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Evaluation of echocardiographic parameters in patients of acute right ventricular myocardial infarction and its association with in-hospital outcome

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ABSTRACT

Background: This study investigates the role of various echocardiographic parameters in assessing right ventricular (RV) function in patients with inferior wall myocardial infarction (IWMI) and RV myocardial infarction (RVMI). **Aims and Objectives:** The primary objective is to evaluate the use of pulmonary regurgitation pressure half-time (PRPHT) and RV global longitudinal strain (RVGLS) as indicators of RV dysfunction and prognostic markers for adverse in-hospital outcomes and the outcome at 3 month follow-up. **Materials and Methods:** 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 echocardiographic evaluation and management, followed by a 3-month post-treatment follow-up. **Results:** The findings suggest significant correlations between echocardiographic parameters of RV function. It was noted that patients with PRPHT values <90, tricuspid annular plane systolic excursion (TAPSE) of <10, FAC of $<28\%$, and RVGLS value of $<(-12)$ were able to predict in-hospital outcome in patients of IWMI/RVMI. The findings of the present study also suggest that interventions in IWMI/RVMI have good outcomes at 3-month follow-up. **Conclusion:** The results also indicate that PRPHT could serve as a valuable prognostic indicator in patients with PRPHT ≤ 100 m. It was noted that RVGLS bears no value in predicting in-hospital outcomes. The study concludes that integrating PRPHT with traditional markers viz. TAPSE, RVFAC, and RVGLS provide a comprehensive assessment of RV function, enabling better identification of patients at risk of adverse outcomes following IWMI/RVMI.

Key words: Right ventricular myocardial infarction; Inferior wall myocardial infarction; Echocardiography; Pulmonary regurgitation pressure half-time; Right ventricular global longitudinal strain; Tricuspid annular plane systolic excursion

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INTRODUCTION

Right ventricular myocardial infarction (RVMI) is a disease that occurs under the umbrella of inferior wall myocardial infarction (IWMI).[1,2] In the case of IWMI/RVMI, where the right ventricle (RV) is primarily involved, which is characterized by regional or global dysfunction, resulting in dilatation of RV cavity, very little is known of the impact of involvement among survivors.

It is very important to recognize the patients of IWMI/RVMI, since in many studies, it has been postulated that

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elevation of ST segment (STE) in v4R is a strong predictor for complications.[3,4] As said by Albulushi et al., RVMI is said to be present if more than 1 segment STE is noted in leads v3R, v4R, v5R, v6R.[5] The diagnostic predictiveness of various parameters of echocardiography (echo) varies among various studies.[6,7]

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 the pressure gradient between pulmonary artery and RV guides the PR jet.[8]

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 M˘uraru et al., RV 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 3.1 (women) and −24.7 2.6 (men).[9] 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 and Park.[10] Longitudinal strain, is a robust method to measure RV systolic function and its results were correlated well with Cardiac magnetic resonance.[10] The RV wall with respect to livedoid vasculopathy (LV) has superficial and deep layers of muscle. The superficial fibres are arranged circumferentially, while the deep fibres are longitudinally placed.[11] It is the contribution of deep muscle layers that account for the 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 postmyocardial infarction in patients undergoing coronary intervention in acute IWMI with special reference to RVMI subset
- To evaluate RV GLS and it's correlation with tricuspid annular plane systolic excursion (TAPSE), RV fractional area change (RVFAC) in patients with acute IWMI with special reference to RVMI subset.

MATERIALS AND METHODS

Inclusion criteria

- Patients presenting with chest pain with Electrocardiogram (ECG) evidence of following features:−≥2 mm STE in ≥m STE in of following features: arteriovenous fistula and elevated cardiac biomarkers[5]
- Patients presenting with RVMI as described by ≥1 mm ST elevation in any one or combination of leads V3R, V4R, V5R, V6R.[5]

Exclusion criteria

- Pulmonary hypertension (HTN)
- 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. Before participation in the study, informed consent was obtained from all, in written. Before the starting of the study, approval from the ethics committee was taken as per protocol. The study was conducted at a 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.

