RISK FACTORS AND OUTCOME ANALYSIS IN CASES OF UNSTABLE ANGINA

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ABSTRACT

BACKGROUND
Unstable angina depends on the presence of one or more of the following three historical features-
1. Crescendo angina (more severe, prolonged or frequently) superimposed on a pre-existing relatively stable, exertion related angina pectoris.
2. Angina pectoris at rest as well as with exertion.
3. Angina pectoris of a new onset (usually within one month), which is brought on by minimal exertion.

MATERIALS AND METHODS
This is a descriptive and analytical study of unstable angina. Risk factors and outcome of the cases were studied in Department of Medicine and CCU at KPC Medical College and Hospital, Kolkata, from December 2014 to December 2015. Details of patients were collected and they were examined. Investigation were recorded and clinical findings are noted. Later outcome of cases were also recorded.

RESULTS
For a period of one year duration, 60 patients were evaluated and tabulated. By this study, various risk factors were diagnosed and treated. For further evaluation and treatment, certain patients were referred to superspeciality department.

CONCLUSION
By evaluating the risk factors in cases of unstable angina, hidden can be brought out and it helps for the treatment purpose also.

KEYWORDS
Unstable Angina, Acute Coronary Syndrome, Myocardial Infarction, Hypertension, ECG, Ischaemic Heart Disease, Angina Pectoris.

BACKGROUND
The main aim is to-
1. Study the risk factors like hypertension, smoking, diabetes mellitus, age, sex distribution, hypercholesteremia and old myocardial infarction in unstable angina.
2. Related the ECG findings on admission to the outcome.
3. Determine the prognostic capacity of a single ECG obtained early after admission in the hospital in patients with unstable angina.
4. Analyse the outcome of patients with unstable angina over a period of 3 weeks.

The term unstable angina was proposed by Fowler is currently retained. The natural history of the disease was subsequently defined by risk stratification. Rapid progress in the understanding of the pathophysiology followed in the late 1970s prompted by recognition of the critical role of a primary decrease in myocardial oxygen delivery. In the late eighteenth century, pioneering surgeon John Hunter experienced Angina Chest Discomfort (ACD)- Chest pain, retrosternal and squeezing type on exertion. It is important to consider that these relationships gave rise to the recent initial release of the SADHART (sertraline antidepressant heart attack randomised trial) data. However, the assumptions that chest discomfort in patients with coronary artery disease generally signals the occurrence of ischaemia and that unstable chest discomfort is due solely to localised oxygen supply/demand are open to debate. This SADHART trial investigates the data suggesting a relationship between acute coronary disease and emotional distress as well as the implications of this relationship for treatment.[1]

Pathological studies of patients with this syndrome usually reveal multiple vessel disease, but a low incidence of recent occlusive thrombus. These findings suggest that

coronary vasospasm of acute ischaemic episode occurs in the presence of severe obstructive organic diseases.

Ischaemic heart disease represents a spectrum of severity with acute transmural infarction at one end of spectrum and unstable angina, chronic angina with silent ischaemia at the other end of the spectrum.[2]

Recently, the term acute coronary syndrome has been used to describe the spectrum of conditions that include unstable angina, non-Q-myocardial infarction and myocardial infarction.[3]

Patients with unstable angina and non-Q-wave myocardial infarction often present in a similar manner and the distinction between the two conditions can be made by the help of cardiac enzymes like creative phosphokinase, myoglobin and troponin T. Unstable angina is the most common cardiac emergency diagnosed worldwide. It carries a variable prognosis because of the various clinical manifestations in unstable angina. It is seen that 15% of patients admitted with acute myocardial infarction gives a prior history of unstable angina.

In this context, India, as a developing nation with a relatively notorious cardiovascular risk status and population of one billion has to take more serious measures in the prevention, diagnosis and management of cardiovascular disease.[4]

Although, stroke tends to be the dominant factor of mortality in a country undergoing epidemiological transition, coronary heart disease death rates are three times higher in Indian when compared to stroke. This may reflect the change in dietary habits, insult resistance and sedentary life style as result of globalisation.

This is a classical example of unity in diversity where people of different cultures, religion with various dietary habits all ending up with the same incidence of cardiovascular disease. Furthermore, the fat intake of Indians, which is proportionately higher due to consumption of dairy production. It needs a closer scrutiny because of associated dyslipidaemias with lead to coronary heart diseases.[5]

If coronary heart disease, morbidity and mortality is not taken care of at this juncture, then India will suffer at the economical level too.

