

A Study on the Assessment of Risk in the Management of Acute Coronary Syndrome using GRACE score

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ABSTRACT

Aim: To assess the risk in the management of acute coronary syndrome by using GRACE score.**Methods:** This was an observational study conducted among 155 patients of cardiology department. Myocardial infarction patients of age above 20 years who were treated with fibrinolytics were included in the study. Patients were assessed for the risk by using the GRACE (Global Registry of Acute Coronary Events) score criteria and was classified into low (≤ 108 points), intermediate (109 to 140 points) and high (> 140 points).**Results:** In this study, the severity of the LV dysfunction in most of the patients was observed to be mild followed moderate and severe. Majority of the patients were observed to be with high risk 61 (39.35%) followed by low risk 49 (31.61%) and intermediate risk 45 (29.04%). Most of the patients with high risk were observed to be in the age group 61-70 years (26.23%) whereas with intermediate risk were observed to be in the age group 41-50 years (35.55%).**Conclusion:** Among the mild, moderate and severe LV dysfunction, most of the patients were observed to be with high risk according to the GRACE score criteria.© 2023 Published by Universal Episteme Publications. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>)

Introduction

Acute coronary syndrome (ACS) is a syndrome caused by decreased blood flow in the coronary arteries. The clinical characteristics of ACS, includes ST elevation of myocardial infarction (STEMI), non-ST elevation myocardial infarction (NSTEMI) and unstable angina, which are known to be the widespread causes for disability and mortality [1]. The cause of an ACS is erosion or rupture of an atherosclerotic plaque with subsequent platelet adherence, activation, aggregation and activation of the clotting cascade. At present, pharmacotherapy of ACS has advanced to include combinations of fibrinolytics, antiplatelets and anticoagulants with more traditional therapies such as nitrates and β -adrenergic blockers. Pharmacotherapy is integrated with reperfusion therapy and revascularization of the culprit coronary artery through interventional means such as percutaneous coronary intervention (PCI) and coronary artery bypass graft (CABG) surgery.

ACS occurs far more often in men than in women below the age of 60 years but women represent the majority of patients over 75 years of age [2]. About 5% of heart attacks occur in young people under the age of 40 years, particularly in those with major risk factors to develop atherosclerosis like

hypertension, diabetes mellitus, cigarette smoking and dyslipidaemia with familial hypercholesterolemia. Males throughout their life are at a significantly higher risk of developing acute MI as compared to females. Women during reproductive period have remarkably low incidence of acute MI, probably due to the protective influence of oestrogen. The use of oral contraceptives is associated with high risk of developing acute MI. After menopause, this gender difference gradually declines but the incidence of disease among women never reaches the men of the same age [3].

The universal use of primary Percutaneous Coronary Intervention (PCI) has been limited by availability of the necessary resources to provide this highly specialised emergency service. Thus, intravenous thrombolytic therapy remains the first-line reperfusion treatment in many hospitals, especially those in rural or remote areas. When primary PCI cannot be achieved within 2 hours of diagnosis, thrombolytic therapy should be administered [4]. The operative mortality is approximately 1.5% but risks are higher in elderly patients, those with poor left ventricular function and those with significant co-morbidity. This has led many surgeons to consider total arterial revascularisation

during CABG surgery [5]. Hence, in this study we made an attempt to assess the risk in the management of acute coronary syndrome by using GRACE score.

Materials and Methods

This was an observational study conducted among 155 patients of cardiology department. Myocardial infarction patients of age above 20 years who were treated with fibrinolytics were included in the study.

Patients with severe renal & hepatic failure, pregnant women, patients had a contraindication to thrombolytic therapy including recent head/ facial trauma and/or ischemic stroke within last 3 months, intracranial tumour & prior intracranial haemorrhage, suspected aortic dissection, active internal bleeding or bleeding diathesis and patients with severe uncontrolled hypertension were excluded from the study.

Patients were assessed for the risk by using the GRACE (Global Registry of Acute Coronary Events) score criteria and was classified into low (≤ 108 points), intermediate (109 to 140 points) and high (> 140 points).

Results and Discussion

Table 1 represents the age wise categorization of the study participants in which most of the study participants were observed in the age group 41-50 years (25.16%) and very few study participants were observed in the age group 21-30 years (4.52%).

