Trakia Journal of Sciences, Vol. 12, Suppl. 1, pp 259-263, 2014

Available online at:
http://www.uni-sz.bg

ISSN 1313-7050 (print)
ISSN 1313-3551 (online)

ECG CHANGES AS MORTALITY PREDICTORS IN PATIENTS WITH STEMI

Zh. Stoykova[1], K. Karamfiloff[1], P. Georeva[2], D. Zlatareva[3], D. Trendafilova[1], J. Jorgova[1]

[1]University Hospital "St. Ekaterina"
[2]Trudova medicina OOD
[3]Department of Diagnostic Imaging, Medical University, Sofia

ABSTRACT

PURPOSE: Our main purpose is to define the association of ECG changes at admission: localization of ST –T changes, left bundle branch block, third degree AV block, ventricular tachycardia and ventricular fibrillation with mortality rates in patients with STEMI. METHODS:

We retrospectively included 549 patients, hospitalized with STEMI in UH "Saint Ekaterina" (age 62.66+-12.56 y, women 31.3%). Left bundle block (including left anterior hemi-block) (4.7 % (25pts)), third degree AV block (2.5 % (13pts)), anterior localization (55 % (290pts)), inferior localization (47.8 %(252pts)), lateral localization (26.9 % (142pts)), right ventricular infarction (2.3 % (12pts)).The patients were followed with clinical, echocardiographic methods and stress – test for 12 months. RESULTS: Associated with statistically significant higher mortality rates are the anterior (17,3% vs. 6,9%, p<=0.001) and inferior (15,9% vs. 7,6%, p<=0.01) localization of ST -T changes, left bundle branch block (33,3% vs. 10,9%,p<=0,05), ventricular fibrillation (45,5% vs. 10,9 %, p<=0,01). Without statistical significance are lateral and right myocardial infarction, ventricular tachycardia. CONCLUSION: ECG is a powerful noninvasive tool not only for diagnostic purposes but also for mortality prediction in patients with STEMI.

INTRODUCTION

Worldwide, coronary artery disease (CAD) is the single most frequent cause of death. Over seven million people every year die from CAD, accounting for 12.8% of all deaths. Every sixth man and every seventh woman in Europe will die from myocardial infarction. STEMI is the deadliest form of CAD. The in-hospital mortality of unselected STEMI patients in the national registries of the ESC countries varies between 6% and 14% (1-3). Infarct size is determined by its localization and myocardial muscle tissue perfused by the diseased artery, severity and duration of the ischemia. ECG can assess these parameters and to great extend predict the probability of MACE and further prognosis. Numerous studies show association between ECG parameters and mortality rates in ACS (4-7).

PURPOSE

Our main purpose was to define the association of ECG changes at admission: localization of ST –T changes, left bundle branch block, complete AV block, ventricular tachycardia and ventricular fibrillation, with mortality rates in patients with STEMI

Methods

Between June 2008 and June 2011 all consecutive 527 STEMI patients treated with pPCI in our center were included in the analysis. Between June 2008 and June 2011 all consecutive 527 STEMI patients treated with pPCI in our center were included in the analysis. STEMI was defined by ongoing chest pain for >20min, ST – elevation in at least two concordant ECG leads. For patients admitted more than once for pPCI (N=5) the first hospitalization was analysed. They were treated according to the current ESC guidelines for STEMI management. Clinical and instrumental (Echo and excercise tests) follow up was performed at 1st, 3rd, 6th and 12th month. We investigated inhospital, 1 month, 1 year mortality grouped in early (inhospital combined with 1 month mortality) and late (1 year mortality) as well as cumulative 1 year mortality (combining

early and late mortality). The statistical processing of the results involved parametric and non-parametric methods (Chi-Square Test) at a significance level $p < 0.05$.

