

Unstable Angina Risk Factors and Influence of Age and Gender in relation to In-Hospital Outcome

Eman Jasim Mohammed Al- Akkam *, Harith younis serrheed**

ABSTRACT:

BACKGROUND:

Unstable angina (UA) is a type of acute coronary syndrome. It has been recognized as a distinct syndrome intermediate between stable exertional angina and myocardial infarction. It includes many types according to the onset, duration, intensity and frequency of pain.

OBJECTIVE :

The objective of this study to estimate the frequency of risk factors of ischemic heart disease, influence of age and gender, also to predict the in-hospital outcome.

METHODS:

One hundred patients with unstable angina of all ages and both gender were enrolled in a cross-sectional study from October 2010 – June 2011 who were admitted to coronary care unit of Baghdad Teaching Hospital / Medical City.

Descriptive analyses were performed to assess the relationship between unstable angina and risk factors and influence of age and gender and in-hospital outcome.

RESULTS:

This study showed a highest incidence of unstable angina among males and females in the age of 50-54 years. Hypertension was the major risk factor (58%) while, smoking (48%), diabetes (38%), family history of ischemic heart disease (35%), hypercholesterolemia (34%) and obesity (22%). There were significant differences between both gender with unstable angina and the following risk factors: hypertension, smoking, hypercholesterolemia and obesity. There were 22% of patients with persistent chest pain who developed non-fatal acute myocardial infarction and 6% died in the hospital.

CONCLUSION:

The following risk factors; hypertension, smoking, diabetes, family history of ischemic heart disease, hypercholesterolemia and obesity play an important role in occurrence of unstable angina and prognosis. The incidence of UA was higher among ages of (50 -54) years of both gender. Persistence of chest pain at rest was greatly associated with unfavorable outcome.

KEYWORDS: unstable angina, risk factors of UA, Ischemic heart disease, electrocardiography

INTRODUCTION:

Unstable angina (UA) is a critical phase of coronary heart diseases with widely variable symptoms and prognosis. It has been applied to the syndrome intermediate between stable angina and myocardial infarction. It is a medical emergency that required immediate medical treatment, if untreated, it can lead to a life threatening condition (heart attack, heart failure or arrhythmias)^(1,2).

Unstable angina includes three groups of patients⁽²⁻⁵⁾:

1. Patients with angina pectoris of recent onset (within 4–6 weeks) that is troublesome and frequent.
2. Patients with angina (of more than 20 minutes) that occurs at rest.
3. Patients with chronic stable angina with a recent increase in intensity, frequency or duration of pain. Exercise tolerance diminishes and patients often develop blunted responses to the beneficial effects of sublingually administered nitroglycerin.

Fifty percent of people with unstable angina will have evidence of necrosis of the heart's muscular cells based on elevated cardiac serum markers such as creatine kinase isoenzyme (CK)-MB and troponin T or I, and thus have a diagnosis of non-ST elevation myocardial infarction^(2,5).

*Medical City / Baghdad Teaching Hospital, Baghdad, Iraq.

**International Center of Teaching Lab. /Medical City / Baghdad, Iraq.

UNSTABLE ANGINA RISK FACTORS

Unstable angina may primary occur in the absence of an extra cardiac condition that has intensified myocardial ischemia or may develop in presence of extra cardiac condition (secondary unstable angina), such as anemia, fever, infection, tachyarrhythmia, emotional stress and hypoxemia. Also, it may develop within 2 weeks of acute myocardial infarction (post infarction unstable angina)^(2,5).

Men of 45 years and women of 55 years old are more likely to have unstable angina^(1,5).

Angina that occurs for the first time in a patient is considered UA. However, such first time angina, unless it occurs at rest and requires hospitalization, has a better prognosis than does angina that progresses to pain at rest or crescendo angina⁽⁶⁾.