Table 1: Age wise categorization

Age	Male (%)	Female (%)	Total (%)
21-30	7 (5.26)	0 (0)	7 (4.52)
31-40	29 (21.81)	5 (22.73)	34 (21.94)
41-50	34 (25.56)	5 (22.73)	39 (25.16)
51-60	29 (21.81)	5 (22.73)	34 (21.93)
61-70	28 (21.05)	3 (13.63)	31 (20)
71-80	6 (4.51)	4 (18.18)	10 (6.45)
Total	133 (100)	22 (100)	155 (100)

Table 2 represents the categorization of the study participants based on their chief complaints. Most of the study participants were observed with chest pain alone (74.19%) followed by chest pain with shortness of breath (SOB) (13.55%).

Table 2: Categorization based on chief complaints

Chief complaints	Male (%)	Female (%)	Total (%)
Chest pain	100 (75.19)	15 (68.18)	115 (74.19)
Chest pain with sweating	6 (4.51)	3 (13.64)	9 (5.81)
Chest pain with SOB	20 (15.04)	1 (4.55)	21 (13.55)
Chest pain, SOB and sweating	5 (3.76)	2 (9.09)	7 (4.52)
Others	2 (1.50)	1 (4.54)	3 (1.93)
Total	133 (100)	22 (100)	155 (100)

Table 3 represents the categorization of the study participants based on the patient characteristics. Most of the patients were observed to be alcoholics (52.90%) and smokers (58.71%). Family history of CAD was observed only in 29.03% patients only.

Table 3: Categorization based on patient characteristics

Characteristics		Male (%)	Female (%)	Total (%)
Alcoholic	Yes	82 (61.65)	0 (0)	82 (52.90)
	No	51 (38.35)	22 (100)	73 (47.10)
Smoking	Yes	88 (66.17)	3 (13.64)	91 (58.71)
	No	45 (33.83)	19 (86.36)	64 (41.29)
Tobacco	Yes	5 (3.76)	0 (0)	5 (3.23)
	No	128 (96.24)	22 (100)	150 (96.77)
Toddy intake	Yes	1 (0.75)	9 (40.91)	10 (6.45)
	No	132 (99.25)	13 (59.09)	145 (93.55)
Family history of CAD	Yes	41 (30.83)	4 (18.18)	45 (29.03)
	No	92 (69.17)	18 (81.82)	110 (70.97)

Table 4 represents the characterization of the patients based on their co-morbidities. Hypertension (49.68%), diabetes (29.68%), respiratory diseases (7.1%), infectious diseases (4.52%), elevation of Troponin-T (69.03%) and ST deviation (98.06%) were observed.

Table 4: Categorization based on the co-morbidities

Co-morbid Conditions		Male (%)	Female (%)	Total (%)
Hypertensive	Yes	68 (51.13)	9 (40.91)	77 (49.68)
	No	65 (48.87)	13 (59.09)	78 (50.32)
Diabetic	Yes	34 (25.56)	12 (54.55)	46 (29.68)
	No	99 (74.44)	10 (45.45)	109 (70.32)
Respiratory disease	Yes	8 (6.02)	3 (13.64)	11 (7.10)
	No	125 (93.98)	19 (86.36)	144 (92.90)
Infectious disease	Yes	7 (5.26)	0 (0)	7 (4.52)
	No	126 (94.74)	22 (100)	148 (95.48)
Troponin-T	Yes	95 (71.43)	12 (54.55)	107 (69.03)
	No	38 (28.57)	10 (45.45)	48 (30.97)
ST Deviation	Yes	132 (99.25)	20 (90.91)	152 (98.06)
	No	1 (0.75)	2 (9.09)	3 (1.94)

Table 5 represents the MI location in which most of the patients were observed with anterior location (45.81%) followed by inferior location (14.84%).