RESULTS

Table 1. *Key basic and ECG characteristics*

All patients	527
Age	62.66 ± 12.56 г.
Women	31.3% (165)
Hypertension	87.7% (462)
Dyslipidemia	67.4% (355)
Smoking	50.1% (264)
Obesitas	26.6% (140)
Diabetes mellitus	27.1% (143)
Family history for CAD	23.7% (125)
Mean heart rate	80.85 ± 18.28
Sinus rythm	89.7 % (473)
Atrial fibrillation	8.7 % (46)
LABB	4.7 % (25)
A-V block III degree	2.5 % (13)
Localization	
Anterior	55 % (290)
Inferior	47.8 %(252)
Lateral	26.9 % (142)
Right ventricular	2.3 % (12)

N.B. There are a patients with more than one localization of ischemic ST – T changes.

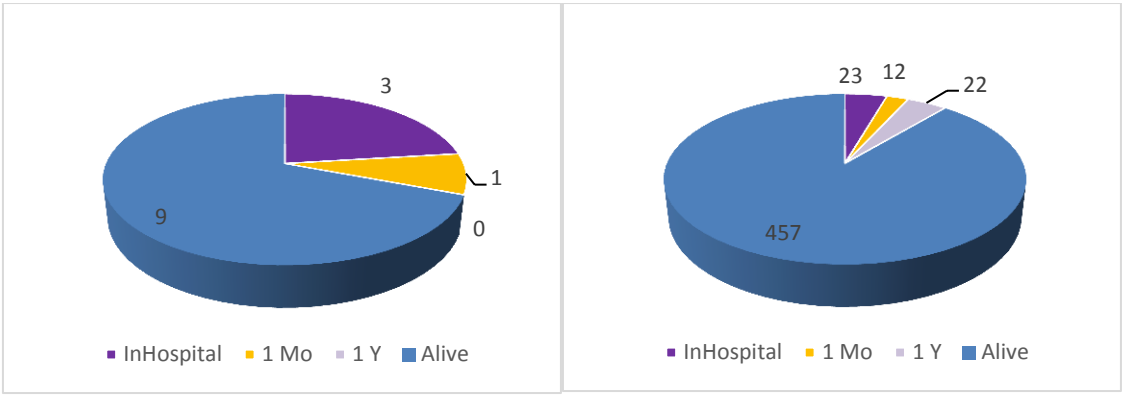

Figure 1. Influence of complete AV block. (left side patients with complete AV block, right side patients without complete AV block). Purple - patients died in hospital, orange - patients died until 1st month, yellow – patients died until 1st year and blue patients alive during one year follow up).

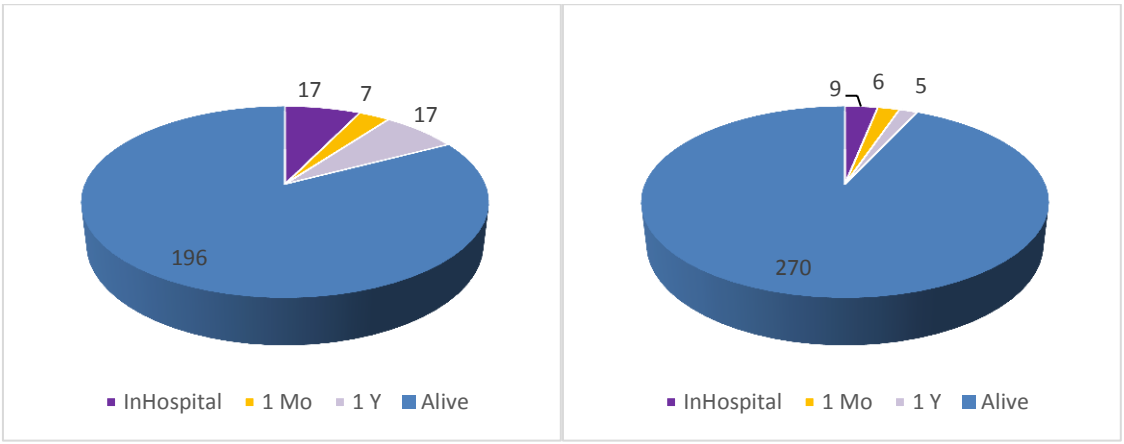

Figure 2. Influence of anterior location of ST Elevation. (left side patients with anterior STEMI, right side patients with another location of ST elevation). Purple - patients died in hospital, orange - patients died until 1st month, yellow – patients died until 1st year and blue patients alive during one year follow up).

