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ORIGINAL ARTICLE

TO STUDY THE RELATIONSHIP OF SERUM HIGH SENSITIVE C REACTIVE PROTEIN AND ITS SHORT TERM PROGNOSTIC SIGNIFICANCE IN ACUTE ISCHEMIC STROKE

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ABSTRACT: Ischemic stroke is one of the most common causes of death worldwide and is most often caused by thrombotic processes. The study was based on 50 patients with ischemic stroke; coming to SGDRIMSR, Amritsar. In this study the level of hsCRP was estimated which is one of the risk factors in cases of acute ischemic stroke and the relationship between its levels and the short term prognosis was evaluated. Patients with history of acute infection or injury in the past 10-14 days before admission, suffering from Diabetes Mellitus, Pregnancy/Nursing Mothers, with Acute Liver disease, with history of Rheumatoid Arthritis, Osteoarthritis or malignancy, with history of skeletal muscle disease, with heart disease which could have led to embolism such as atrial fibrillation or Valvular disease, with thyroid or renal dysfunction were excluded from the study. It was concluded that acute ischemic stroke had higher circulating serum high sensitive CRP and the high sensitive CRP levels was maximum after 2 days of the stroke. Short term unfavorable prognosis seems to be associated with elevated serum high sensitive CRP levels in patients with ischemic stroke in our study.
KEYWORDS: High sensitive CRP, Acute Ischemic Stroke, SSSS, NIHSS.

INTRODUCTION: Cerebrovascular diseases include some of the most devastating disorders like ischemic stroke, hemorrhagic stroke, venous thrombosis and cerebrovascular anomalies such as intracranial aneurysm and AV malformations. Basic and clinical studies provide evidence that inflammation plays a crucial role in atherosclerosis and cardiovascular disease. Despite a growing literature on the role of acute phase proteins, particularly high sensitivity C-reactive protein (hs CRP) and other inflammatory markers, risk stratification and predictors of outcomes among patients with cardiovascular disease, very little is known about the role of the inflammatory markers in predicting outcome in patients with cerebrovascular disease. In present study the elevated levels of high sensitive C reactive protein as an inflammatory marker in acute ischemic stroke and its short term prognostic significance in acute ischemic stroke were studied.

Roger etal[1] showed that high sensitive C reactive protein is a useful marker in detection of early stages of acute ischemic stroke and the results correlated with our study.

MATERIAL AND METHODS:

The study was based on 50 patients with ischemic stroke; coming to SGDRIMSR, Amritsar.

Exclusion criteria:

1. Patients who were admitted more than 24 hours after the onset of symptoms.
2. Patients whose clinical and radiological findings were not consistent with acute ischemic stroke.

3. Patients whose neurological symptoms improved within 24 hours.
4. Those diagnosed as haemorrhagic cerebrovascular disease following CT /MRI brain.
5. Those who had previously suffered an ischemic stroke.
6. Patients with history of acute infection or injury in the past 10-14 days before admission.
7. Patients suffering from Diabetes Mellitus.
8. Pregnancy/Nursing Mothers.
9. Patients with Acute Liver disease.
10. Patients with history of Rheumatoid Arthritis, Osteoarthritis or malignancy.
11. Patients with history of skeletal muscle disease.
12. Patients who had heart disease which could have led to embolism such as atrial fibrillation or Valvular disease.
13. Patients with thyroid or renal dysfunction.
14. Patients on anti-inflammatory drugs.
15. Patients who had been thrombolysed following stroke.

At admission, plain CT scan of the head was done to rule out hemorrhage. The clinical status and outcome of the patients was evaluated with Scandinavian stroke scale and National Institute of Health Stroke scale on admission and 10th day after stroke onset and scoring by both the scales patients was discussed. The patients were grouped according to age as <50, 50-59, 60-69 and >70 years.

Routine investigations were also done before enrolling the patient in the study. Serum High Sensitive C-reactive protein levels were estimated in every patient at the time of enrollment of patient in the study and were repeated on the 2nd, 5th, 10th day of admission.

ETHICS: While performing this study on human subjects, the procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (Instrumental or regional) and with Helsinki Declaration of 1975 that was revised in 2000.

