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Acute Myocardial infarction and laboratory confirmed Influenza infection, a tertiary care hospital based study.

[1]Jan Mohammad. (M.B.B.S, MD, DM), [2]Khursheed Aslam Khan (M.B.B.S, MD, DM), [3]Imran Hafeez (M.B.B.S, MD, DM), [4]Hilal Ahmad Rather (M.B.B.S, MD, DM), [5]Ajaz Ahmad Lone (M.B.B.S, MD, DM)

[1]*Previously DM scholar at Sher I Kashmir Institute of Medical Sciences J&k India*

Currently working as interventional cardiologist at Ujala Cygnus JK Hindu Hospital Sonipat Haryana India

[2]*Ex Professor, Cardiology At Sher I Kashmir Institute of Medical sciences Soura Srinagar*

Presently working as senior cardiologist at Noora Hospital Srinagar

[3]*Associate Professor Cardiology at Sher I Kashmir institute of medical sciences*

[4]*Professor and Head Department of Cardiology at Sher I Kashmir institute of medical sciences.*

[5]*Additional professor department of cardiology at Sher I Kashmir institute of medical sciences.*

ABSTRACT:

Introduction: There is a seasonal increase in influenza infections during winter months, likewise there is increase in the incidence of acute myocardial infarction (AMI) in vulnerable population. To know any relationship between these two conditions, we conducted a hospital based observational study.

Patients and Methods: 728 patients were screened for the recent respiratory tract infection, out of them 106 patients had the symptoms confirming with the recently formulated definition of influenza like illness. After confirming the cardiac diagnosis swabs were sent to the viral research laboratory. Statistical analysis (Student t test, Pearson chi square test) was done with spss21 software. All p values were two side and taken significant when less than 0.05.

Results: Mean age of our patients was 47.67 years, the mean age of AMI patients with positive influenza was 63.4 years.). As categorical variable a subgroup analysis (Pearson chi square test) of influenza positive and influenza negative STEMI patients was done which revealed a P value of 0.000(2 sided).Out of 9 patients of NSTEMI, 2 patients were positive for influenza A and B respectively as categorical variable after Pearson chi square test the p value was 0.02(2 sided). For heart failure patients as categorical variable after Pearson chi square test, the P value was 0.34 , all other patients who were tested for influenza were negative.

Conclusion: From our study we conclude that Influenza is a significant risk factor to cause Myocardial Infarction especially in patients who are more than 63 years of age. The annual influenza vaccination can prevent many patients from the infection and cardiovascular events.

Key words: Seasonal variation, Influenza, Respiratory tract Infection, Acute myocardial infarction,

I. INTRODUCTION:

Cardiovascular events and Respiratory Tract Infections see an upsurge during winter months. India bears a huge number in terms of cardiovascular events (cardiac deaths, myocardial infarction and stroke) [1].Some studies [2-4] have suggested a decrease in cardiovascular mortality and morbidity by an annual influenza vaccination. In our study we formulated a hypothesis i.e. does an episode of influenza increase the vulnerability for an acute myocardial infarction? Although several studies have analyzed the association between various types of infection and acute cardio and cerebrovascular events, convincing evidence of a stronger association has emerged for the flu syndrome. The epidemiological relationship between acute myocardial infarction (AMI) and flu syndrome was first observed in third decade of 20th century [5] with an increased mortality due to cardiovascular causes in conjunction with the epidemic influenza peak.

II. PATIENTS AND METHODS:

We screened 728 admitted patients, "in a cardiology ward of tertiary care hospital" for the symptoms pertaining to respiratory tract, 132 patients had symptoms within in the past 2 weeks of admission. From 132 patients with recent history of respiratory tract infection 26 patients were excluded from the study because they did not fit in the definition of influenza like illness and finally 106 patients were enrolled in the study

2.1 Inclusion criteria: Patients were enrolled according to a recently formulated definition of acute influenza like illness [10], i.e. "An acute respiratory illness with a measured temperature of ≥ 38 °C and cough, with onset within the past 10 days". Definition of MI (Myocardial Infarction) was according to fourth universal definition [11].

The diagnosis of influenza was done with the laboratory examination of nasopharyngeal or nasal (middle turbinate) or throat swabs. The date of onset of flu like symptoms and date of swab sampling was noted in all patients enrolled. All the swab samples were sent to viral research laboratory of the tertiary care hospital.The testing methods included immuno assays, RT PCR (reverse transcriptase polymerase chain reaction) and viral cultures .All confirmed cases of influenza were kept in an isolation ward of the hospital.

