnT was noted. Hospital duration was noted for all patients. If the patient died in two weeks from admission, then as per operational definition poor outcome was labeled. Data analysis carried out through SPSS version 20. Standard and mean deviation was measured for numerical variables like age. Percentage and Frequency were completed for the nominal variable as like gender and poor outcome. For measuring association amongst raised Hs- TnT, $\text{value} \geq 14\text{ng/L}$ and poor outcome (death during 15 days of attack) relative risk were calculated. $RR > 1$ was taken as the risk of association. Stratification of data carried out for gender, age, and family history of MI. Post-stratification adjusted RR was measured. P-value as ≤ 0.05 was considered as significant.

RESULTS:

Patients average age range was (50.60 ± 7.30) years. In this research study, the participants from both of the

genders male and female were 54 (54%) and 48 (48%) respectively. Patients having a family history for MI were 15 (15%). Among the Patients with high Hs-TnT

tendency of poor outcome was significantly 1.602 times high as in comparison with the patients having normal Hs-TnT (RR: 1.602 and p-value = 0.024)

Table – I: Baseline Characteristics

Variables	Number	Percentage
Male	53	53
Female	47	47
Family History	15	15

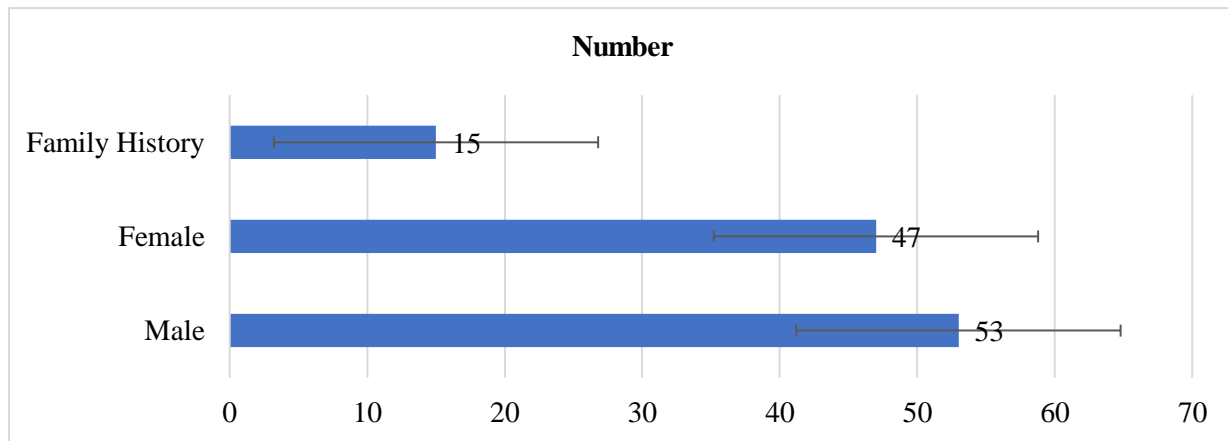
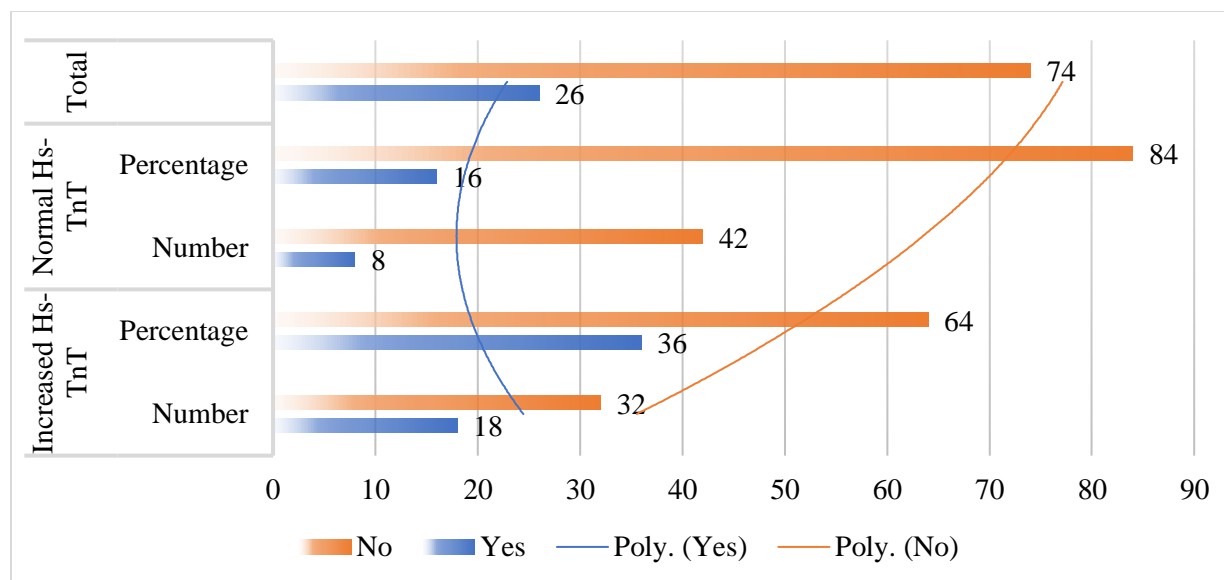


Table – II: Association between increased level of hs-TnT and poor outcome (after acute ischemic stroke)

Poor Outcomes	Increased Hs-TnT		Normal Hs-TnT		Total
	Number	Percentage	Number	Percentage	
Yes	18	36	8	16	26
No	32	64	42	84	74



