

## ORIGINAL ARTICLE



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## Evaluation of Echocardiographic Parameters in Patients of Acute Right Ventricular Myocardial Infarction and it's Association with In-Hospital Outcome

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### Abstract

This study investigates the role of various echocardiographic parameters in assessing right ventricular (RV) function in patients with inferior wall myocardial infarction (IWMI) and right ventricular myocardial infarction (RVMI). The primary objective is to evaluate the use of pulmonary regurgitation pressure half-time (PRPHT) and right ventricular global longitudinal strain (RVGLS) as indicators of RV dysfunction and prognostic markers for adverse in-hospital outcomes. The study is a prospective observational cross-sectional analysis conducted at the public sector apex institute in eastern India, involving 155 patients diagnosed with acute IWMI/RVMI. Patients underwent a comprehensive evaluation followed by a three-month post-treatment follow-up. Echocardiographic parameters were measured. The study's findings suggest significant correlations between these parameters, highlighting their interdependence in evaluating RV function. The results indicate that PRPHT and RVGLS can serve as reliable markers for assessing RV dysfunction. The results also indicate that PRPHT could serve as a valuable prognostic indicator in patients with PRPHT  $\leq$  100 ms. This study also suggests that PRPHT has no significant correlation with in-hospital outcome especially in patients with PRPHT >100ms. This study also suggests that RVGLS bears no value in predicting in-hospital outcomes. The findings of this study also suggest that negative RVGLS are well correlated with other standard echocardiographic measures of RV dysfunction viz. TAPSE and FAC. The study concludes that integrating PRPHT with traditional markers viz. TAPSE, RVFAC, and RVGLS provides a comprehensive assessment of RV function, enabling better identification of patients at risk of adverse outcomes following IWMI/RVMI. This study also suggests that PRPHT has no significant correlation with in-hospital outcome especially in patients with PRPHT >100ms. However, the study acknowledges limitations such as the small sample size and the need for further research to confirm these findings and establish PRPHT's clinical utility as a prognostic tool. It was also noted that patients with PRPHT values < 90, TAPSE of less than 10, FAC of less than 28% and RVGLS value of less than (-12) were able to predict in-hospital outcome in patients of IWMI/RVMI. The findings of present study also suggests that interventions in IWMI/RVMI have good outcomes at 3 month follow-up.

**Keywords:** RVMI, IWMI, Echocardiography, PRPHT, RVGLS, TAPSE

## 1 Introduction

Right ventricular myocardial infarction (RVMI) is a disease that occurs under the umbrella of inferior wall myocardial

infarction (IWMI)<sup>1, 2</sup>. In a case of IWMI/RVMI, where right ventricle (RV) is primarily involved, which is characterised by regional or global dysfunction, resulting in dilatation of RV

cavity, very little is known of impact of involvement among survivors.

It is very important to recognise the patients of IWMI/RVMI, since in many studies it has been postulated that elevation of ST segment (STE) in v4R is a strong predictor for complications<sup>3,4</sup>. As said by Albulushi A *et al*, RVMI is said to be present if more than 1 segment STE is noted in leads v3R, v4R, v5R, v6R<sup>5</sup>. The diagnostic predictiveness of various parameters of echocardiography (echo) varies amongst various studies<sup>6,7</sup>.

With the help of parameters for pulmonary regurgitation (PR), we can get an insight into right ventricular (RV) function. It relies on the concept of Bernoulli equation. It states that pressure gradient between pulmonary artery & RV guides the PR jet<sup>8</sup>.

In cases of IWMI/RVMI, where due to RV infarction, RV tends to dilate with declining ejection fraction, raising RVEDP (RV end diastolic pressure) is reflected in PR flow patterns. The above concept helped us to propose a hypothesis that PR flow patterns can be used as an alternate marker of RV dysfunction in RVMI along with other standard markers of RV dysfunction.