2.2 Exclusion criteria: Patients who did not fit into the definition of acute influenza like illness or did not have symptoms were excluded from the study.

Statistical analysis was done using SPSS 18 software. Descriptive statistics was done using students t test, Pearson's chi square test was used for categorical variables , all p values were two sided and taken as significant when less than 0.05.

III. RESULTS:

From 108 patients, 46(42.6%) were female and 62(57.4%) patients were male. Out of 22 STEMI patients 8 patients were positive for influenza A (3 patients with H3N2 and 5 patients having H1N1). As categorical variable a subgroup analysis (Pearson chi square test) of influenza positive and influenza negative STEMI patients was done which revealed a P value of 0.000(2 sided).

Out of 9 patients of NSTEMI, 2 patients were positive for influenza A and B respectively. As categorical variable after Pearson chi square test the p value was 0.02(2 sided). For heart failure patients as categorical variable after Pearson chi square test the P value was 0.34, all other patients who were tested for influenza were negative for the same. In a subgroup of 10 patients of STEMI and NSTEMI who tested positive for influenza the mean age was 63.4 years.

Table: 1 Baseline characteristics of enrolled patients (N=106)

VARIABLE	*Mean(N)*	*SD (%)*	*P VALUE*
AGE	*47.67*	*13.422*	*0.000*
CR	*1.137*	*0.4296*	*0.000*
UREA	*27.39*	*15.158*	*0.000*
LDL	*125.84*	*29.916*	*0.000*
TG	*202.09*	*87.08*	*0.000*
SMOKER	*(43)*	*(39.80%)*	*0.314*
INF.A	*(11)*	*(10.30%)*	*0.033*
CKD	*(6)*	*(5.60%)*	*0.447*
VAC	*(8)*	*(7.5%)*	-------
HT	*(55)*	*(50.90%)*	*0.772*
INF.B	*(1)*	*(0.94%)*	------
COPD	*(14)*	*(13.00%)*	*0.003*

VAC =VACCINATED AGAINST INFLUENZA

Table 2: Cardiac diagnosis of enrolled patients and their influenza status (N=108)

DIAGNOSIS	NUMBER	PERCENTAGE	Influenza A(B)	Symptom To swab**
HF(RHD)*	11	10.30%	0(0)	7.5 days
STABLE CAD	40	37.7%	0(0)	9.3 days
H.F(cardiomyopathy)*	24	22.20%	2(0)	6.2 days
STEMI	22	20.7%	8(0)	3.9 days
NSTEMI	9	8.40%	1(1)	4.9 days

*Out of total 8 patients who were vaccinated 4 patients belonged to RHD group and 4 patients were from patients of cardiomyopathy.

** From the symptom onset of influenza like illness to throat swab sampling average number of days is lowest in patients with STEMI and highest in chronic stable angina who were admitted for intervention.

IV. DISCUSSION:

In patients admitted with Acute Coronary Syndrome (ACS), we observed that the proceeding influenza infection was seen in significant number of patients. Statistically it was observed that the temporal relation between the two is far from the occurrence by chance. Higher percentage of STEMI patients had history of flu like illness and influenza positive status, in NSTEMI although the percentage of influenza positive patients was lower but it reached the statistical significance. Inflammation and prothrombogenicity of the virus can be the reasons behind higher incidence of acute coronary syndrome in influenza patients. Our findings are in confirmation with the previous studies although the design of our study is different from previous studies [12-18]. All of these studies reported a higher incidence ratios of myocardial Infarction post Laboratory confirmed Influenza. In our study none of influenza positive MI patient was vaccinated.

Since only Influenza (A &B) tests were done in our patients it's possible that other viruses which were not tested were responsible for the illness. Another explanation is that the patient had the infection and was negative on the day of sampling. Further it was observed that mean duration from symptom (of flu like illness) onset was lowest in patient of STEMI followed by NSTEMI, from this observation we inferred that infection in its initial days

(probably when the inflammation and infection is at its nadir) is more likely to initiate the process of plaque rupture and thrombosis. In addition to that our patients who were diagnosed with influenza and AMI were younger as compared to patients in previous studies. The likely explanation is that occurrence of AMI a decade earlier in Indian subcontinent due higher atherosclerotic burden and hence higher chances of plaque rupture due to inflammation.

V. CONCLUSION:

From our study we conclude that Influenza is a significant risk factor to cause Myocardial Infarction especially in patients who are more than 63 years of age. The annual influenza vaccination can prevent many patients from the infection and cardiovascular events.

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