

*Research Article***Can parameters From Other Side of the heart predicts post-discharge first-month deaths in AMI?****Adel H. Mahmoud , Khaled S. Mahmoud El Maghrby, Alaa M. Ibrahiem, Nasser M. Taha and Engy M. Awad**

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**Abstract**

**Background:** to study different right ventricular echocardiographic parameters and find their correlation to death after discharge and up to 1 month after acute STEMI. **Methods and Results:**134 patients with acute STEMI admitted from 2014 to 2016 were included. History and 12- Lead ECG and clinical examination and Echocardiography was done within 48 hours from admission. End points was death event in the period extending from discharge till end of 30-days post-AMI. Study cohort were divided into group of patients who died in the above period of time and group of patients who survived. Univariate Predictors were the RWMA score (p=0.003), RWMA score index (p=0.004), mitral E/e' ratio(p=0.019), EF% (p=0.009), and TAPSE (p=0.001). After, multivariate regression analysis only TAPSE (p=0.010) was statistically independent predictor. **Conclusion:**Reduced Tricuspid valve annular plane systolic excursion in addition to reduced EF can give prognostic indicator for death in period extending from discharge till 30<sup>th</sup> day post-AMI.

**Key words:** AMI, RV, TAPSE**Introduction**

Still Cardiac disease is the main cause of death worldwide. Echocardiography is a simple available non-invasive method. We are looking from other side of the heart to find out there is any other parameter derived from the Echocardiography or tissue Doppler that can be used as red indicators of risk of death associated with AMI.

**Aim of the work**

to find out whether any of right ventricular parameters carries a prognostic significance to probability of death in first month post-discharge after AMI.

**Patients and methods**

The study included 134 patients with STEMI were followed up after discharge till they one

month from date of AMI. Data was correlated with admission-echocardiography and tissue Doppler study which was done within 24 hours of admission.

**Statistical method**

Statistical pack of social science SPSS 18 with p-value < 0.05 is considered significant and confidence interval 95%.

**Results and statistic**

The study included 86 males (64.2%),48 females (35.8%). 31(23.1%) patient were diabetic. 35(26.1%) patient were hypertensive. And 41 patients (30.6%) were smokers. mean age of study population was (60.95±9.15) years.

**Group A:** STEMI patients who died n= 8(6%),**Group B:** STEMI patients who survived n= 126 (94%).

**Table (1)** : comparison between group A and group B.

	<b>GROUP A</b> N=8 (6%)	<b>GROUP B</b> N=126 (94%)	<b>Significance</b>
	<b>Mean and Std. deviation</b>	<b>Mean and Std. deviation</b>	
<b>Age (years)</b>	63.3750 ±9.56090	60.9524±9.15192	0.470
<b>EF %</b>	36.38 ± 2.875	39.94 ± 3.726	<b>0.009</b>
<b>Mitral E/A ratio</b>	0.9590 ± 0.33204	0.9899 ± 0.35209	0.810
<b>Mitral E/e' ratio</b>	8.3943 ± 4.88073	11.4916 ± 3.48596	<b>0.019</b>
<b>RV basal diameter</b>	3.4425± 0.46922	3.4388±0.44875	0.982
<b>RV longitudinal diameter</b>	7.7375±0.11877	7.7937 ± 0.23039	0.497
<b>RWMA score</b>	20.1250 ± 5.79254	14.5794 ± 4.95799	<b>0.003</b>
<b>RWMA score index</b>	10.0813 ± 3.03918	7.3627 ± 2.50950	<b>0.004</b>
<b>Tricuspid E/A ratio</b>	1.1322 ± 0.44290	1.0289 ±.33546	0.409
<b>Tricuspid E/e' ratio</b>	6.0558 ± 0.63808	6.5033 ± 2.03571	0.538
<b>TAPSE</b>	1.4075 ± 0.07106	1.6567 ± 0.15808	<b>0.001</b>

There was a statistically significant difference between **group (A)** and **group (B)** regarding RWMA score, RWMA score index, mitral E/ e' ratio, EF%, and TAPSE. However, there was no statistically significant difference between the above-mentioned groups regarding Mitral E/A ratio or Tricuspid E/A ratio or Tricuspid E/e' ratio, or RV basal or RV longitudinal diameter (table 1). On doing univariate regression the RWMA score (p=0.003), RWMA score index (p=0.004), mitral E/e' ratio (p=0.019), EF% (p=0.009), and TAPSE (p=0.001) were significant independent predictors. However, on doing multivariate analysis only TAPSE (p=0.010) was statistically independent predictor but RWMA score (p=0.654), RWMA score index (p=0.678), mitral E/ e' ratio (p=0.204) and EF % (p=0.509) were not statistically significant independent predictors.