The sample size was calculated on the basis of the 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 the RAOSOFT sample size calculator (www.raosoft.com).

Method

All the subjects after inclusion were subjected to a clinical history taking, physical examination, echo, ECG and cardiac biomarkers. In this study, we recruited only patients with hemoglobin >10 mg/dL, serum creatinine (Cr) <1.3 mg/dL and positive kit troponin T test for assessibility for revascularisation via percutaneous coronary intervention (PCI). Patients who would be eligible for reperfusion within the window period were treated with tenecteplase or primary PCI as per intention to treat strategy.

ECG

RVMI was suspected when STE ≥ 1 mm was observed in lead v3R, V4R, V5R, and V6R, which was recorded in all patients.[5]

Echo

The echo of the enrolled subjects was done with Mindray DC-70 machine 12 h 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, and RVGLS. RV Strain imaging was be done by using a standard protocol,[10] RVGLS obtained and it's correlation with the above parameters was studied. Their echocardiographic parameters were assessed again at an interval of 3 months post-treatment as follow-up.

Coronary catheterization and revascularization

As soon as it was feasible, coronary catheterization 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 is ≥70% stenosis of the involved coronary artery. The subjects with substantial CAD received PCI.

In-hospital events

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

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

Statistical analysis

Patients were analyzed overall and also grouped on the basis of Doppler features of PR. PRPHT ≤100 m were designated Group A, while PRPHT >100 m were designated Group B. Continuous variables were analyzed using mean and standard deviation (SD). Variable between groups was analyzed using an independent t-test. For correlation between various echocardiographic parameters analysis of variance (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 pro forma. Statistical analysis was done using SPSSv23.

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 ≤100 m, whereas Group B included individuals with PRPHT >100 m. Zoghbi et al., quantified PRPHT ≤100 m as severe PR.[12]

Overall, they had a mean age of 56.85 years with SD of 9.53 years. The minimum age registered was 40 years, while the 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 the percentage of people having DM in group A is 61.22% and in group B is 50.88%.

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

The lipid profile of 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, whereas 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 echo measured was 94.8 bpm.

The baseline characteristics are summarised in Table 1.

PRPHT

- Group A has a mean PRPHT of 91.94 m with a SD of 9.5, while Group B has a higher mean PRPHT of 108.2 m with an SD of 13.11

- The range of PRPHT values is wider in group B (82–126) compared to group A (80–126).

An independent t-test was used. The means of PRPHT between two groups revealed a P<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 PR tracings between the two groups. Figure 1 shows 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 47–58%, whereas group B had a mean LVEF of 56.14% with a range of 52–59%. 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.

Figure 2 shows an example of the 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 32–40%. This again suggests better RV function in group B. Additionally, the SD reveals that the FAC values in group B are less spread out than those in group A.

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%–−14%. A more negative RVGLS indicates better RV function, suggesting that group B has better RV function with respect to (wrt) group A in this regard.

