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INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI:10.21474/IJAR01/16413
DOI URL: http://dx.doi.org/10.21474/IJAR01/16413

RESEARCH ARTICLE

PROGNOSTIC IMPLICATION OF HIGH SENSITIVITY C-REACTIVE PROTEIN IN ACUTE CORONARY SYNDROME PATIENTS

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Manuscript Info

Manuscript History
Received: 10 January 2023
Final Accepted: 14 February 2023
Published: March 2023

Key words:-
HS-CRP,STEMI,NSTEMI

Abstract

Aim: An observational cross sectional study for assessing the levels of High sensitivity creactive protein in patients with acute coronary syndrome and study its prognostic implication.

Methods: All the patients presenting with clinical,ECG and 2D – echocardiographic evidence of acute myocardial infarction admitted in department of medicine.

Results: A study of 48 patients with acute coronary syndrome of both sex were taken as sample.36 patients were diagnosed as ST elevation MI(STEMI) and 12 patients were diagnosed as Non-ST elevation MI(NSTEMI).Out of 36 STEMI patients,20 patients were male and 16 were female.Out of 12 NSTEMI patients,6 were male and 6 were female.Among male patients with STEMI ,85% had risk factor of smoking,alcohol,diabetes mellitus or systemic hypertension,whereas in females it was 81%.Among NSTEMI males had risk of 83% and females it was 60%.In patients with STEMI,8% had normal EF,25% had Moderate EF and 50% had low EF.The correlation between the prognosis and values of HS-CRP of patients with extensive AWMI is found to be statistically significant.(ppatients with extensive AWMI is found to be statistically significant.($p<0.05$).

Conclusion: The levels of HS-CRP correlate with several cardiovascular risk factors such as smoking,diabetes mellitus and hypertension.Elevated levels of hs-CRP is related to the presence of plaque rupture ,which provokes acute coronary syndrome.Therefore, in a resource limited country like India, evaluation of hs-CRP would be considered as the best modality over optical coherence tomography and intravascular ultrasound.This suggests that the assessment of HS-CRP levels may enable the physician in detecting the prognosis of acute coronary syndrome patients,plan effective reperfusion therapy and also assess long term complications.

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Introduction:-

The term acute coronary syndrome refers to a range of acute myocardial ischemic states. It encompasses unstable angina, non – ST segment elevation myocardial infarction and ST segment elevation myocardial infarction.[1]

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A scientific statement issued by Centre for Disease Control (CDC) and American Heart Asso-ciation (AHA) has mentioned hs-CRP as the only inflammatory marker that can be used for risk prediction both for primary and secondary prevention of cardiovascular events.[2]

CRP has become the most effective and sensitive marker for inflammation and unremarkable predictor of cardiovascular risk.CRP's predictive power for vascular risk detection resides between 0.1 to 0.5 mg/dl, a level which is present in most of the healthy individuals without inflammation. Hence, a high sensitive assay is required which has very low detection values.[3].

Methodology:-

An observational cross sectional study was carried out for one year at the department of Medicine in SMBT medical college,Igatpuri.The study comprised of a total of 48 patients above 18 yrs of age with confirmed acute coronary syndrome.The ethical and scientific committee approval was taken.After taking informed consent,detailed history was taken from the patients or relatives.The technique and risks of the procedure were discussed with all the patients.

Patient diagnosed as acute coronary syndrome by –
1.STEMI – ST elevation in the absence of either LBBB or LVH is defined as ST elevation of atleast 2mm in men or 1.5mm in women in at least two continuous leads.
2.NSTEMI – Patients with typical symptoms without persistent ST segment elevation in at least two contiguous leads but with elevation of myocardial biomarkers are classified as having NSTEMI.
3.Unstable angina – Patients without typical symptoms and serial negative markers of myocardial necrosis are classified as having unstable angina.
2D echo findings :- presence and location of regional wall motion abnormality

- According to American heart association,
- Normal ejection fraction - 50-70%
- Borderline ejection fraction – 41-49%
- Reduced ejection fraction - <= 40%

The blood sample of patients was collected on admission and levels of hs-CRP was evaluated as follows,
According to American Heart Association and Centres for Disease control and prevention states that,
Hs- CRP - risk
Less than 1 - lower vascular risk
1 to 3 - moderate vascular risk
More than 3 - higher vascular risk

Inclusion Criteria
1.All consecutive patients with ACS including unstable angina(UA) ,non-ST elevation myocardial infarction(NSTEMI) and ST elevation myocardial infarction(STEMI) were included in the study.
2.Patients above the age of 18 years.