### Discussion

Our study revealed that not only left ventricular echocardiography parameters were different after STEMI in group of patients who died in the period extending from discharge till 1month post AMI, but also the right ventricular M-mode measured TAPSE is also different and on using regression it remained statistically significantly independent predictor. This might be explained that EF measured on admission is usually the result of ischemic stunning, hibernation and

necrosis. So EF on admission despite being different in group of patients who died compared to survivors, can't be an independent predictor of death event.

Data of 196 patients aged (38-72) with primary LV inferior STEMI was analyzed. The Echocardiography was done within 24 hours of STEMI onset to measure LV EF and TAPSE. All subjects were taken into the 2-week hospital follow up. There were no significant differences in LVEF between groups. In-hospital mortality rate was significantly greater in Group of patients with TAPSE≤14 mm (9.4% vs. 7.1%, P<0.05).

Also, Ventricular arrhythmias and atrial fibrillation were observed in 32% of same group and 14% of Group of patients ≥ (P<0.05). It was concluded that in acute phase of STEMI, TAPSE ≤14mm is associated with higher in-hospital mortality and serious complications and decreases the threshold of exercise induced ischemia and angina (Hayrapetyan HG and MC-Yerevan E, 2011).

In the past, the clinical importance of RV function has been underestimated. Although RV dysfunction was reported to recover to some extent after AMI, recently the value of RV function for the prediction of long-term outcome has been well recognized in patients with inferior

AMI and LV dysfunction. (Popescu BA et al., 2005).

Masci et al., have demonstrated that RV ischemic myocardial injury by CMR, are often present early after reperfusion of ST-segment elevation MI. RV abnormalities are contiguous to the jeopardized LV myocardium and do not occur exclusively in inferior LV infarcts but are also found in anterior LV infarcts as well (Masci PG et al., 2010).

Zoronoff et al., 2002, confirmed that RV function is weakly correlated with LV function in post-AMI patients with LV dysfunction, and demonstrated that RV function quantified with RVFAC was independently associated with an increased risk of mortality and HF in AMI patients (Zornoff et al., 2002).

### Conclusion

Some echocardiographic parameters derived from right side of the heart can give prognostic indicators for post-discharge death in first month after AMI.

### References

1. Hayrapetyan HG, Yerevan MC. Tricuspid annular plane systolic excursion in acute left ventricular inferior myocardial infarction with ST segment elevation: prognostic importance and influence on ergometric parameters. *European Heart Journal* (2011); 32; (Abstract Supplement), 1063.
2. Masci PG, Francone M, Desmet W, Ganame J, Todiere G, Donato R, Siciliano V, Carbone I, Mangia M, Strata E, Catalano C, Lombardi M, Agati L, Janssens S, Bogaert J. Right Ventricular Ischemic Injury in Patients With Acute ST-Segment Elevation Myocardial Infarction Characterization With Cardiovascular Magnetic Resonance. *Circulation*. 2010; 122:1405-1412.
3. Popescu BA, Antonini-Canterin F, Temporelli PL, Giannuzzi P, Bosimini E, Gentile F, Maggioni AP, Tavazzi L, Piazza R, Ascione L, Stoian I, Cervesato E, Popescu AC, Nicolosi GL. Right ventricular functional recovery after acute myocardial infarction: relation with left ventricular function and interventricular septum motion. GISSI-3 echo substudy., GISSI-3 Echo Substudy Investigators. *Heart*. 2005 Apr; 91 (4):484-488.
4. Zornoff LA, Skali H, Pfeffer MA, St John SM, Rouleau JL, Lamas GA, Plappert T, Rouleau JR, Moye LA, Lewis SJ, Braunwald E, Solomon SD.
5. Right ventricular dysfunction and risk of heart failure and mortality after myocardial infarction. *J Am Coll Cardiol*. 2002; 39: 1450 –1455.