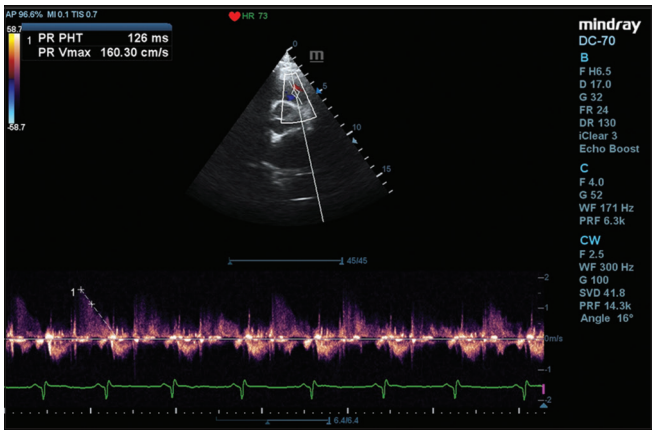

Figure 1: Example of calculation of pulmonary regurgitation pressure half-time

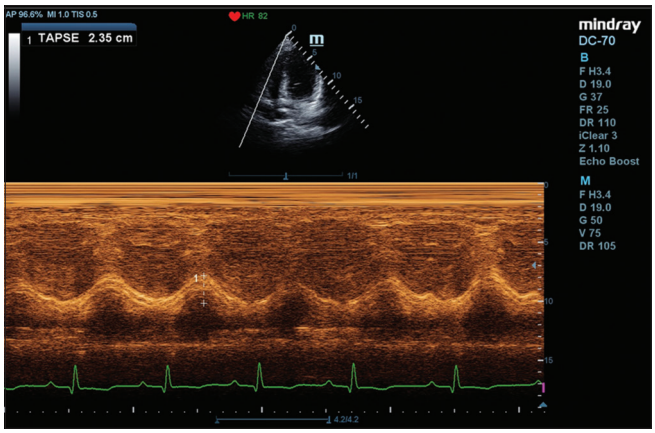

Figure 2: Example of calculation of tricuspid annular plane systolic excursion

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.

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

Table 1: Shows baseline echocardiographic values among groups

Parameters	Group A	Group B	Independent t-test significance
PRPHT (m)	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–−8	Mean: −20.33 Range: −24–−14	P<0.001

PRPHT: Pulmonary regurgitation pressure half-time, LVEF: Left ventricular ejection fraction, TAPSE: Tricuspid annular plane systolic excursion, FAC: Fractional area change, RVGLS: Right ventricular global longitudinal strain, SD: Standard deviation

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

TAPSE: Tricuspid annular plane systolic excursion, FAC: Fractional area change, RVGLS: Right ventricular global longitudinal strain, RV: Right ventricular

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 the 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 summarized 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 summarized in Table 4:

The values of echocardiographic variables with PRPHT <90, TAPSE <10, FAC <28%, and RVGLS value <(−12) were associated with significantly increased chances of adverse in-hospital outcomes.

ANOVA analysis among groups is summarized in Table 5:

The difference in PRPHT for group A is statistically significant, with a P=0.027 which is below the significance level of 0.05. This suggests that PRPHT <100 m may be useful in predicting in-hospital outcomes. While, RVGLS does not seem to be useful in predicting in-hospital outcomes for either group.

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

TAPSE: Tricuspid annular plane systolic excursion, FAC: Fractional area change, RVGLS: Right ventricular global longitudinal strain, PRPHT: Pulmonary regurgitation pressure half-time, ANOVA: Analysis of variance

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<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 Figure 3.

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<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<0.001 when using the independent t-test. Since the P<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 months.

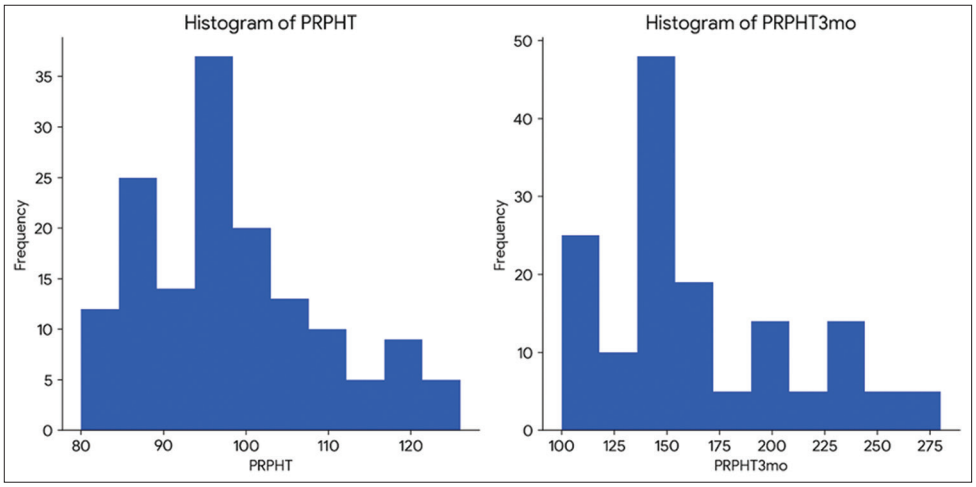

Figure 3: Histogram of pulmonary regurgitation pressure half-time and pulmonary regurgitation pressure half-time at 3 months

