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CORRELATION OF KILLIP CLASS AND STROKE VOLUME IN ACUTE MYOCARDIAL INFARCTION

Cardiology

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ABSTRACT

Aim of the study: To correlate killip class with stroke volume by echocardiography in patients with acute myocardial infarction.

Materials & Methods: 50 consecutive patients were included in this study. The present study was conducted on the newly diagnosed cases of acute myocardial infarction visiting emergency of cardiology department Madras medical college & Rajiv Gandhi govt general hospital Chennai over a period of three months. Patients with prior history of acute myocardial infarction, valvular heart disease, cardiomyopathy, cardiac surgery, congenital heart disease, and patients with co-morbidities like renal failure, chronic liver disease, anemia, gastroenteritis, dehydration and chest diseases were not included in this study. Patients were classified as per killip's classification and 2D echo was performed on patients within 24hours of admission. Findings of clinical examination (presenting killip class) were correlated with two-dimensional and Doppler echocardiographic findings & stroke volume is calculated.

Results: Patients included in this study were grouped into four Killip classes separately. In ST Elevation MI killip classes were found as: Class 1 (50%), Class II (24%), Class III (20%), and Class IV (6%). For all patients stroke volume was calculated by using LVOT diameter & LVOT VTI parameter. The calculated stroke volume (in ml) was directly correlated with killip class. Statistical analysis was done by using Pearson Chi-square test and the p value was found to be less than 0.05 which was statistically significant. Patients with higher the killip class was found to have lower the stroke volume.

Conclusion: Echocardiographic left ventricular stroke volume obtained after an acute myocardial infarction is an affordable and readily available technique, which provides important prognostic information regarding patient's clinical outcome along with prognosis. From our study, we conclude that Echocardiographic findings are correlated with Killip Class. Patients with higher Killip Class have lower stroke volume and increased complications.

KEYWORDS

Acute myocardial infarction, 2D Echocardiography, LVOT

Introduction:

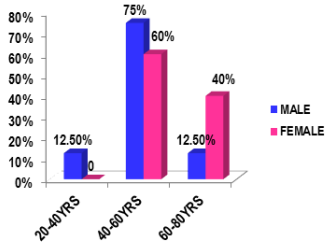
Cardiovascular disease has a major impact on global health. Among the cardiovascular diseases acute myocardial infarction is the leading cause of mortality and morbidity in the world. Early detection of patients with acute myocardial infarction (AMI) at risk of development of in-hospital congestive heart failure (CHF) is necessary to limit myocardial injury and left ventricular (LV) dysfunction. Early noninvasive evaluation of LV function assessed by echocardiography reduces morbidity and mortality in acute myocardial infarction. Heart failure significantly worsens the prognosis of patients with acute myocardial infarction[1]. Considering the kind of cardiac dysfunction following MI, most patients present with systolic dysfunction. Consequences of cardiac dysfunction after MI are well established, and its presence increases the risk of death by at least 3–4 fold[2]. In-hospital mortality in patients with acute myocardial infarction is predominantly related to heart failure, shock and mechanical complications (acute mitral regurgitation, ventricular septal rupture, and free wall rupture). Heart failure and shock are primarily the consequences of contractile dysfunction of the left ventricle[3]. Cardiogenic shock is the most common cause of death in patients hospitalized with acute myocardial infarction and is associated with a poor prognosis. In patients with acute myocardial infarction heart failure ischaracterized either by systolic dysfunction alone or by both systolic and diastolic dysfunction[4]. The echocardiogram is a standard tool in the management of patients with acute myocardial infarction (MI). The role of echocardiography in establishing the diagnosis, location, ejection fraction, and extent of myocardial infarction (MI), in diagnosing mechanical complications of infarction, and in providing prognostic information that is important for risk stratification will be reviewed[5].The value of echocardiography as a tool for evaluating the prognosis of patients after myocardial infarction lies in its ability to define the region, extent of ischemic damage and left ventricular function. Echocardiography can identify the type of rupture and assess right ventricular (RV) function at the patient's bedside[6].Mitral regurgitation (MR) has been associated with adverse outcomes after myocardial infarction (MI). Echocardiography plays an essential role in the early diagnosis of MR, estimating its severity, the mechanisms and also the prognosis[7]. The echocardiography performed in the early stages of disease should be integral part of the treatment of the acute myocardial infarction and by this modality we can reduce morbidity and mortality of acute myocardial infarction.