Hence, identifying coronary heart disease instituting proper treatment at the right time and experimenting or reviving novel methods in the management of coronary heart disease becomes the prime task ahead of the physicians.

MATERIALS AND METHODS
Study Design-
- To study the risk factors like hypertension smoking, diabetes mellitus, age, sex distribution, hypercholesteremia and old myocardial infarction in unstable angina.
- To relate the ECG findings on admission to the outcome.

- To determine the prognostic capacity of a single ECG obtained early after admission in the hospital in patients with unstable angina.
- To analyse the outcome of patients with unstable angina over a period of 3 weeks.

Inclusion Criteria
1. Age from 21 years to 80 years.
2. Hypertension.
3. Smoking.
4. Alcoholism.
5. Hyperlipidaemia.
6. Type 2 diabetes mellitus.
7. Both sexes were included.
8. Rest angina.
9. New onset and severe angina.
10. Crescendo angina.
11. Previous myocardial infarction 2 weeks back.

To study the clinical features, risk factors-like hypertension, smoking, diabetes mellitus, age-sex distribution, hypercholesteremia and old myocardial infarction.

To relate to ECG findings an admission to outcome.

The outcome of all patients were monitored for a period of 3 weeks.

Exclusion Criteria
1. Age more than 80 years.
2. Thyroid disease (hypothyroidism and hyperthyroidism).
3. Valvular heart disease.
4. Non-coronary heart disease.
5. Non-ST elevation myocardial infarction.
6. Pericardial disease.

Sample Size
60 patients both male and female at KPC Medical College and Hospital, Jadavpur, Kolkata, fulfilling the inclusion criteria were admitted in CCU during December 2013 to December 2014 were included.

All patients in the study group were given heparin (LMWH/unfractionated heparin), aspirin, clopidogrel, nitrites, beta-blockers, calcium-channel blockers and ACE inhibitors.[6]

During the course of hospitalisation, events such as arrhythmias, heart failure and cardiogenic shock were treated with antiarrhythmics, diuretics and inotropes.

The patients were observed in ECU and wards based on the clinical condition. At discharge, patients were advised to attend the cardiology OPD for follow up.

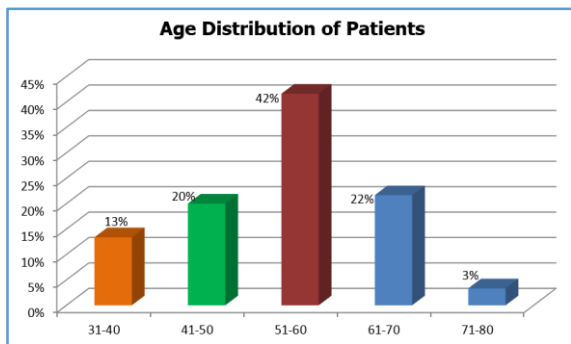Every patient was reviewed after 3 weeks and events were noted till then.

Figure 1. Age Distribution of Patients

Observations and Analysis

The results were taken from 60 patients out of which males were 46 (76.6%) and females were 14 in number (23.33%). A detailed age-risk distribution of patients is given in the table below. The majority of patients belong to age group of 51-60 years (41.66%).

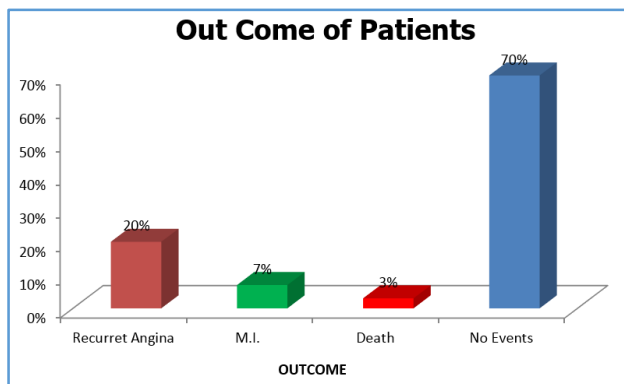| Age of Patients	Number of Patients in Risk	Percentage
31-40	8	13.37%
41-50	12	20%
51-60	25	41.60%
61-70	13	21.66%
71-80	2	3.33
Table 1. Age Risk Distribution of Patients		