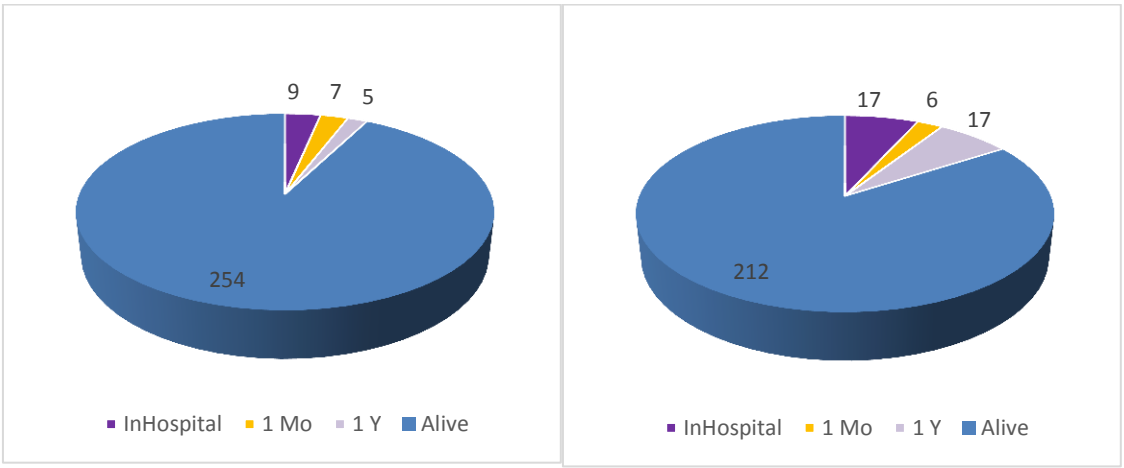

Figure 3. Influence of inferior location of ST elevation. (left side patients with inferior STEMI, right side patients with another location of ST elevation). Purple - patients died in hospital, orange - patients died until 1st month, yellow – patients died until 1st year and blue patients alive during one year follow up).

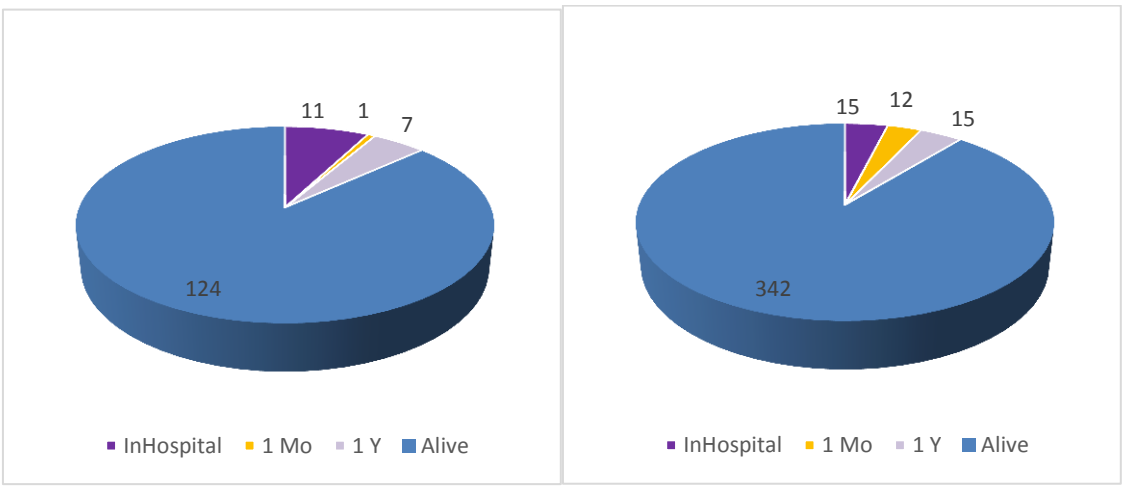

Figure 4. Influence of lateral location of ST elevation. (left side patients with lateral STEMI, right side patients with another location of ST elevation). Purple - patients died in hospital, orange - patients died until 1st month, yellow – patients died until 1st year and blue patients alive during one year follow up).