Acute rapidly progressive UA results in more severe ventricular diastolic as well as systolic dysfunction. The blood pressure may be elevated and sign of peripheral artery disease should be sought. Xanthoma may indicate hyperlipidemia and Arcus in younger age group should be taken seriously^(7,8).

Patients with horizontal or down ward sloping ST- segment depression with a peaked negative T-wave in pericardial leads, compared with those positive T-wave had a similar incidence of AMI, but in hospital mortality was much more significant in the first group and on coronary angiography had a significant (70%) incidence of left main coronary artery occlusion. Thus ECG pattern of horizontal or down ward ST- segment depression passing into a peaked negative T-wave identified high risk patients in whom the prognosis is poor once AMI occurs. Patients with UA can safely undergo sub maximal exercise tests after being medically stabilized for a few days. Patients with positive results of exercise test had a fourfold greater incidence of subsequent Q wave infarct or cardiac death⁽⁹⁾.

Patients with UA should be admitted to the hospital because there is (10-15%) risk of progression to AMI. Up to (60%) of patients with MI recall an antecedent history of UA. In hospital based studies, it seems clear that the majority of adverse events occur in the first 30 days^(10,11).

The persistence of chest pain and magnitude and extent of ECG ST-T changes were predictors of an unfavorable outcome. There was greater incidence of nonfatal MI and Coronary Artery By-pass Graft (CABG) in patients with persistence pain after admission compared to those whose pain resolve

within 24 hours. CABG was needed more in those with sever ECG changes compared with minimum or moderate changes⁽¹²⁾.

Hypercholesterolemia occurred more frequently among those with a complicated outcome. The patients with a complicated outcome had chest pain of longer duration before admission. Chest pain lasting at least 30 minutes was more associated with a complicated outcome⁽¹³⁾.

The prognosis of UA is influenced by the following:

- 1) Extent and nature of the anatomic disease in the coronary arteries⁽¹²⁾.
- 2) Presence or absence of a previous MI or multiple areas of wall motion abnormalities, including fibrosis⁽¹²⁾.
- 3) The existence of AMI, which may be suggested by ST-segment abnormalities, new Q-wave or an abnormal increase in serum enzymes by serial determination⁽¹²⁾.
- 4) Other factors such cardiac failure, ventricular arrhythmias, and hypertension or hypotension^(6,7).

The objective of this study was to estimate the frequency of risk factors of unstable angina and influence of age and gender, also to predict the in-hospital outcome.

METHODS:

Across sectional study included one hundred patients with UA of all ages and both sexes admitted to coronary care unit of Baghdad Teaching Hospital / medical city from October 2010 – June 2011. The present study included 52% male with a mean age of 55.59±10 years and 48% female with a mean range of 56.37 ± 9 years.

The diagnosis of UA in each case was established 24 hours after admission and was based on the presence of typical chest pain with serial ST–T changes in the ECG but without evidence of heart muscle necrosis as manifested by high level of cardiac enzymes (serum troponin, CK-MB and serum GOT)^(5,12). In addition, patients with persistent chest pain with equivocal or no serial ECG changes were included in this study.

The following factors were recorded to predict the immediate prognosis in those patients; Age, gender, history of stable angina, history of MI, mode of onset of UA, interval between onset of pain and admission to the hospital, persistence of chest pain after admission to the hospital and magnitude of ECG changes. Development of arrhythmias and heart failure were also recorded.

The following risk factors were considered in this study; hypertension (Bp), smoking, hypercholesterolemia (serum lipid profile), diabetes (FBS126mg/dL or above or HbA_{1c} 6.5% or above),

UNSTABLE ANGINA RISK FACTORS

obesity depend on body mass index (BMI =weight in kg/height in m², obese BMI ≥ 30) and family history of ischemic heart disease (IHD) ⁽⁵⁾. All patients were followed in index hospital admission.

RESULTS:

The present study showed that highest incidence of the disease among males and females was in the age group (50 -54) years than in the age group (60 - 64) years for both gender, as shown in table 1 and 2.