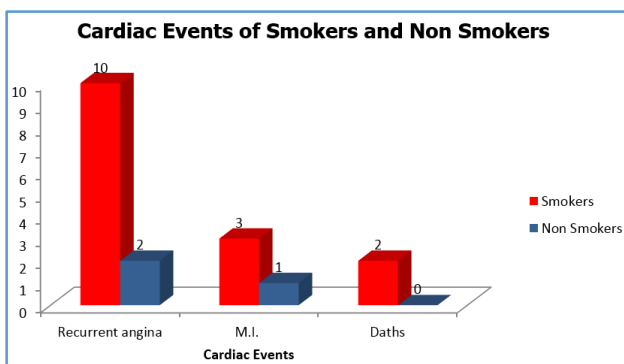**Figure 2. Outcome of Patients**

Figure 3. Cardiac Events of Smokers and Non-Smokers
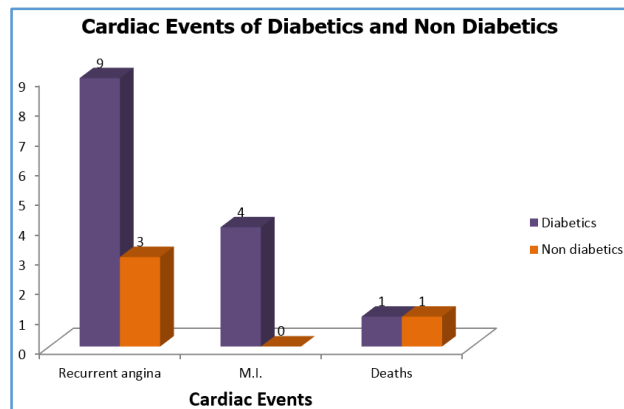

Figure 4. Cardiac Events of Diabetics and Non-Diabetics
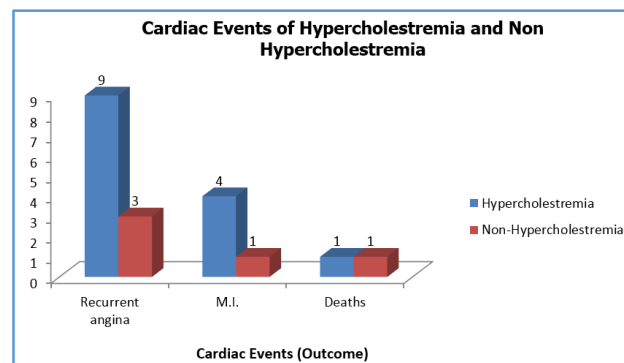

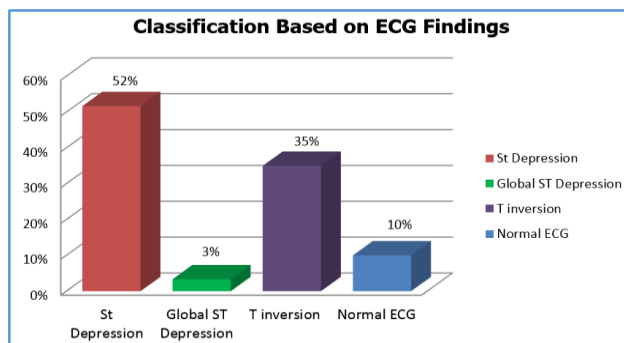**Figure 5. Cardiac Events of Hypercholesteremia and Non-Hypercholesteremia**

Figure 6. Classification Based on ECG Findings

ECG

Patients were divided on ECG findings on admission and are grouped into the following-

1. Patients with ST depression.
2. Global ST depression.
3. T inversion.

Those with ST depression was seen in 31 (51.66%) patients, 2 (3.33%) patients that had global ST depression, 21 (35%) patients had T-wave inversion and 6 (10%) patients had normal ECG.[7]

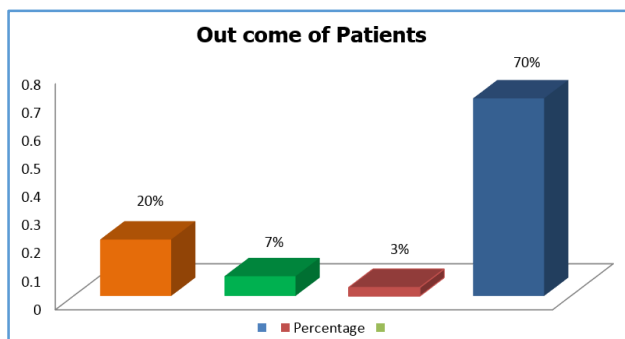| ECG Changes	Number of the Patients	Percentage
ST depression	31	51.66%
Global ST depression	2	3.33%
T inversion	21	35%
Normal ECG	6	10%
Table 2. ECG Changes		