RESULTS AND DISCUSSION: The mean high sensitive C-reactive protein level of stroke patients were 0.541±0.03 on admission, 0.972±0.20 on the 2nd of admission, 0.899±0.20 on the 5th of admission and 0.613±0.02 on the 10th day of admission, it was found that high sensitive C-reactive protein level increases after acute ischemic stroke and the higher the high sensitive C-reactive protein levels, worse is the prognosis, in terms of clinical status and outcome as per scandavian stroke scale and the e Institute of Health Stroke Scale (NIHHS). This was supported by statistical analysis which showed data to be statistically highly significant ($p<0.001$).

The present study showed that the correlation of Scandinavian Stroke Scale and high sensitive C-reactive protein on the day of admission (-0.4520 is statistically highly significant) $p<0.001$ and on 10th day of admission (0.324) is also significant ($p<0.05$). Similarly the correlation of National Institute of Health Stroke Scale (NIFISS) Score and high sensitive reactive protein on the 10th day of admission (0.301) was also found to be highly significant with the p-value of <0.001.

Roger et al [1]showed that as the value of C reactive protein goes on increasing the prognosis gets more and more worsened.

Muir et al[2] showed that there is a relationship between high sensitive C-reactive protein and prognosis of patient after acute ischemic stroke. They showed that survival in those with C-reactive

protein more than 10.1 mg/L was significantly worse than in those with C-reactive protein <10.1 mg/L. These finding were consistent with our study and showed that C-reactive protein concentration is an independent predictor of survival after ischemic stroke and also shows a role of inflammation in acute ischemic stroke. In our study, the mean high sensitive C-reactive protein levels on the day of admission in patients of acute ischemic stroke were higher in those who died (1.025±0.267) than in those who survived (0.499±0.155). The statistical correlation was highly significantly ($p<0.001$). Thus higher level of highly sensitive C-reactive protein level was associated with more mortality.

Yoldas et al., in a study showed that levels of high sensitive C reactive protein on second day of stroke were satisfactory higher in those patients who died within 1-10 days than those in surviving patients.

Song et al., [3] in their study demonstrated that elevated levels of high sensitive C-reactive protein on the rather than levels occurs within the 24 hours after stroke onset, could strongly predict the prognosis of functional disability. The result supported that high sensitive C-reactive protein is a useful marker of ischemic stroke in the Korean population. In our study the values of high sensitive protein on the 2nd day of admission were the highest and were correlated to the short term prognosis.

Napolian[4] included 128 patients in their study. The C-reactive protein values within 24 hours of acute ischemic stroke and between 48 to 72 hours of acute ischemic stroke were 1.3 (0.5 to 3.3) and 1.0 (0.5 to 2.3) mg/d respectively.

Brott[5] conducted a study to correlate levels of CRP with acute ischemic stroke. The prognosis of cerebral infarction goes on increasing as the level of CRP goes on increasing.

Rost[6] and Wolf carried out a study to correlate levels of CRP with prognosis of acute ischemic stroke. it was found that level of CRP on day 10 was higher than level of CRP on day 5 and was associated with worse prognosis than day 5.

Young et al[7] in a study showed that levels of high sensitive C reactive protein on second day of stroke were satisfactory higher in those patients who died within 1-10 days than those in surviving patients.

Dell[8] C-reactive protein outcome after ischemic stroke was directly proportional to duration of stroke.

Robin S[9] showed that CRP levels on day 8 was higher than on day 5 and was showed worse prognosis than on day 5.

Pearson[10] showed that CRP levels goes on increasing with duration of stroke and was associated with worsened prognosis.

Ross[11] showed that atherosclerosis is an inflammatory disease and level of inflammatory markers like CRP goes on increasing as duration of atherosclerosis goes on increasing and was associated with more worsened prognosis.

CONCLUSION: From our study we concluded that high sensitive C-reactive protein levels at presentation are increased in cases of ischemic stroke being maximum on second day of stroke suggesting an inflammatory response in acute ischemic stroke. Furthermore, the increased levels correlate with sever neurological deficit and worse outcome.

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