Table 1: The mean age and age range of unstable angina cases by sex.

Gender	Age (years) Mean ± SD	% by sex
Male %	55.59 ± 10.8	52%
Female %	56.37 ± 9.82	48%
Total %	55.97 ± 10.32	100%

Table 2: Distribution of 100 case of unstable angina by age and sex.

Age group (years)	Male	Female	No. of cases
30 -34	2	0	2
35 -39	2	1	3
40 -44	4	4	8
44 -49	6	4	10
50 -54	14	14	28
55 -59	4	3	7
60 -64	8	10	18
65 -69	5	5	10
70 -74	5	4	9
75 -79	1	2	3
80 -84	1	1	2
Total	52	48	100

The results demonstrated statistically significant (p<0.025), smoking habit (p<0.005), differences between both genders with UA and hypercholesterolemia (p<0.005) and obesity(p<0.01) as the following risk factors ;hypertension shown in table 3 and in the figure 1.

Table 3: Risk factors of unstable angina and gender.

Risk factor (RF)		UA +RF		UA without RF		P value
		No.	%	No.	%	
Hypertension	Male	24	41.4	28	66.7	P < 0.025
	Female	34	58.6	14	33.3	
	Total	58	58 %	42	42 %	
Smoking	Male	38	79.2	14	26.9	P < 0.005
	Female	10	20.8	38	73.1	
	Total	48	48 %	52	52 %	
hypercholesterolemia	Male	9	26.5	43	65.2	P < 0.005
	Female	25	73.5	23	34.8	
	Total	34	34 %	66	66%	
Diabetes	Male	17	44.7	35	56.5	Not significant
	Female	21	55.3	27	43.5	
	Total	38	38%	62	62%	
Obesity (BMI ≥ 30)	Male	6	27.3	46	58.97	P < 0.01
	Female	16	72.7	32	41.03	
	Total	22	22%	78	78%	
Family history of IHD	Male	16	45.7	36	55.4	Not significant
	Female	19	54.3	29	44.6	
	Total	35	35%	65	65%	

UNSTABLE ANGINA RISK FACTORS

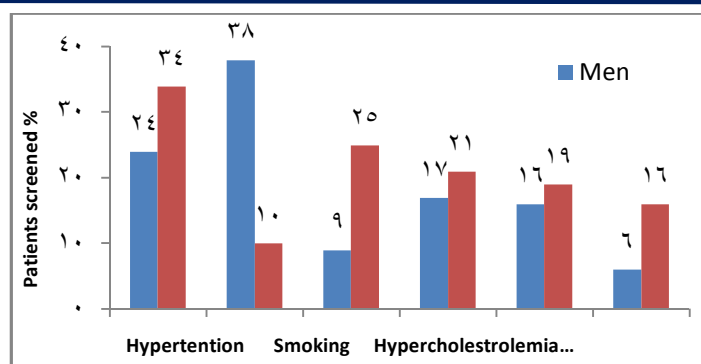


Figure 1: Percentage of patients with each risk factor.

Many patients with UA had more than one risk factor as illustrated in table 4.

Table 4: Number of risk factors in 100 patients with unstable angina.

No. of risk factors	No. of patients	%
No risk factor	5	5%
One risk factor	25	25%
More than one risk factor	70	70%
With 2 risk factors	22	31.4%
With 3 risk factors	30	42.9%
With 4 risk factors	12	17%
With 5 risk factors	4	5.7%
With 6 risk factors	2	2.9%

Regarding the in-hospital outcome, 16 patients with persistent chest pain at rest developed into AMI, and 6 patients with persistent chest pain died in hospital as shown in table 5.

Table 5: Relation between persistent of chest pain and hospital outcome.

Cardiac outcome	No pain No. of patients = 48 (48%)	With pain No. = 52 (52%)	Total
Non-Fatal MI	6	16	22
Death	----	6	6
Total	6 (12.5%)	22 (42.3%)	28 (28%)

Patients with UA developed many complications during hospitalization which are demonstrated in table 6.