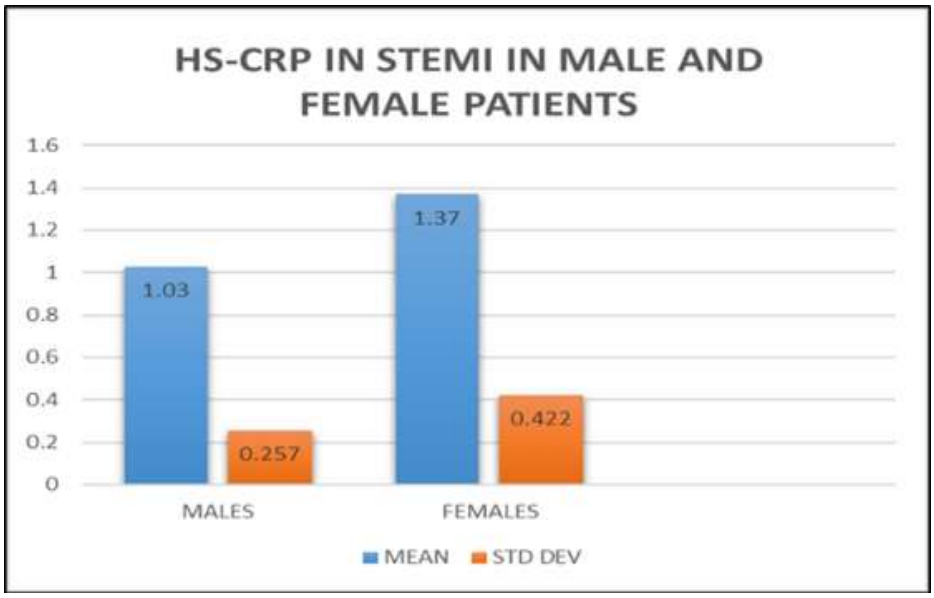
Exclusion Criteria
1.Patients not willing for consent.
2.Patients with stable coronary artery
3.Patients with ischemic stroke.
4.Patients with valvular heart disease.
5.Patients with acute or chronic kidney disease.
6.Patients with acute or chronic liver disease.
7.Collagen vascular disease and rheumatological disorders.
8.Febrile disorders.
9.Malignancy.

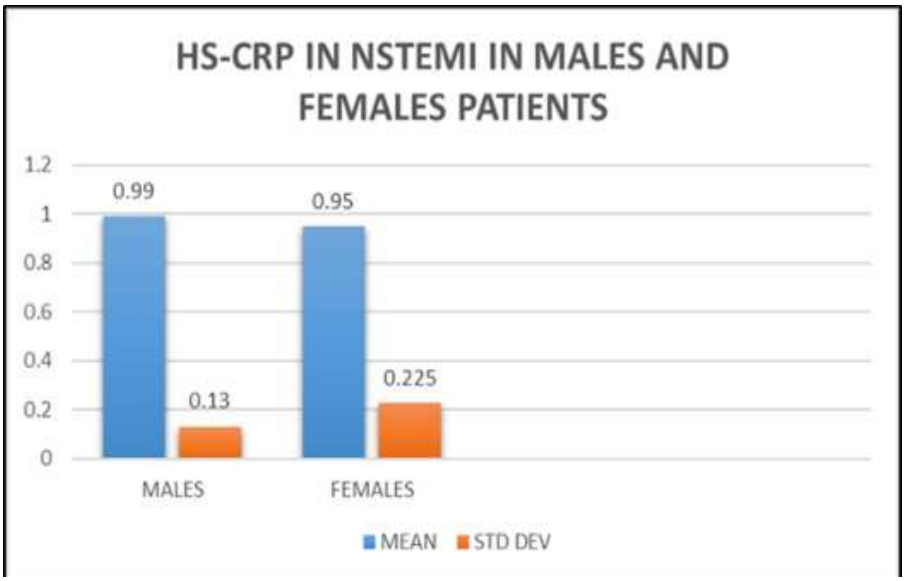
Results:-

Out of the 48 acute coronary syndrome patients; 36 patients were diagnosed as ST elevation MI (STEMI) and 12 patients as non ST elevation MI (NSTEMI). Out of 36 STEMI patients; 20 patients were males and 16 patients were females. Out of 12 NSTEMI patients; 6 patients were males and 6 patients were females.