In a study done by Muraru *et al*, right ventricular strain imaging studies was done on patients and Global Longitudinal Strain (GLS) total was obtained and bull's eye plotting was done. The normal value of RVGLS total varied in the range of  $-26.7 \pm 3.1$  (women) and  $-24.7 \pm 2.6$  (men)<sup>9</sup>. In contrast to other echo parameters of RV systolic function, strain imaging picks up insight into intrinsic myocardial function and helps distinguish active movement from passive movement, as said by Lee JH *et al*<sup>10</sup>. Longitudinal strain, is a robust method to measure RV systolic function, and its results were correlated well with Cardiac M<sup>10</sup>. The RV wall with respect to LV has superficial and deep layers of muscle. The superficial fibres are arranged circumferentially, while the deep fibres are longitudinally placed<sup>11</sup>. It is the contribution of deep muscle layers that account for majority of RV contraction, due to which RV GLS to quantify RV contraction should be a good way to assess RV systolic function.

### Aims and Objectives

- Assessment of echo parameters in subjects presenting with acute IWMI with special reference to RVMI subset and its association with in-hospital outcome.
- To assess the echocardiographic parameters at 3 months post myocardial infarction in patients undergoing coronary intervention in acute IWMI with special reference to RVMI subset.

- To evaluate RV GLS and its correlation with tricuspid annular plane systolic excursion (TAPSE), right ventricular fractional area change (RVFAC) in patients with acute IWMI with special reference to RVMI subset.

## 2 Materials and Methods

### Inclusion Criteria:

- Patients presenting with chest pain with ECG evidence of following features:-  $\geq 2$ mm STE in  $\geq 2$  consecutive leads in II, III, aVF and elevated cardiac biomarkers<sup>5</sup>.
- Patients presenting with RVMI as described by  $\geq 1$  mm ST elevation in any one or combination of leads V3R, V4R, V5R, V6R<sup>5</sup>.

### Exclusion Criteria:

- Pulmonary Hypertension
- No PR at the time of evaluation.
- Not gave consent for coronary imaging.
- Contrast anaphylaxis.
- Patients with atrial fibrillation at the time of admission.

### Study Design:

A prospective, observational study was carried out in the cardiology wing of our institute. Prior to participation in the study, informed consent was obtained from all, in written. Prior to the starting of the study, approval from ethics committee was taken as per protocol. The study was conducted at public sector institute in eastern India.

### Study Population:

A total of 155 patients who were diagnosed with acute IWMI/RVMI and sought treatment at the cardiology emergency, in our institute from 1st March 2023 to 29th February 2024 were considered.

Sample size was calculated on the basis of proportion of such patients, who are likely to develop one or more adverse in-hospital outcomes as we mean a large population size and the crude proportion figure to be 10%, it is calculated that 139 subjects would be required to define this proportion with 5% margin of error and 95% confidence level, keeping 10% margin for dropout, the recruitment target will be 155 subjects. Sample size calculation was done with RAOSOFT sample size calculator ([www.raosoft.com](http://www.raosoft.com)).

### Method:

All the subjects after inclusion were subjected to a clinical history taking, physical examination, echocardiography, electrocardiogram and cardiac biomarkers. In this study, we recruited only patients with hemoglobin (Hb)  $>10$  mg/dl,

serum creatinine (Cr) < 1.3 mg/dl and positive kit troponin T test for accessibility for revascularisation via percutaneous coronary intervention (PCI). Patients who would be eligible for reperfusion within window period were treated with Tenecteplase or primary PCI as per intention to treat strategy.

#### ECG:

RVMI was suspected when STE  $\geq$  1mm observed in lead v3R, V<sub>4</sub>R, V<sub>5</sub>R, V<sub>6</sub>R, which was recorded in all patients<sup>5</sup>.

#### Echocardiography:

The echo of the enrolled subjects was done with Mindray DC-70 machine 12 hours after admission.