Table 6: Complication and hospital course in patients with UA.

Type of complication	No. of patient
Arrhythmias	32
• Paroxysmal atrial fibrillation	10
• Premature ventricular contractions	16
• Ventricular tachycardia	2
• Ventricular fibrillation	3
• Heart block 1 st to 2 nd degree	1
Heart failure	27
Cardiogenic shock	3
Total	62

DISCUSSION:

Unstable angina is a common presentation of CAD. It is a medical emergency with significant risk of progression to MI and sudden cardiac death^(6,7).

The incidence of UA was higher among ages of (50 -54) years of both sexes. Men had a higher incidence of UA than women before the age of 50 years with male to female ratio of 1.5/1. This difference declines at age of 50 years and over, probably related to hormonal effect and the onset of menopause in females^(10,14).

Hypertension remains a strong and consistent risk factor of development of coronary artery disease⁽¹⁵⁾. In this study the incidence of hypertension was (58%) with predominantly female distribution with significant difference with male ($p<0.025$). Smoking is a major risk factor for acute coronary heart disease⁽¹⁶⁾. In this study the incidence of smoking was 48% and the difference is highly significant with predominantly male distribution ($p<0.005$).

The results showed that 34% of patients had hypercholesterolemia with female's incidence of 73.5% with significant difference with male ($p<0.005$)⁽¹⁷⁾.

The results showed that 22% of patients had BMI ≥ 30 with female's incidence of 72.7% with significant difference with male ($p<0.01$)⁽⁶⁾.

From collection of data finding in this study, it was observed that women had risk factor profile dominated by hypertension, hypercholesterolemia and obesity rather than smoking which is similar to what have found by Hussain M.A.et al., 2016⁽¹⁸⁾.

Diabetics had increased risk for coronary heart disease (38%). Female diabetic had greater incidence of CAD than male diabetic but this difference is not significant⁽¹⁹⁾. The family history of heart attack before the age of 60 years is an independent risk factor for coronary heart disease⁽²⁰⁾.

This study showed the incidence of hospital mortality was 6% affecting equally males and females. There were 22% of patients who developed non- fatal AMI⁽²¹⁾.

Patients with persistent chest pain after admission for more than 24 hours were (52%). Those patients had three or more risk factors, ST changes equal or more than 0.5 mm, severe angina, known CAD. Those patients had increased risk of either infarction (16%) or death

in hospital (6%). So the persistence of pain at rest was greatly associated with unfavorable outcome so, initiate more active medical and surgical treatment as coronary angiography, angioplasty or CABG^(12, 13, 21, 22).

CONCLUSION:

The most affected risk factors in female were hypertension, hypercholesterolemia and obesity while, smoking was more influenced in male. The incidence of UA was higher among ages of (50 -54) years of both sexes. Men had a higher incidence of UA than women before the age of 50 years.

Persistence of pain at rest was greatly associated with unfavorable outcome.

REFERENCES:

1. Braunwald E, Morrow DA. Unstable angina. Is it time for a requiem? *Circulation* 2013;127: 2452-57.
2. Hamm CW, Braunwald E. A classification of unstable angina revisited. *Circulation* 2000;102:118 -22.
3. Wiviott SD, Braunwald E. Unstable angina and non-ST – segment elevation myocardial infarction: part I Coronary revascularization, hospital discharge, and post hospital care. *Am. Fam. Physician* 2004;70:535-38.
4. Mishraa S, Ray S, Dalal JJ, Sawhney JPS, Ramakrishnan S, et al. Management standards for stable coronary artery disease in India. *India Heart Journal* 2016;68: 31-49.
5. Cannon CP and Braunwald E; Non –ST-segment elevation Acute Coronary Syndrome. In: Kasper D., Fauci A., Hauser S., Longo D., Jameson J.L., Loscalzo J., et al.,eds. *Harrison's Principles of Internal Medicine*, 19th ed. New York,NY: McGraw-Hill; 2015.
6. Overbaugh, Kristen J. MSN, RN, APRN-BC. Acute Coronary Syndrome. *The American Journal of Nursing* 2009;109:42-52.
7. Joseph SM, Cedars AM, Ewald GA, Geltman EM, Mann DL. Acute decompensated heart failure contemporary medical management. *Texas Heart Inst J.* 2009; 36:510-20.
8. Dwivedi S, Jhamb R. Cutaneous markers of coronary artery disease. *World J Cardiol* 2010; 2:262-69.
9. Ginghina C, Ungureanu C, Vladaia A, Popescu BA, Jurcut R. The electrocardiographic profile of patients with angina pectoris. *Journal of Medicine and Life* 2009;2:80-91.