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

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

TAPSE: Tricuspid annular plane systolic excursion, FAC: Fractional area change, RVGLS: Right ventricular global longitudinal strain

Table 5: ANOVA analysis of various parameters among groups

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

RVGLS: Right ventricular global longitudinal strain, ANOVA: Analysis of variance

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

To compare the columns RVGLS and RVGLS3mo, an independent t-test was run. The t-statistic yielded a value of 7.52, and the P-value was found to be <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.

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 analyze the association between these echocardiographic parameters and with in-hospital outcome, and to assess their predictive value after 3-month follow-up. The study also aims to analyze the correlation among RVGLS and other established measures of RV function, such as TAPSE and RVFAC.

As per criteria defined by Zoghbi et al., based on PRPHT, total study population was divided into 2 parts. Group A has PRPHT <100 m and Group B with PRPHT >100 m.[12] 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 more lower PRPHT is associated with impaired RV function[12] and hence adverse outcomes in patients in whom heart failure has developed in RVMI as said by Nägele and Flammer.[13]

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 et al.[14]

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 align with the study done by Hameed et al., stating the use of TAPSE and FAC as dependable markers of RV function.[15]

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 and RVMI.[16] The study by Anastasiou et al., also states that more positive absolute values of RVGLS are associated with poor outcomes.[16]

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 a tendency to increase/decrease simultaneously. A study by Hameed et al. states the established role of TAPSE and FAC as reliable indicators of RV function.[15] 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.[15]

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 the absolute value of RVGLS, representing impaired longitudinal myocardial shortening, is associated with reduced TAPSE and FAC, emphasizes the impact of RV myocardial dysfunction on global RV systolic performance.[16] 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 RV.[16]

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

Association between echocardiographic parameters and in-hospital outcome

While looking for an 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 and RVGLS with in-hospital outcome. While, FAC may be used as a tool to predict adverse in-hospital outcomes (P=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 <90 can fairly predict adverse outcomes (P=0.049). TAPSE of <10 can also predict adverse outcomes fairly (P=0.01). While, FAC of <28% (P=0.022) and RVGLS value of <(−12) (P=0.024) are also able to predict in-hospital outcomes. El-Rabat et al., in their study, showed that TAPSE of <7.9 and RVGLS values of <(−15.9) were independent predictors of in-hospital adverse complications in patients of RVMI, findings of which are at par with our study.[17] 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 the findings of our study.[18] Kanar et al., in their study, showed that RVGLS ≤ (−14) predicted dismal prognosis in patients of RVMI, which is in concordance with the findings of our study.[19]

The study's findings indicate a significant correlation between PRPHT and in-hospital outcomes, particularly in the group with PRPHT ≤100 m (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 ≤100 m.

We noticed a lack of significant correlation between PRPHT and in-hospital outcomes in the group with PRPHT >100 m (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 and FAC in prognosticating patients of RVMI,[20,21] this study is the first of its kind to take into account the role of PRPHT in the prognostication of patients of IWMI/RVMI only next to a study published by Cohen et al., which showed that PRPHT ≤150 m can predict RV involvement in patients with acute IWMI.[22]

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

3 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 RV function following revascularisation in concordance with a study done by Haeck et al.[23] Park 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.[24]

Limitations of the study

There are some notable limitations with respect to the results and 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 center, 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 RV 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 considerate value, keeping in mind that not all IWMI and RVMI patients may present with PR. The results cannot be generalized 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.

CONCLUSION

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

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

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

The findings of the present study also suggest that interventions in IWMI/RVMI have 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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