Figure 7. Outcome of Patients

Patients were followed up to a period of 3 weeks. The occurrence of recurrent angina, myocardial infraction or death was registered. 12 patients had recurrent angina, i.e. (20%); 4 patients had myocardial infarction, i.e. (6.60%); 2 patients had death, i.e. (3.33%); 42 patients had no events, i.e. (70%).

Cardiac Events	Number of the Patients	Percentage
Recurrent angina	12	20%
Myocardial infarction	4	6.66%
Deaths	2	3.33%
No events	42	70%
Table 3. Cardiac Events		

Comparison of hypertensives and non-hypertensives were done based on cardiac events. Among hypertensives, 8 had recurrent angina, 2 had myocardial infarction and 2 had death. Among non-hypertensives, 4 had recurrent angina and 2 had myocardial infarction.

Cardiac Events	Hypertensives	Non-Hypertensives
Recurrent angina	8	4
Myocardial infarction	2	2
Deaths	2	0
Table 4. Comparison of Hypertensives and Non-Hypertensives Patients		

ECG Findings Based on Cardiac Events
Among patients with recurrent angina, 11 had recurrent angina, 2 patients had myocardial infarction and 2 patients died. Among patients with T-wave inversion, 1 had recurrent angina and 2 patients had myocardial infarction.

Cardiac Events	ST Depression	T-Depression	Normal ECG
Recurrent angina	11	1	
Myocardial infraction	2	2	
Deaths	2	0	
Table 5. ECG Findings Based on Cardiac Events			

DISCUSSION
Unstable angina-like myocardial infarction is an acute manifestation of myocardial ischaemia due to acute local coronary obstruction.[8] Stable angina can manifest as the first symptom of Coronary Artery Disease (CAD) on aggravation of pre-existing symptoms.

In the present study, 60 patients were admitted in the Department of Cardiology with the diagnosis of unstable angina during the period between December 2014 to December 2015. Males predominated (76.6%), which was slightly higher than (68%) previous studies (James E. Calvis et al).[9] In a study conducted by Kanoja et al, 80% were males and 14% were females.[10] When the risk factors were analysed in our study, hypertension was the risk factor in a majority of 35 hypertensive, i.e. 59.27%. Hypertension was associated with risk factors like diabetes mellitus, smoking, previous myocardial infarction and hypercholesteremia in varying combination. This was correlating with the study by James E. Clavis et al where 62% of patients admitted with unstable angina had hypertension. In a study conducted by Wasir et al, hypertensive constituted 56.66% in a previous study by James E. Calviset, the percentage of smokers were 48%, diabetes mellitus was 68% of the total population.

Of the 60 patients, one patient had a previous PTCA done and had a myocardial infarction 1 year back. He develops acute myocardial infraction 2 weeks after admission.

Another 59-year-old male who was admitted with myocardial infarction had an old anteroseptal myocardial infarction and had underwent a coronary artery bypass grafting. He developed a second myocardial infarction within 24 hours after admission. Both these high-risk cases had developed myocardial infarction during the follow up period. Based on ECG- 1) ST depression or T-wave inversion; 2) Those with ST depression on admission ECG constituted the majority of 31 patients, i.e. (51.66%). In a previous study by Lene Holmvant et al, the percentage of population with ST depression was 12%. This difference could be because patients with ST-elevation was also included in that study. The patients who had a normal ECG were not admitted directly to CCU and were kept in the medical ward for observation. This accounts for less number of patients who had a normal ECG in our patients with T-wave inversion also constituted 35% of the total previous study conducted by Lee Holmvant et al where the percentage of patients with isolated T-wave inversion was 34%. Patients without ST-T changes constituted 10% (n=6), whereas in the previous study, it was slightly higher 28% (Lee Holmvant et al). In a study by Satiya E et al, ST-T changes were present in 54% and absent in 46%. Four out of 60% had CK-MB and trop T positive. A diagnosis of non-Q-myocardial infarction was made in these patients. Out of the four patients, one had recurrent angina during followup period and one patient had developed acute myocardial infarction.