In male patients with STEMI, the mean of peak value of Hs-CRP measured between 36-48 hours was 1.03 mg/dl. In female patients with STEMI, the mean of peak value of Hs-CRP measured between 36-48 hours was 1.37 mg/dl.

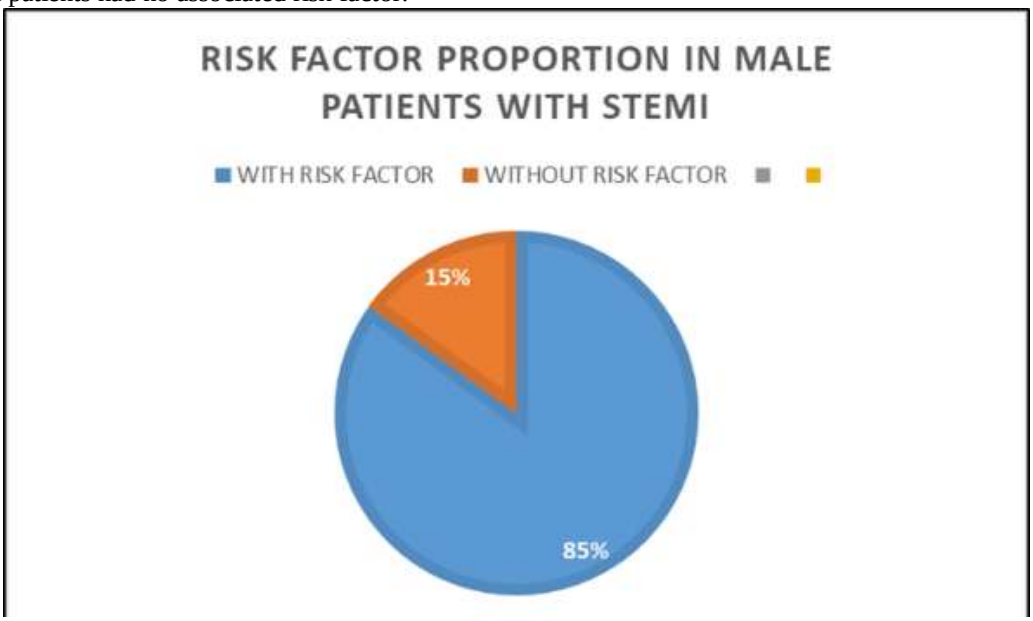
In male patients with NSTEMI, the mean of peak value of Hs-CRP measured between 36-48 hours was 0.99 mg/dl. In female patients with NSTEMI, the mean of peak value of Hs-CRP measured between 36-48 hours was 0.95 mg/dl.