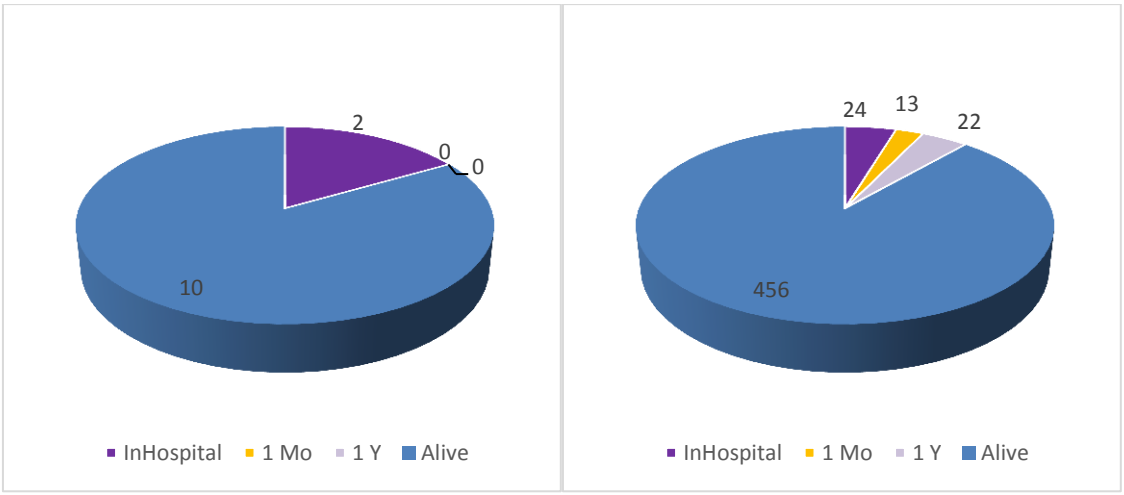

Figure 5. Influence of RV infarction. (left side patients with RV infarction, right side patients without RV infarction). Purple - patients died in hospital, orange - patients died until 1st month, yellow – patients died until 1st year and blue patients alive during one year follow up).

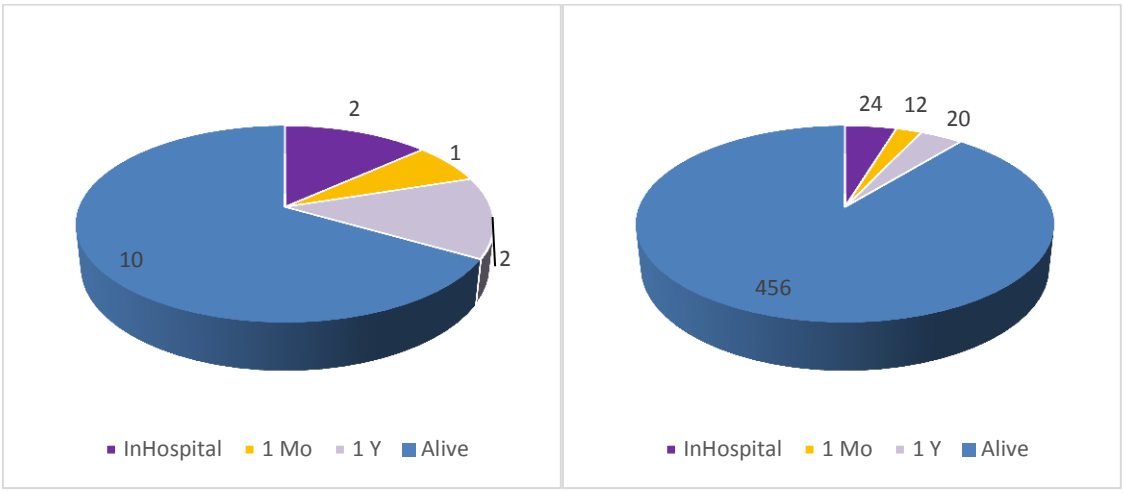

Figure 6. Influence of LBBB. (left side patients with LBBB, right side patients without LBBB). Purple - patients died in hospital, orange - patients died until 1st month, yellow – patients died until 1st year and blue patients alive during one year follow up).