Apart from routine baseline parameters, patients were recorded for PR pressure half time (PRPHT). The other parameters that were studied were LV ejection fraction (LVEF), RVFAC, TAPSE, RVGLS. RV Strain imaging was done by using standard protocol<sup>10</sup>, RVGLS obtained and its correlation with above parameters were studied. Their echocardiographic parameters were assessed again at an interval of 3 months post treatment as follow-up.

#### Coronary catheterisation & revascularisation:

As soon as it was feasible, coronary catheterisation was done in all subjects during their hospital stay. Coronary artery disease (CAD) was looked for. Significant CAD in a vessel is said when there was  $\geq$  70% stenosis of the involved coronary artery. The subjects with substantial CAD received percutaneous coronary intervention (PCI).

#### In-hospital events:

Acute in-hospital events, as described below and their correlation with echo parameters was determined in the present study:

- Death
- Sinus node dysfunction
- Severe malignant arrhythmia [ventricular fibrillation (VF), sustained ventricular tachycardia (VT)].
- High grade Atrio-ventricular block, complete heart block
- Need for temporary pacemaker.
- Low cardiac output features (SBP <90 mmHg, reduced urine output, Need for volume loading, inotropic support).
- Ischemic events.

#### Statistical analysis:

Patients were analysed overall and also grouped on the basis of doppler features of PR. PRPHT  $\leq$  100 ms were designated Group A, while PRPHT > 100 ms were designated Group B. Continuous variable were analysed using mean and standard

deviation. Variable between groups were analysed using independent t-test. For correlation between various echocardiographic parameters ANOVA test were used. For association with in-hospital outcome, ANOVA and chi-square test were used. To compare between baseline and 3 month follow-up, paired t-test and Mann-Whitney U test were used. The findings were compiled in a proforma. Statistical analysis was done using SPSSv23.

### 3 Results

The study included 155 subjects. The entire study population was split into two categories depending on PRPHT. Group A consisted of participants with PRPHT  $\leq$  100 ms, whereas group B included individuals with PRPHT > 100 ms. Zoghbi WA et al quantified PRPHT  $\leq$  100ms as severe PR<sup>12</sup>.

Overall, they had a mean age of 56.85 years with standard deviation (SD) of 9.53 years. The minimum age registered was 40 years, while oldest was 75 years. The mean age for group A is 60.92 with a SD of 8.24. For group B, the mean age is 49.86 with a SD of 7.31. This suggests that on average, individuals in group A are older than those in group B.

Among all, the majority of the subjects were male (101 patients, 65.2%), and 54 patients (34.8%) were female. Among groups, group A has an equal number of males and females (49 each) while, group B has a significantly higher number of males (52) compared to females (5).

While talking about co-morbidities, 89 patients (57.4%) had diabetes mellitus (DM) overall, with percentage of people having DM in group A is 61.22% and in group B is 50.88%.

Among study population overall, 88 patients (56.8%) had hypertension (HTN), with prevalence in group A at 58.16%, while in group B was 54.39%.

The lipid profile of among all patients showed that 101 patients (65.2%) had dyslipidemia, while 54 patients (34.8%) had a normal lipid profile (eulipidemic). Among groups, group A had 57% people with dyslipidemia, while group B had 77% with dyslipidemia.

The majority of the patients were non-smokers (129 patients, 83.2%), and 26 patients (16.8%) were smokers. Group A had 6% smokers while group B had 35% smokers.

The mean heart rate at the time of echocardiography measured was 94.8 bpm.

#### PRPHT:

- Group A has a mean PRPHT of 91.94 ms with a standard deviation (SD) of 9.5, while group B has a higher mean PRPHT of 108.2 ms with a SD of 13.11.
- The range of PRPHT values is wider in group B (82 to 126) compared to group A (80 to 126).

Independent t-test was used. The means of PRPHT between two groups revealed a p-value of <0.001. The p-value suggests a statistically significant variance in PRPHT between the two groups.