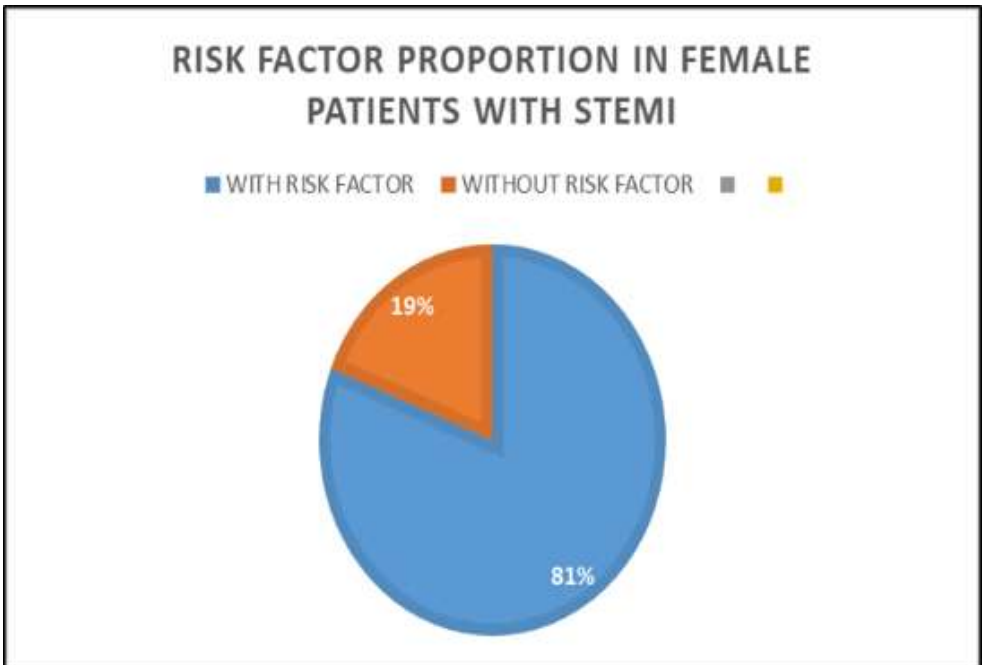




Among male patients with STEMI; 85% of patients had modifiable risk factor of smoking, alcohol and non-modifiable risk factor of Diabetes mellitus or Systemic Hypertension and 15% of patients had no associated risk factor.

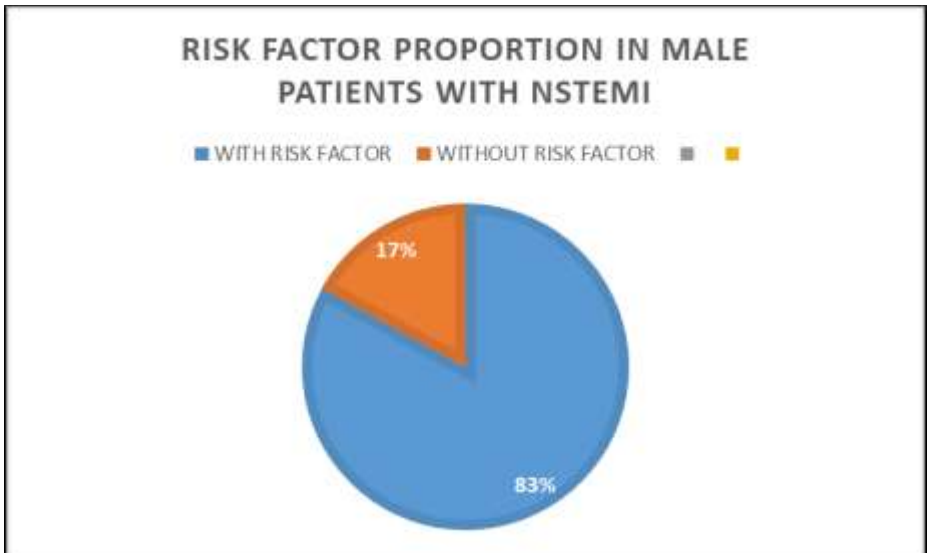
Among female patients with STEMI; 81% of patients had risk factor of Diabetes mellitus or Systemic Hypertension and 19% of patients had no associated risk factor.