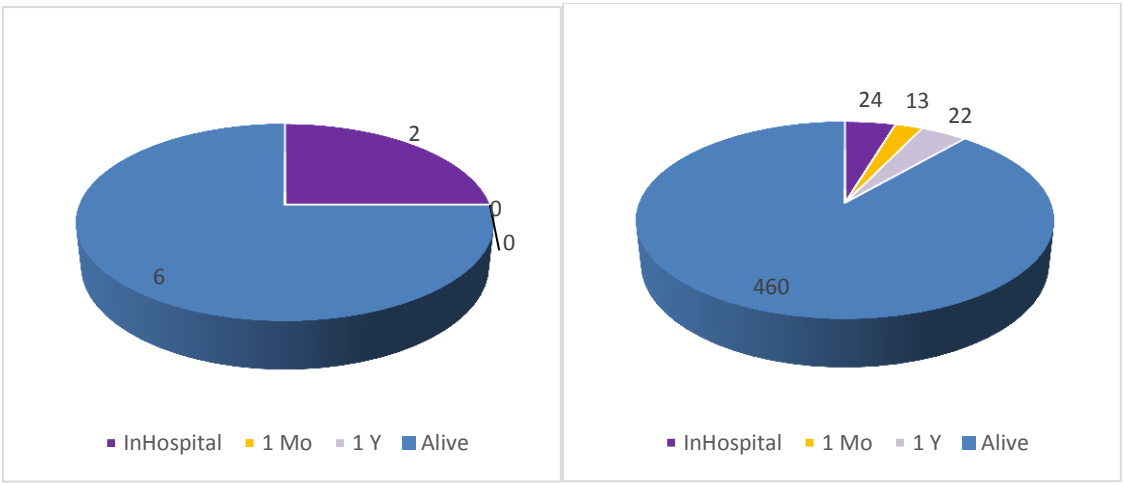

Figure 7. Influence of ventricular tachycardia. (left side patients with VT, right side patients without VT). Purple - patients died in hospital, orange - patients died until 1st month, yellow – patients died until 1st year and blue patients alive during one year follow up).