In conclusion, group B exhibits significantly higher PRPHT values compared to group A. This suggests potential differences in pulmonary regurgitation tracings between the two groups. Fig. 1 shows example of calculation of PR PHT.



Fig. 1: Example of calculation of PR PHT

#### LVEF:

Group B demonstrated a significantly higher LVEF compared to group A. The mean LVEF for group A was 50.03% with a range of 47% to 58%, whereas group B had a mean LVEF of 56.14% with a range of 52% to 59%. An independent t-test indicated that this disparity was statistically significant ( $p < 0.001$ ), implying potential distinctions between the two groups.

#### TAPSE:

The descriptive statistics for TAPSE shows remarkable difference between the two groups:

- Group A: A mean TAPSE was significantly lower in this group, at 10.89 mm, with SD of 2.27 mm. The range of TAPSE values in this group was from 8 mm to 17 mm.
- Group B: This group had a notably higher mean TAPSE of 16.86 mm, also with SD of 2.26 mm. The TAPSE values in this group ranged from 12 mm to 19 mm.

These findings suggest that patients in group B, on average, had better RV systolic function as assessed by TAPSE compared to those in group A.

Fig. 2 shows example of calculation of TAPSE.

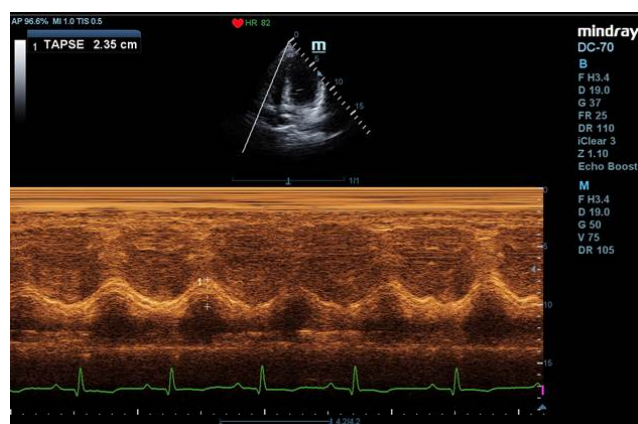


Fig. 2: Example of calculation of TAPSE

#### FAC:

- Group A: The average FAC was 27.67% with a SD of 3.82%, with values ranging from 22% to 38%.
- Group B: The average FAC was higher at 36.77% with a SD of 2.99%, with a range of 32% to 40%. This again suggests better right ventricular function in group B. Additionally, the standard deviation reveals that the FAC values in group B are less spread out than those in group A.

#### Right Ventricular Global Longitudinal Strain (RVGLS):

- Group A: The average RVGLS was -12.89%, with values ranging from -21% to -8%.
- Group B: The average RVGLS was lower at -20.33%, with a range of -24% to -14%. A more negative RVGLS indicates better right ventricular function, suggesting that group B has better right ventricular function with respect to (wrt)group A in this regard.

#### Correlation between echocardiographic parameters of RV function:

The columns RVGLS, TAPSE and FAC are for the numerical calculations. We used Pearson correlation to find correlation between these columns shown as in Table. 2.

- Negative RVGLS has a very strong positive correlation with TAPSE (0.969) and FAC (0.936), implying that as the value of negative RVGLS increases (becomes less negative), TAPSE and FAC both tend to increase.
- TAPSE and FAC both have a very strong positive correlation (0.922), indicating that they tend to increase or decrease together.