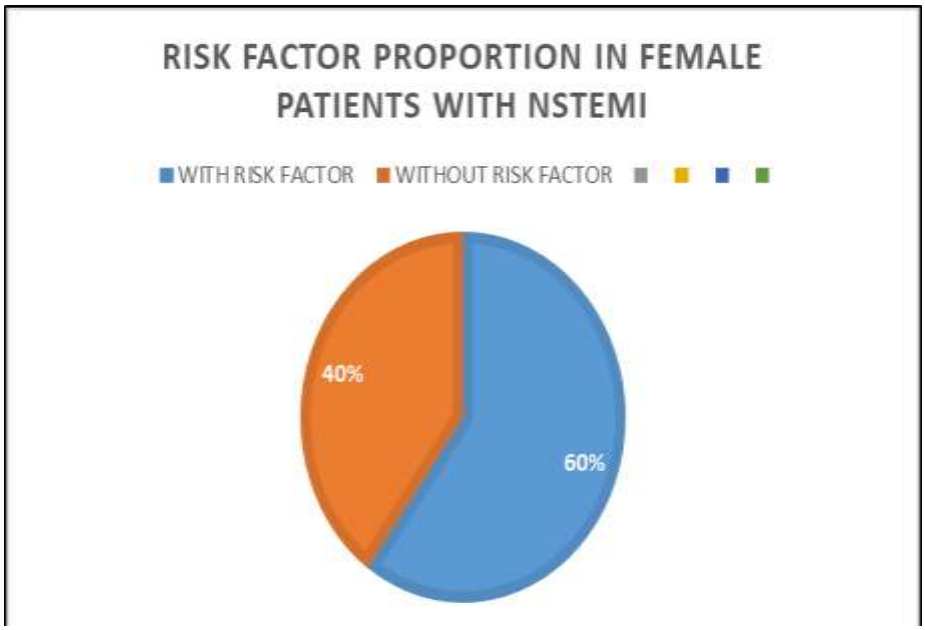




Among male patients with NSTEMI; 83% of patients had modifiable risk factor of smoking, alcoholic and non-modifiable risk factor of Diabetes mellitus or Systemic Hypertension and 17% of patients had no associated risk factor.

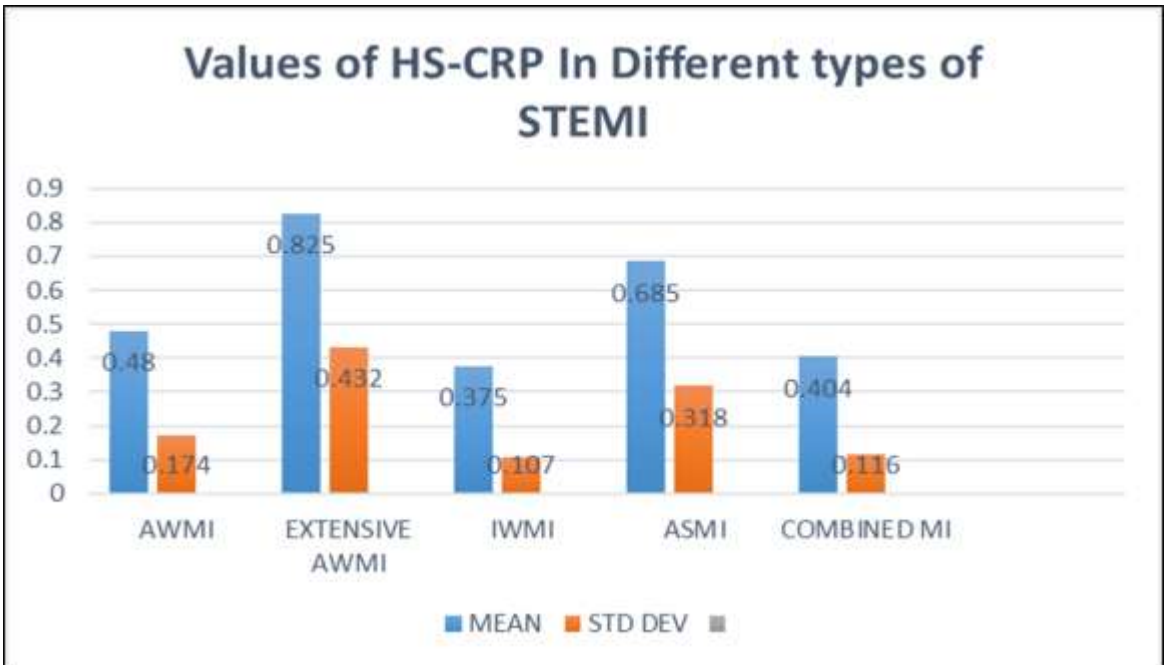
Among female patients with NSTEMI; 60% of patients had non-modifiable risk factor of Diabetes mellitus or Systemic Hypertension and 40% of patients had no associated risk factor.