DISCUSSION:

Many lines of evidence highlight the high cTnT levels as a prognostic pointer in stroke patients. High cTnT levels happen in 5 to 36% of patients with severe ischemic stroke and they are linked with higher stroke intensity on admission and greater risk of poor clinical outcomes, mortality and insular lobe damage [10, 13, 15]. The hs-TnT analyzes, for which the dimensions are termed hs-cTnT, have expanded the potential usage of cTnT levels as pointers within myocardial infarction and even in other cardiac diseases as like of atrial fibrillation end-stage renal disease pulmonary embolism and structural heart disease, and other circumstances [16, 18]. a sensitive and specific biochemical marker of myocardial harm has been found in the literature of hs-cTnT levels as of other kinds of tissue damage, for instance, stroke. Higher cTnT was also found within 5 to 34% of patients with severe ischemic stroke [6]. On the time of hospital admission, stroke severity was linked with the elevation of cTnT as observed in many studies, short- and long-term clinical outcome, insular cortex lesions and enlarged mortality risk [8, 10, 19] displaying prognostic importance of enhanced cTnT within the severe ischemic stroke. In our study classification for patients was made on the basis of the Hs-Tnt level. Half strength of the patients (50%) was with raised Hs-TnT level remaining patients (50%) were having a normal level of Hs-TnT. Poor outcome was seen amongst the number of 26 (26%) patients and within 18 patients (36%) (with high Hs- TnT level) the outcome was poor and within only 8 patients (16%) (with normal levels of Hs-TnT level) outcome was poor. Comparative risk value of 1.602 indicated that

patients with a high value of Hs-TnT were having 2.26 times more probabilities of the poor outcome as in comparison with the patients with a normal level of Hs-TnT. The same tendency was observed in all groups with respect to age (40 years to 50 years (Poor Outcome): RR=1.46, and 51years to 60 years (Poor Outcome): RR=1.87 and greater than 60 years (Poor outcome): RR=1.38) patients and for both genders patients [Men (Poor Outcome): RR=1.75 and Women (Poor Outcome):RR=1.44]. and also, the patients having family History for MI (Poor outcome): (Yes): RR=2.76 and No=1.42]. In the year 2016, Junfeng Liu stated possible hs-cTnT levels relationships along with hypertension risk in his study and with the general prognosis of critical ischemic stroke patients through RHD within China.he found that patients with high levels of hs-cTnT were having significantly high risk related to hypertension, three-month mortality and three-month disability or mortality having all p-value less than 0.028. After controlling for hypertension, National Institutes of Health Stroke Scale score on admission, renal impairment, gender, sex, hypertension, renal impairment and age, the probability of hypertension and three-month mortality was as 4.0 and 5.5 respectively, fold higher within patients having higher levels of hs-cTnT as compared with patients with normal levels of hs-cTnT [20]. It was seen in a study patient with high Hs-TnT, (27.8%) while patients with low Hs-TnT (6.5%) were having mortality (P<0.01). The average hospital duration of high Hs-TnT patients comprised twelve days whereas the average hospital duration of lower Hs-TnT patients comprised seven days (P<0.001) [12]. In a study presented by Raoul Stahrenberg reported that Hs-TnT

forecasts vascular proceedings and cause mortality within patients having severe cerebral ischemia as well as improves forecasts beyond clinically established scores [21]. Results of the above-mentioned studies and our study are the same indicating that with high Hs-TnT level patients' chance for poor mortality, prognosis, and other morbid conditions is high. But none of the studies have calculated relative risk for poor outcome within the connection to high Hs-TnT levels. The mechanism of two candidates is regarded in relevance to troponin elevation within severe ischemic stroke in the absence of renal insufficiency. Initially, the coincident severe coronary syndrome can lead to focal ischemic myocardial necrosis with the help of the coronary vessel's thrombotic occlusion. After that, the imbalance of stroke-induced autonomic with succeeding catecholamines surge could induce global dysfunction, the release of cTnT and harm of myocardial tissue. Still, the cause of cTnT rise within the individual patients of stroke has many questions, leading to a therapeutic and diagnostic dilemma for physicians. Severe coronary syndrome reliably coronary station has to be clarified for ruling out the coincident. But, hazards of cerebral bleeding problems limit the diagnostic process using coronary angiogram within patients having acute stroke [11]. cTnT levels are recurrently high within patients having an acute ischemic stroke and high cTnT predicts mortality and poor outcome. The mechanism of the path of troponin release can relate to the disease of myocardial ischemia and comorbid coronary artery or, alternatively to neurogenic damage of cardiac because of autonomic activation after severe ischemic stroke. So, there is uncertainty regarding the management of therapeutic and diagnostic workup for acute ischemic stroke patients having increased levels of cTnTs. The clinical risk forecasting scores are frequently validated and are taken as prognostic tools for the management of patients within cerebral ischemia, with moderate predictive value [22]. Easily accessible biomarkers like hs-TnT are highly reproducible and standardized surrogates for biological procedures that are very objective as well as easy to understand when doctors are having clear rules regarding their usage. Because of the high standardization degree, they are suitable for comparisons within different settings.

CONCLUSION:

Results of this research study approved that, the elevated level of Hs-TnT is linked with the poor outcome within patients presenting with severe ischemic stroke. Routine usage of Hs-TnT within stroke patients helped in better risk forecasting and

improvement in outcomes for these patients and in risk-tailored secondary preventive measures.

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