**Table 1: Baseline echocardiographic values among groups**

Parameters	Group A	Group B	Independent t-test significance
PRPHT (ms)	Mean: 91.94 SD: 9.5	Mean: 108.2 SD: 13.11	p < 0.001
LVEF (%)	Mean: 50.03 Range: 47-58	Mean: 56.14 Range: 52-59	p < 0.001
TAPSE (mm)	Mean: 10.89 SD: 2.27 Range: 8-17	Mean: 16.86 SD: 2.26 Range: 12-19	p < 0.001
FAC (%)	Mean: 27.67 SD: 3.82 Range: 22-38	Mean: 36.77 SD: 2.99 Range: 32-40	p < 0.001
RVGLS (%)	Mean: -12.89 Range: -21 to -8	Mean: -20.33 Range: -24 to -14	p < 0.001

**Table 2: Correlation between echocardiographic parameters of RV function**

Parameters	TAPSE	FAC	Negative RVGLS
TAPSE	1	0.922	0.969
FAC	0.922	1	0.936
Negative RVGLS	0.969	0.936	1

These correlations suggest that these parameters are interrelated and may reflect different aspects of right ventricular function. For instance, a more positive absolute value of RVGLS (impaired right ventricular function) is associated with reduced TAPSE and FAC (decreased right ventricular systolic function).

**Association of echocardiographic parameters with in-hospital outcome:**

The column in-hospital outcome is categorical. To find the correlation between PRPHT, negative RVGLS and in-hospital outcome, we used ANOVA test. We first converted the in-hospital outcome column to a categorical data type and then performed the ANOVA test overall and for each group separately and reported the results. The ANOVA test results are summarised in [Table 3](#).

Chi-square test of independence was done to determine specific values of echocardiographic variables which can predict the occurrence of adverse in-hospital outcomes. The results are summarised in [Table 4](#).

The values of echocardiographic variables with PRPHT less than 90, TAPSE less than 10, FAC less than 28% and RVGLS value less than (-12) were associated with significantly increased chances of adverse in-hospital outcomes. ANOVA analysis among groups are summarised in [Table 5](#).

**Table 3: Association of various parameters with in-hospital outcome**

ANOVA Test	F Value	P Value	Association
PRPHT overall with in-hospital outcome	2.16	0.076	No significant association
TAPSE overall with in-hospital outcome	2.304	0.061	No significant association
FAC overall with in-hospital outcome	2.523	0.043	Significant association
RVGLS overall with in-hospital outcome	2.125	0.080	No significant association

**Table 4: Association of various parameters with in-hospital outcome**

Chi-square test between PRPHT value less than 90 with in-hospital outcome	Chi-square test between (TAPSE value less than 10) with in-hospital outcome	Chi-square test between (FAC value less than 28) with in-hospital outcome	Chi-square test between (RVGLS value less than -12) with in-hospital outcome
Chi-square Value: 9.544	Chi-square Value: 13.377	Chi-square Value: 11.44	Chi-square Value: 11.287
P Value: 0.049 suggesting significant association between the two	P Value: 0.010 suggesting significant association between the two	P Value: 0.022 suggesting significant association between the two	P Value: 0.024 suggesting significant association between the two

**Table 5: ANOVA analysis of various parameters among groups**

Group A		Group B	
PRPHT	Negative RVGLS	PRPHT	Negative RVGLS
F-value: 2.885	F-value: 2.148	F-value: 0.794	F-value: 0.531
P-value: 0.027	P-value: 0.081	P-value: 0.503	P-value: 0.663

The difference in PRPHT for group A is statistically significant, with a p-value of 0.027 which is below the significance level of 0.05. This suggests that PRPHT <100 ms may be useful in predicting in-hospital outcomes. While RVGLS doesn't seem to be useful in predicting in-hospital outcomes for either group.

Nevertheless, it is crucial to note that this analysis relies on a small dataset, and additional research with a more extensive sample size is required to validate these results and ascertain the clinical usefulness of PRPHT as a prognostic tool for patients with RVMI.

### Correlation among baseline and 3 month follow-up parameters:

To compare baseline and 3-month follow-up parameters, we excluded patients who had passed away and performed statistical analysis.

We used a paired t-test to compare the LVEF and LVEF3mo columns and determine if there was a statistically significant difference between these two measurements.