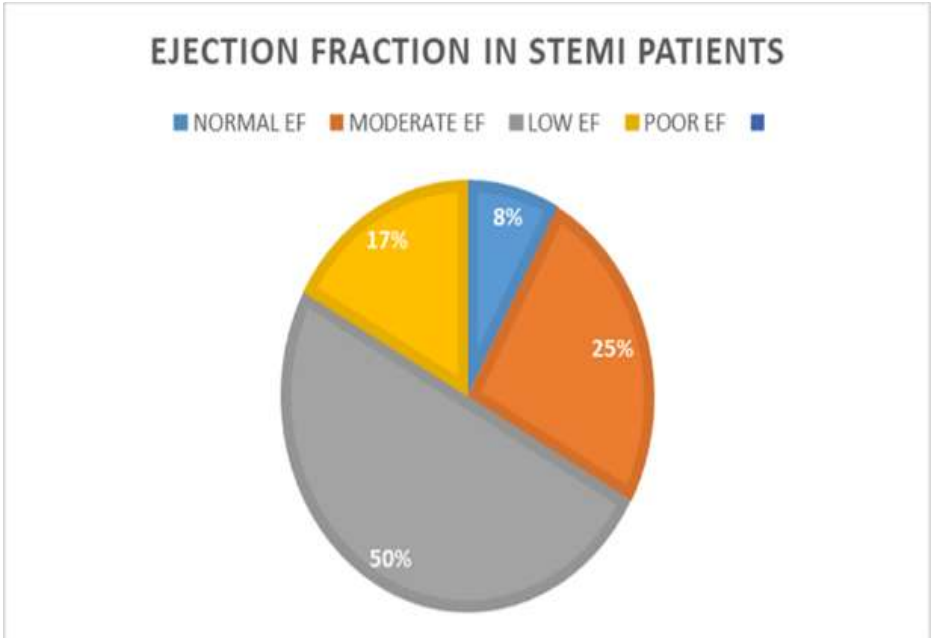
Among STEMI patients, the highest level of peak value of Hs-CRP is seen in extensive AWMI with a mean value of 1.77mg/dl and 1.29mg/dl for females and males, respectively. Among NSTEMI patients, the mean values (peak) Hs-CRP are 0.99 and 0.950 for males and females, respectively.

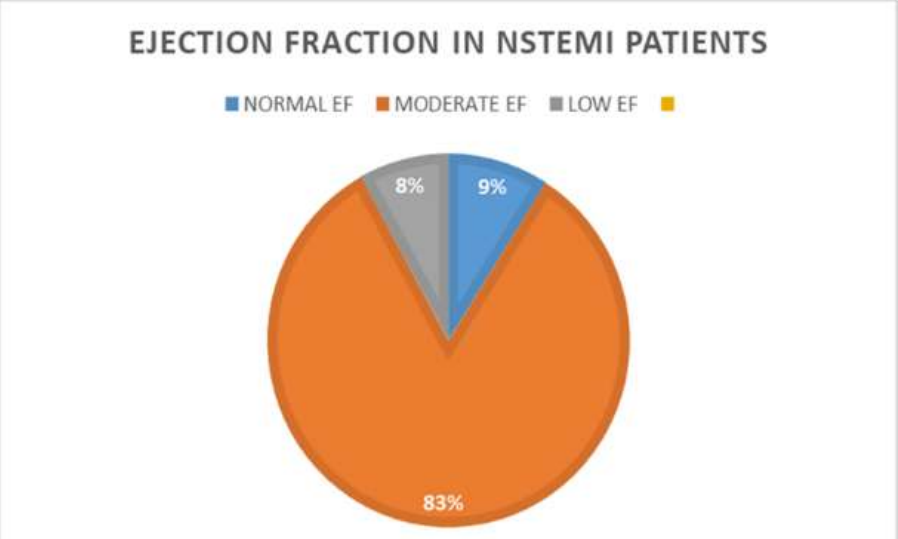
The mean of baseline values of Hs-CRP for anterior wall myocardial infarction (AWMI), extensive AWMI, inferior wall myocardial infarction (IWMI), antero-septal myocardial infarction (ASMI) and combined IWMI/PWMI (posterior wall myocardial infarction) were found to be 0.480 mg/dl, 0.825 mg/dl, 0.375 mg/dl, 0.685 mg/dl and 0.404 mg/dl, respectively in our study. So the highest baseline level of Hs-CRP was recorded for patients with extensive AWMI (0.825mg/dl).



In patients with STEMI; 8% of patients had normal EF; 25% of patients had moderate EF; 50% of patients had low EF and 17% of patients had very low Ejection fraction.

In patients with NSTEMI; 9% of patients had normal EF; 83% of patients had moderate EF; 8% of patients had low EF and no patients had very low Ejection fraction.





The correlation coefficient of peak values of Hs- CRP (36-48 hrs) to ejection fraction in STEMI and NSTEMI cases are -0.65 and -0.54.

There is a statistically significant correlation between peak values of Hs- CRP (36-48 hrs) to ejection fraction in STEMI patients with a p value of 0.006.

Among NSTEMI cases, the correlation between baseline and peak values of Hs-CRP and ejection fraction is statistically insignificant with p-value of 0.5 and 0.07, respectively.