UNSTABLE ANGINA RISK FACTORS

10. Badran HM, Elnoamany MF, Khalil TS, EzzEldin MM. Age-related alteration of risk profile, inflammatory response and angiographic findings in patients with acute coronary syndrome. *Clin. Med. Cardiol.* 2009;3:15-28.
11. Alavi-Moghaddam M, Safari SM, Alavi-Moghaddam H. Screening characteristics of TIMI Score in predicting acute coronary syndrome outcome; a diagnostic accuracy Study. *Emergency* 2017;5:18-19.
12. Kumar A, Cannon CP. Acute Coronary Syndromes: Diagnosis and Management, Part I. *Mayo Clin Proc.* 2009; 84:917–38.
13. Amsterdam EA, Wenger NK, Brindis RG, Casey DE, Ganiats TG, Holmes DR. 2014 AHA/ACC Guideline for the Management of Patients with Non–ST-Elevation Acute Coronary Syndromes. *Journal of the American College of Cardiology* 2014; 64:139–228.
14. Whayne TF Jr, Mukherjee D. Women, the menopause, hormone replacement therapy and coronary heart disease. *Curr Opin Cardiol.* 2015;30:432-38.
15. DeGoma EM, Knowles JW, Angeli F, Budoff MJ, RaderDJ. The evolution and refinement of traditional risk factors for cardiovascular disease. *Cardiol Rev.* 2012; 20:118–29.
16. Yagi H, Komukai K, Hashimoto K, Kawai M, Ogawa T, Anzawa R, et al. Difference in risk factors between acute coronary syndrome and stable angina pectoris in the Japanese: Smoking as a crucial risk factor of acute coronary syndrome, *J Cardiol.* 2010; 55:345-53.
17. Punekar RS, Fox KM, Richhariya A, Fisher MD, Cziraky M, Gandr SR. Burden of first and recurrent cardiovascular events among patients with hyperlipidemia. *Clin. Cardiol.* 2015;38: 483–91.
18. Hussain MA, Al Mamun A, Peters SAE, Woodward M, Huxley RR. The burden of cardiovascular disease attributable to major modifiable risk factors in Indonesia. *J Epidemiol.* 2016; 26: 515–21.
19. Carnethon MR, Biggs ML, Barzilay J, Kuller LH, Mozaffarian D, Mukamal K, et al. Diabetes and Coronary Heart Disease as risk factors for mortality in older adults. *Am J Med.* 2010; 123: 556.e1–9.
20. Simon J, Rosolova H. Family history and independent risk factors for coronary heart disease, it is time to be practical. *European Heart Journal* 2002; 23, 1637–38.
21. Silva FMF, Pesaro AEP, Franken M, Wajngarten M. Acute management of unstable angina and non-ST segment elevation myocardial infarction. *Einstein* 2015;3:454- 61.
22. Rizik DG, Healy S, Margulis A, Vandam D, Bakalyar D, Timmis G, et al. A New Clinical Classification for hospital prognosis of unstable angina pectoris. *The American Journal of Cardiology* 1995;75: 993-97.