The t-test with paired data resulted in a t-statistic of -19.400 and a p-value less than 0.001. As the p-value is below 0.05, we can infer that there is a statistically significant variance between LVEF and LVEF3mo.

The distributions of PRPHT and PRPHT3mo are shown in the histograms in Fig. 3.

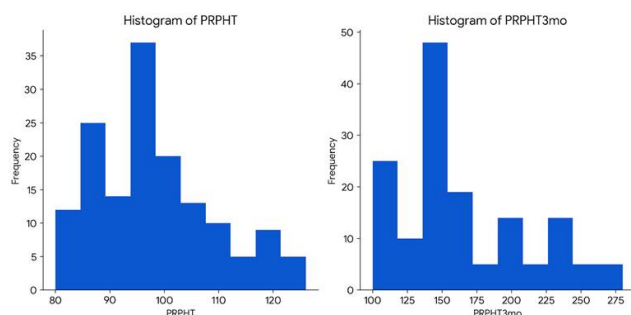


Fig. 3: Histogram of PRPHT & PRPHT at 3 month

The Shapiro-Wilk test indicates that neither PRPHT nor PRPHT3mo are normally distributed. As a result, we employed the Mann-Whitney U test to compare them. The obtained p-value is less than 0.001, suggesting a statistically significant distinction between PRPHT and PRPHT at 3 months.

The TAPSE and TAPSE at 3-month comparison resulted in a t-statistic of -13.259 and a p-value of less than 0.001 when using the independent t-test. Since the p-value is less than 0.05, we have the ability to reject the null hypothesis, indicating a difference in means between the two groups. This suggests a statistically significant difference between TAPSE and TAPSE at 3-month.

To confirm whether significant difference exists between group FAC & FAC3mo statistically, independent t test was run. The t-statistic came out to be -18.310 and p-value of <0.001. The resulting p-value of <0.05 indicates that a statistically significant difference exists between FAC and FAC3mo.

To compare the columns RVGLS and RVGLS3mo, independent t test was run. The t-statistic yielded a value of 7.52, and the p-value was found to be less than 0.0001. Due to the extremely small p-value, it can be inferred that there exists a statistically

significant variance between negative RVGLS and negative RVGLS3mo.

These results collectively indicate that interventions in IWMI/RVMI patients led to significant improvements in echocardiographic parameters of RV function.

## 4 Discussion

The objective of this study is to evaluate the effectiveness of echo parameters and to analyze the results in individuals who meet the inclusion criteria. The study hypothesized that alterations in PR doppler patterns and RVGLS values could serve as early indicators of RV involvement and adverse outcomes. The objectives were to analyse the association between these echocardiographic parameters & with in-hospital outcome, and to assess their predictive value after 3 month follow-up. The study also aims to analyse the correlation among RVGLS and other established measures of RV function, such as TAPSE and RVFAC.

As per criteria defined by Zoghbi WA et al based on PRPHT, total study population was divided into 2 parts. Group A having PRPHT < 100ms and group B with PRPHT > 100 ms . The findings indicated a substantial discrepancy in PRPHT levels between the two groups, with group B displaying significantly elevated values. This observation aligns with previous research indicating that lower PRPHT is associated with impaired RV function<sup>12</sup> and hence adverse outcomes in patients in whom heart failure (HF) have developed in RVMI as said by Nägele MP *et al*<sup>13</sup> .

The research also noted a considerable disparity in LVEF between the two groups, with group B displaying elevated values. This finding suggests that patients with lower PRPHT may also experience a degree of left ventricular dysfunction, which is collaborative to the study which states that RVMI is associated with lower LVEF as pointed out by Liao H *et al*<sup>14</sup> .

The comparison of TAPSE and FAC showed that group A had notably lower values than group B, demonstrating a significant decrease in RV systolic function in group A. These results aligns with the study done by Hameed A et al stating the use of TAPSE and FAC as dependable markers of RV function<sup>15</sup> .