Table 5: MI location

MI location	Male (%)	Female (%)	Total (%)
Anterior	65 (48.87)	6 (27.28)	71 (45.80)
Antero-inferior	1 (0.75)	0 (0)	1 (0.64)
Antero-lateral	3 (2.26)	0 (0)	3 (1.94)
Antero-posterior	2 (1.50)	2 (9.09)	4 (2.58)
Apico-inferior	2 (1.50)	0 (0)	2 (1.29)
Apico-lateral	2 (1.50)	0 (0)	2 (1.29)
Inferior	19 (14.29)	4 (18.18)	23 (14.83)
Infero-lateral	12 (9.02)	3 (13.64)	15 (9.68)
Infero-posterior	5 (3.76)	3 (13.64)	8 (5.16)
Infero-postero-lateral	6 (4.51)	1 (4.54)	7 (4.52)
Lateral	3 (2.26)	2 (9.09)	5 (3.23)
Posterior	3 (2.26)	1 (4.54)	4 (2.58)
Postero-inferior	3 (2.26)	0 (0.00)	3 (1.94)
Postero-lateral	7 (5.26)	0 (0.00)	7 (4.52)
Total	133 (100)	22 (100)	155 (100)

Table 6 represents the severity of LV dysfunction in which most of the patients were observed with mild dysfunction (70.97%) followed by moderate dysfunction (22.58%).

Table 6: Severity of LV dysfunction

LV Dysfunction	Male (%)	Female (%)	Total (%)
Mild	94 (70.67)	16 (72.72)	110(70.97)
Moderate	30 (22.56)	5 (22.73)	35 (22.58)
Severe	9 (6.77)	1 (4.55)	10 (6.45)
Total	133 (100)	22 (100)	155 (100)

Table 7 represents the GRACE score of the study participants based on gender. Among the study participants, 61 (39.35%) were observed to be with high risk, 45 (29.04%) were observed to be with intermediate risk and 49 (31.61%) were observed to be with low risk.

Table 7: GRACE score of Gender wise categorization

Gender	GRACE 2.0		
	High	Intermediate	Low
Male	56 (91.80)	41 (91.11)	36 (73.47)
Female	5 (8.20)	4 (8.89)	13 (26.53)
Total	61 (100)	45 (100)	49 (100)

Table 8 represents GRACE score of the study participants based on the age wise categorization. Most of the study participants with high risk were

observed in the age group 61-70 years (26.23%) whereas with intermediate risk were found to be in the age group 41-50 years (35.55%) and the study participants in the age group of 31-40 years (30.62%) were observed with low risk.

Table 8: GRACE score of age wise categorization

Age	GRACE 2.0		
	High	Intermediate	Low
21-30	1(1.64)	3(6.67)	3(6.13)
31-40	12(19.67)	7(15.56)	15(30.62)
41-50	13(21.31)	16(35.55)	10(20.41)
51-60	15(24.59)	10(22.22)	9(18.36)
61-70	16(26.23)	9 (20)	6(12.24)
71-80	4(6.56)	0(0)	6(12.24)
Total	61 (100)	45 (100)	49 (100)

Table 9 represents the GRACE score of the study participants based on LV dysfunction. Among the high risk study participants, 72.13%, 21.31% and 6.56% were observed with mild, moderate and severe LV dysfunction respectively. Among the intermediate risk study participants, 71.11%, 22.22% and 6.67% were observed to be with mild, moderate and severe LV dysfunction respectively whereas in case of low risk study participants, 69.39%, 24.49% and 6.12% were observed to be with mild, moderate and severe LV dysfunction respectively.

Table 9: GRACE score based on LV dysfunction of study participants

LV Dysfunction	GRACE 2.0		
	High	Intermediate	Low
Mild	44 (72.13)	32 (71.11)	34 (69.39)
Moderate	13 (21.31)	10 (22.22)	12 (24.49)
Severe	4 (6.56)	3 (6.67)	3 (6.12)
Total	61 (100)	45 (100)	49 (100)

Conclusion

In this study, the severity of the LV dysfunction in most of the patients was observed to be mild followed moderate and severe. Majority of the patients were observed to be with high risk 61 (39.35%) followed by low risk 49 (31.61%) and intermediate risk 45 (29.04%). Most of the patients with high risk were observed to be in the age group 61-70 years (26.23%) whereas with intermediate risk were observed to be in the age group 41-50 years (35.55%). Among the mild, moderate and severe LV dysfunction, most of the patients were observed to be with high risk according to the GRACE score criteria.

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