Methods:

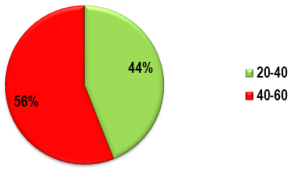
This is a cross sectional study in which 50 consecutive patients were included. The present study was conducted on the newly diagnosed cases of acute myocardial infarction visiting emergency of cardiology department Madras medical college & Rajiv Gandhi govt general hospital Chennai over a period of three months. Patients with prior history of acute myocardial infarction, valvular heart disease, cardiomyopathy, cardiac surgery, congenital heart disease, and patients with co-morbidities like renal failure, chronic liver disease, anemia, gastroenteritis, dehydration and chest diseases were not included in this study. Patients were classified as per killip's classification and 2D echo was performed on patients within 24hours of admission. Findings of clinical examination (presenting killip class) were correlated with two-dimensional and Doppler echocardiographic findings & stroke volume is calculated.

Results:

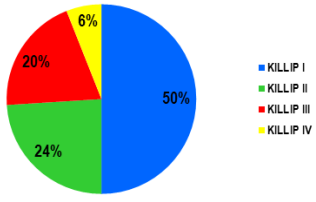
AGE AND SEX DISTRIBUTION OF MI PATIENTS



STROKE VOLUME



KILLIP GRADING OF MI PATIENTS



Chi-Square Tests

	CHI SQUARE	df	P VALUE
Pearson Chi-	**27.404[a]**	**6**	**.000**
Likelihood	34.104	6	.000

This table explains the association between KILLIP and stroke volume in MI patients. As the stroke volume increases the KILLIP grade decreases .This is highly significant (p<0.000)

Patients included in this study were grouped into four Killip classes separately. In ST Elevation MI killip classes were found as: Class 1 (50%), Class II (24%), Class III (20%), and Class IV (6%). For all patients stroke volume was calculated by using LVOT diameter & LVOT VTI parameter. The calculated stroke volume (in ml) was directly correlated with killip class. Echocardiographic findings in STEMI patients and its correlation with Killip's classication shows, that stroke volume decreases with higher killip class.

There was a statistically highly significant correlation between stroke volume and Killip's class: the greater the Killip class the less the stroke volume (P<0.05) after applying Pearson Chi-square test

Discussion:

The key findings of this study were the following**,** Killip Class II, III, and IV patients had higher risk profiles and rates of major adverse clinical events across AMI.[8] Classes II, III, and IV were associated with higher rate of death in patients presenting with STEMI. In this series male were found in majority 64% and females were found 36%. Masood A et al, [9] had also found male in the majority 75% as compared to female 25%. A study on coronary artery disease, it reported that the total 42% patients were hypertensive. [10] Study of Arvind kumar et al, was found high smoking rate as risk factor and also majority of males were involved.[11] In the study of masood A et al, [12] Eighty-six (53.8%) patients were hypertensive, 66 (41.3%) were smokers, 58 (36.3%) had diabetes mellitus, 38 (23.8%) patients had family history of ischemic heart disease and 40 (25%) patients had dyslipidemia. While in the present study hypertension was most common 70%, while second most common risk factor was smoking 59%, and 3rd most common was family history and diabetes. STEMI Killip's classification was found as; Class I (50%) Class II (24%), Class III (20%) and Class IV (6%). Masood A et al, 115 stated one hundred and two (63.8%) patients had anterior wall, 50 (31.3%) had inferior wall, 6 (3.8%) had posterior wall and 2 (1.3%) had lateral wall myocardial infarction. In this study cases of ST elevation as; Anterioseptal wall MI, Inferior wall MI, Anteriolateral wall MI, Inferior + RVMI, Lateral wall MI, Posterior wall MI and AVR STEMI, 29%, 26%, 22%, 14%, 3.7%, 2.8%, and 1.8% respectively**.** The stroke volume of 40-60ml was seen in 56 % of patients STEMI, and also stroke volume of 20-40 ml was seen 44 % of patients. Significant correlation between stroke volume and Killip's class: the greater the Killip's class the less the stroke volume (P<0.05). Similarly Jitendra Kodilkar et al, [13] reported that, severity of the infarction increased with the increase in the Killip class. Mean ejection fraction was also observed to be decreasing in patients with increase in severity of the infarction.

Conclusion:

Echocardiographic left ventricular stroke volume obtained after an acute myocardial infarction is an affordable and readily available technique, which provides important prognostic information regarding patient's clinical outcome along with prognosis. From our study, we conclude that Echocardiographic findings are correlated with Killip Class. Patients with higher Killip Class have lower stroke volume and increased complications.

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