The evaluation of RVGLS, a fairly new measure for assessing RV performance, indicated a noteworthy distinction between the groups. Group A demonstrated less negative absolute values, indicating more pronounced RV dysfunction compared to group B. This is in concordance with the study which shows that RVGLS may be a sensitive marker for detecting subtle RV dysfunction in the setting of acute IWMI & RVMI<sup>16</sup> . The study by Anastasiou V *et al* also states that more positive absolute values of RVGLS are associated with poor outcomes<sup>16</sup> .

### **Correlation between echocardiographic parameters of RV function:**

The strong correlations observed between TAPSE, FAC, and RVGLS underscore the intricate relationship between these parameters in evaluating RV function. The positive correlation between TAPSE and FAC suggests that these parameters have tendency to increase/decrease simultaneously. A study by Hameed A *et al.* states the established role of TAPSE and FAC as reliable indicators of RV function<sup>15</sup>. The robust correlation between TAPSE and FAC underscores their complementary roles in assessing RV systolic function. While TAPSE provides a simple and readily obtainable measure of RV longitudinal displacement, FAC offers a more comprehensive evaluation of RV contractile function by considering changes in RV cavity size<sup>15</sup>.

While taking into account the RVGLS, the strong positive correlation between negative RVGLS and both TAPSE and FAC highlights the sensitivity of RVGLS in detecting subtle changes in RV myocardial function. An increase in absolute value of RVGLS, representing impaired longitudinal myocardial shortening, is associated with reduced TAPSE and FAC, emphasises the impact of RV myocardial dysfunction on global RV systolic performance<sup>16</sup>. This robust correlation also suggests that RVGLS is non-inferior to TAPSE and FAC as a tool to evaluate RV function in patients of IWMI/RVMI.

The integration of TAPSE, FAC, and RVGLS allows for a comprehensive assessment of RV hemodynamics, systolic function, and myocardial performance, enabling physicians to identify patients with RV involvement and potential adverse outcomes. The complementary nature of these parameters enhances the accuracy and sensitivity of RV functional evaluation, facilitating timely and targeted interventions to improve patient outcomes. RVGLS, in particular, emerges as a promising prognostic marker for patients with conditions affecting the right ventricle<sup>16</sup>.

The correlational analysis between the various echocardiographic parameters revealed strong associations, particularly between TAPSE, FAC, and RVGLS highlight the potential of these parameters for comprehensive RV function evaluation.

### **Association between echocardiographic parameters and in-hospital outcome:**

While looking for association between echocardiographic parameters and in-hospital outcome among the total patient population, one way ANOVA test was done. It revealed non-significant p-value when associating PRPHT, TAPSE & RVGLS with in-hospital outcome. While FAC may be used as a tool to predict adverse in-hospital outcomes (p-value= 0.043).

Chi-square test of independence was carried out to find specific values of various echocardiographic parameters in predicting adverse in-hospital outcomes. It was seen that patients with PRPHT values less than 90 can fairly predict adverse outcomes (p-value= 0.049). TAPSE of less than 10 can also predict adverse outcomes fairly (p-value= 0.01). While FAC of less than 28% (p-value= 0.022) and RVGLS value of less than (-12) (p-value= 0.024) are also able to predict in-hospital outcome. El-Rabat et al in their study showed that TAPSE of less than 7.9 and RVGLS values of less than (-15.9) were independent predictors of in-hospital adverse complications in patients of RVMI, findings of which are at par with our study<sup>17</sup>. While Gupta et al in their study elaborated that TAPSE of <13.4 mm and FAC <31.76% were associated with adverse in-hospital outcomes in patients of RVMI, which are also in accordance with findings of our study<sup>18</sup>. Kanar BG *et al.* in their study showed that RVGLS  $\leq$  (-14) predicted dismal prognosis in patients of RVMI, which is in concordance with findings of our study<sup>19</sup>.