In our study, patients were followed over a period of 3 weeks for recurrent angina, myocardial infarction or death. Twelve out of the 60 patients had recurrent angina that is 20%. In a study conducted by Parikh et al, incidence of recurrent angina was 30%, 4 patients had myocardial infarction (6.66%), two patients died (3.33%) and 42 patients had an event free follow up period (70%).

Both diabetes and hypertension with hypercholesteremia showed an increased incidence of recurrent angina in comparison to them without risk factors.
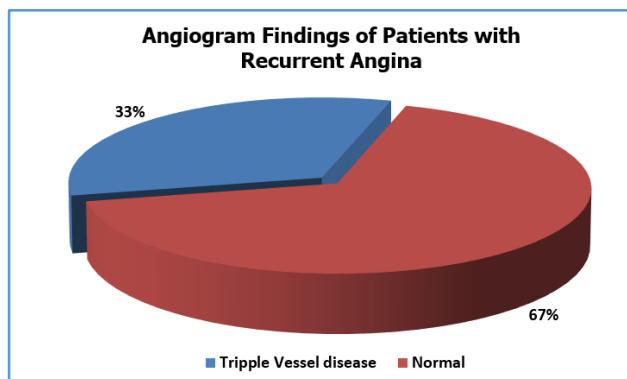

Figure 8. Angiogram Findings of Patients with Recurrent Angina

The ECG findings in patients who had recurrent angina, myocardial infarction or death were studied. Out of the twelve patients who had recurrent angina, four had ST depression on admission ECG. Out of the four patients who developed myocardial infarction, two had ST depression on the admission myocardial infarction, two had ST depression on the admission ECG. Thus, it was concluded that ST-depression on admission ECG carried a poor prognosis when compared to those patients who has T-wave inversion. This observation was correlated by Lene Holmvant et al showed ST segment depression on the admission ECG, which is a strong predictor of early event. The patients who had recurrent angina, a coronary angiogram was performed. Out of the twelve patients who had recurrent angina, 10 patients had triple vessel disease, two patients had initial stabilisation with bed rest, nasal O2, aspirin, B-blocker and heparin. All the patients who developed recurrent angina was given IV nitroglycerin to reduce angina episodes. Patients came with symptoms of myocardial infarction. An initial 160 mg/dL used for our patients along with combination of aspirin. There was lesser incidence of myocardial infarction or death in current practice guidelines with the use of combination of unfractionated heparin and aspirin for the treatment of myocardial infarction. B-blockers reduced the risk of myocardial infarction in patients with unstable angina. There is uniform recommendation for the use of these medications as the first line of treatment in all cases of acute coronary syndrome. This beneficial effect is thought to be mediates through the ability of these agents to reduce myocardial oxygen demand.

Nitrates cause a reduction of myocardial O2 demand, augmentation of collateral coronary blood flow, reduction in the frequency of coronary vasospasm and inhibition of platelet aggregation.

It is important to identify the subgroup of patients with acute ischaemic syndromes who are at high risk of subsequent adverse cardiac events. These patients should be offered a more aggressive medical or surgical therapy to improve prognosis.

CONCLUSION

1. Study population consisted of 60 patients with unstable angina in RMMC and H.
2. All constitutional risk factors (smoking, HTN, diabetes, hypercholesteremia) were prevalent with in our population.
3. Male patients formed the bulk of our study.
4. Incidence of recurrent angina was higher among smokers and diabetics.
5. Four patients had increased cardiac enzymes on admission.
6. Patients with recurrent angina was 12, that is 20%, and myocardial infraction was 4 that is 6.66% and death was two in number, 3.33%.
7. Incidence of serious cardiac events were higher is patients who had ST-depression in the admission ECG compared to those with T-inversion.
8. Elderly patients had the risk of developing serious cardiac events compared to younger patients.
9. All patients who had recurrent angina were referred for coronary angiography and for coronary artery bypass grafting.
10. To study the prognostic capacity of a single ECG on admission in the hospital in predicting the outcome of patients with unstable angina.
11. Patients with clinical features of class Ib were 10 and that of IIb was 1, respectively.
12. Patients with myocardial infarction was of class Ib, one was of IIb and two patients died were of class Ib.

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