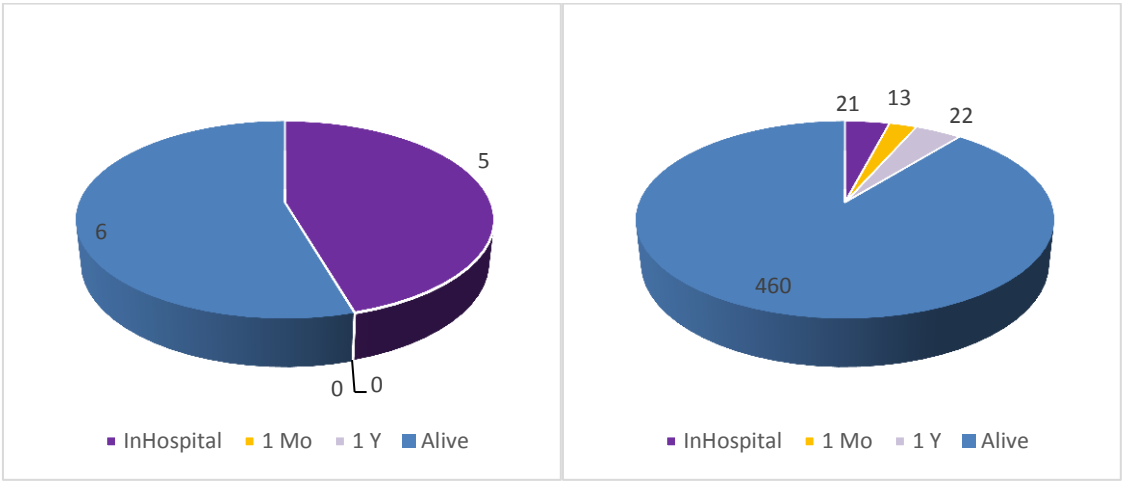

Figure 8. Influence of ventricular fibrillation. (left side patients with VF, right side patients without VF). Purple - patients died in hospital, orange - patients died until 1st month, yellow – patients died until 1st year and blue patients alive during one year follow up).

Our analysis revealed the anterior ST elevation location was associated with statistically significant higher mortality rates for early (10.1% vs 5.2%, p<0.05) and late (7.2% vs. 1.7%, p<0.01) as well as cumulative one year mortality (7.3% vs. 6.9%, p<=0.001). It is among the strongest factors affecting unfavourably the prognosis in the STEMI patients. Inferior ST elevation on the other hand, showed statistically significant influence only on late mortality (6.7% vs. 1.8%, p<0.01) and cumulative one year mortality (15.9% vs. 7.6%, p<=0.01). Left bundle branch block increased in statistically significant manner only the cumulative one year mortality (33.3% vs. 10.9%, p<=0.05). Most naturally ventricular fibrillation had strongest impact on early mortality (45.5% vs. 6.6%%, p<=0,001), this influence was so strong that it was able to affect significantly the cumulative one year mortality (45.5% vs. 10.9%, p<0.01). Intraprocedural complete AV block showed increased early mortality (23.1% vs. 4.5%, p<0.05). Without statistical significance were the following variables (cumulative one year mortality): ST elevation in lateral zone (13.3% vs 10.9%, p=0.447), right myocardial infarction (16.7% vs. 11.5%, p=0.63) and ventricular tachycardia (25.0% vs 11.4%, p=0.234).

CONCLUSION

ECG is a powerful noninvasive tool not only for diagnostic purposes but also for mortality prediction in patients with STEMI.

RREFERENCES

1. S M, P P, B N, editors. Global Atlas on Cardiovascular Disease, Prevention and Control. Geneva: World Health Organization, 2011.
2. WHO Fact sheet N8310, updated June 2011, http://www.who.int/mediacentre/factsheets/fs310/en/index.html.
3. Steg, Ph Gabriel, et al. "ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation The Task Force on the management of ST-segment elevation acute myocardial infarction of the European Society of Cardiology (ESC)." European Heart Journal 33.20 (2012): 2569-2619.
4. Geltman EM, Ehsani AA, Campbell MK, Schechtman K, Roberts R and Sobel BE (1979): The influence of location and extent of myocardial infarction on long-term ventricular dysrhythmia and mortality. Circulation 60:805-814.
5. Thanavaro S, Kleiger RE, Province MA, Hubert JW, Miller JP, Krone RJ and Oliver GC 1982): Effect of infarct location on the in-hospital prognosis of patients with first transmu myocardial infarction. Circulation 66:742-747.
6. Stone PH, Raabe DS, Jaffe AS, Gustafson N, Muller JE, Turi ZG, Rutherford JD, Poole WK, Passamani E and Willerson JT (1988): Prognostic significance of location and type of myocardial infarction: Independent adverse outcome associated with anterior location. J Am Coll Cardiol 11:453-463.
7. Kandzari DE, Tcheng JE, Gersh BJ, Cox DA, Stuckey T, Turco M, Mehran R, Garcia E, Zimetbaum P, McGlaughlin MG, Lansky AJ, Costantini CO, Grines CL, Stone GW and CADILLAC Investigators (2006): Relationship between infarct artery location, epicardial flow, and myocardial perfusion after primary percutaneous revascularization in acute myocardial infarction. Am Heart J 151:1288-1295.