The study's findings indicate a significant correlation between PRPHT and in-hospital outcomes, particularly in the group with PRPHT  $\leq$ 100 ms (Group A). The statistically significant difference in PRPHT between patients with and without adverse in-hospital events within this group suggests that PRPHT could be a useful predictor of complications in patients with IWMI/RVMI with PRPHT  $\leq$ 100ms.

We noticed a lack of significant correlation between PRPHT and in-hospital outcomes in the group with PRPHT > 100 ms (Group B) might be attributed to several factors. Patients in group B might have had less severe RV dysfunction, making it more challenging to identify a clear relationship between PRPHT and outcomes, which might be one of the reasons.

While there are studies which stated role of RVGLS, TAPSE & FAC in prognosticating patients of RVMI<sup>20, 21</sup>, this study is first of its kind to take into account the role of PRPHT in prognostication of patients of IWMI/RVMI only next to a study published by Cohen A *et al.*, which showed that PRPHT  $\leq$ 150ms can predict RV involvement in patients with acute IWMI<sup>22</sup>.

The potential prognostic value of PRPHT in RVMI patients warrants further investigation. Further research involving larger cohorts and a more diverse range of patients is necessary to confirm these results and demonstrate the clinical usefulness of PRPHT as a prognostic indicator.

### **Correlation between baseline and 3 month follow-up characteristics:**

Three months after the myocardial infarction, the LVEF, TAPSE, FAC, and RVGLS showed considerable improvements during the follow-up assessment indicating a degree of recovery in both left and right ventricular function following revascularisation in concordance with study done by Haeck

ML *et al.*<sup>23</sup>. Park SJ *et al.* in their study stated that RVGLS holds significant importance as a key parameter for assessing RV systolic function and predicting the prognosis following PCI for acute IWMI, especially in patients with maintained LV function<sup>24</sup>.

### Limitations:

There are some notable limitations with respect to the results & study design. First, the relatively small size of sample, which can potentially impact the broad applicability of the results. Second, the study was carried out at a single centre, and only those patients were recruited who had Hb > 10 mg/dl and Cr < 1.3, which could introduce selection bias. Third, the absence of a control group of patients without inferior wall MI makes it challenging to ascertain the specificity of the echocardiographic parameters for RVMI. Fourth, this study is cross sectional in type which limits its ability to establish causal relationships, highlighting the need for longitudinal studies to track changes in RVGLS and right ventricular function over time and evaluate their influence on clinical outcomes. Fifth, one of the inclusion criteria of the study is PR at presentation, while it may be of considerable value, keeping in mind that not all IWMI & RVMI patients may present with PR. The results cannot be generalised upon those who do not present with PR. Sixth, the assessment did not cover long-term results, and it is crucial to establish the prognostic significance of the echocardiographic parameters.

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### 5 Conclusion

Conclusively, this research showcases the usefulness of different echocardiographic parameters, specifically PR PHT, TAPSE, FAC & RVGLS, in evaluating right ventricular function and forecasting in-hospital results in IWMI/RVMI patients along with echo findings of 3month follow up.

It was also noted that patients with PRPHT values less than 90, TAPSE of less than 10, FAC of less than 28% and RVGLS value of less than (-12) were able to predict in-hospital outcome in patients of IWMI/RVMI. The results indicates that PRPHT could serve as a valuable prognostic indicator in patients with PRPHT ≤ 100 ms. This study also suggests that PRPHT has no significant correlation with in-hospital outcome especially in patients with PRPHT >100ms.

The findings of this study also suggest that negative RVGLS are well correlated with other standard echocardiographic measures of RV dysfunction and is non-inferior to parameters TAPSE and FAC in evaluation of RV function in IWMI/RVMI.

The findings of present study also suggests that interventions in IWMI/RVMI has good outcomes at 3 month follow-up. RVGLS can be used as a tool to evaluate RV function in such cases.

More extensive research is necessary to confirm these results in broader and more varied groups of patients, and over a longer follow-up period to more accurately evaluate clinical outcomes.

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