GROUP			EJECTION FRACTION
STEMI	Hs- CRP (36-48 hrs)	Pearson Correlation	-0.452
		R-value	
		P-value	.006
		N	36
NSTEMI	Hs- CRP (36-48 hrs)	Pearson Correlation	-0.540
		R-value	
		P-value	.070
		N	12

Discussion:-

1. Out of the 48 acute coronary syndrome patients who participated in our study; 36 patients were diagnosed as ST elevation MI (STEMI) and 12 patients as non ST elevation MI (NSTEMI). Out of 36 STEMI patients; 20 patients were males and 16 patients were females. Out of 12 NSTEMI patients; 6 patients were males and 6 patients were females.
2. Among male patients with STEMI; 85% of patients had risk factor of smoking, alcohol, Diabetes mellitus or Systemic Hypertension and 15% of patients had no associated risk factor. Among female patients with STEMI; 81% of patients had risk factor of Diabetes mellitus or Systemic Hypertension and 15% of patients had no associated risk factor.
3. Among male patients with NSTEMI; 83% of patients had risk factor of smoking, alcoholic, Diabetes mellitus or Systemic Hypertension and 17% of patients had no associated risk factor. Among female patients with NSTEMI; 60% of patients had risk factor of Diabetes mellitus or Systemic Hypertension and 40% of patients had no associated risk factor.
4. In our study, in STEMI cases the mean value of Hs-CRP measured within 6 hours (baseline value) was 0.52 mg/dl and the mean of peak value measured between 36-48 hours was 1.82 mg/dl. In NSTEMI cases, the mean value of Hs-CRP measured within 6 hours (baseline value)) and the mean of peak value of Hs-CRP (measured between 36-48 hours) were 0.29 mg/dl and 0.97 mg/dl, respectively. For the controls, the mean value of Hs-CRP for males was 0.12 mg/dl and for females it was 0.19mg/dl. (Normal range of Hs-CRP <0.2mg/dl)
5. The mean of peak values of Hs-CRP in males for anterior wall myocardial infarction (AWMI), extensive AWMI, inferior wall myocardial infarction (IWMI), antero-septal myocardial infarction (ASMI) and combined IWMI/PWMI (posterior wall myocardial infarction) were found to be 1.12 mg/dl, 1.29 mg/dl, 0.94 mg/dl, 0.96 mg/dl and 0.96 mg/dl, respectively in our study. So, for males the highest level of Hs-CRP was recorded for patients with extensive AWMI (1.29mg/dl).
6. In females, the mean of peak value of Hs-CRP with anterior wall myocardial infarction (AWMI), extensive AWMI, inferior wall myocardial infarction (IWMI), antero-septal myocardial infarction ASMI and combined IWMI (inferior wall myocardial infarction)/PWMI (posterior wall myocardial infarction) was found to be 1.38 mg/dl, 1.77 mg/dl, 1.37 mg/dl, 1.34 mg/dl and 1.20 mg/dl, respectively. The highest level of Hs-CRP was recorded for patients with extensive AWMI (1.77mg/dl) among females also.
7. In patients with STEMI; 8% of patients had normal EF; 25% of patients had moderate EF; 50% of patients had low EF and 17% of patients had very low EF. In patients with NSTEMI; 9% of patients had normal EF; 83% of patients had moderate EF; 8% of patients had low EF and no patients had very low EF.
8. Higher values of baseline and peak values of Hs-CRP were seen in patients who had ST – elevation MI (STEMI) than in Non ST – elevation MI (NSTEMI).
9. The patients with higher peak values of Hs-CRP had a poor Ejection fraction and the association between them was statistically significant in our study.

Conclusion:-

1. The levels of Hs-CRP correlate with several cardiovascular risk factors such as smoking,diabetes mellitus and hypertension.
2. Higher level of baseline Hs-CRP along with extensive myocardial infarction in the Electrocardiogram is associated with a extensive myocardial infarction.
3. Elevated levels of Hs-CRP is related to the presence of plaque rupture ,which provokes acute coronary syndrome.Therefore, in a resource limited country like India, evaluation of Hs-CRP would be considered as a modality where optical coherence tomography and coronary intravascular ultrasound is not available.
4. So, the assessment of Hs-CRP levels may enable the physician in detecting the severity of acute coronary syndrome patients and in planning a more prompt and effective reperfusion therapy.

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