

- McCullough PA, Olobatoko A, Vanhecke TE. Galectin-3: a novel blood test for the evaluation and management of patients with heart failure. *Rev Cardiovasc Med* 2011; 12: 200-10.
- Gruson D, Ko G. Galectins testing: new promises for the diagnosis and risk stratification of chronic diseases? *Clin Biochem* 2012; 45: 719-26. [CrossRef]
- Lok DJ, Van Der Meer P, de la Porte PW, Lipsic E, Van Wijngaarden J, Hillege HL, et al. Prognostic value of galectin-3, a novel marker of fibrosis, in patients with chronic heart failure: data from the DEAL-HF study. *Clin Res Cardiol* 2010; 99: 323-8. [CrossRef]
- Vanhoutte PM. Endothelial dysfunction in obesity. *Ann Pharm Fr* 2013; 71: 42-50. [CrossRef]
- Ding L, Hanawa H, Ota Y, Hasegawa G, Hao K, Asami F, et al. Lipocalin-2/neutrophil gelatinase-B associated lipocalin is strongly induced in hearts of rats with autoimmune myocarditis and in human myocarditis. *Circ J* 2010; 74: 523-30. [CrossRef]
- Choi KM, Lee JS, Kim EJ, Baik SH, Seo HS, Choi DS, et al. Implication of lipocalin-2 and visfatin levels in patients with coronary heart disease. *Eur J Endocrinol* 2008; 158: 203-7. [CrossRef]
- Diez J, Laviades C, Mayor G, Gil MJ, Monreal I. Increased serum concentrations of procollagen peptides in essential hypertension. Relation to cardiac alterations. *Circulation* 1995; 91: 1450-6. [CrossRef]
- Dellegrottaglie S, Sands RL, Gillespie BW, Gnanasekaran G, Zannad F, Sengstock D, et al. Association between markers of collagen turnover, arterial stiffness and left ventricular hypertrophy in chronic kidney disease (CKD): the Renal Research Institute (RRI)-CKD study. *Nephrol Dial Transplant* 2011; 26: 2891-8. [CrossRef]
- Gluba A, Bielecka-Dabrowa A, Mikhailidis DP, Wong ND, Franklin SS, Rysz J, et al. An update on biomarkers of heart failure in hypertensive patients. *J Hypertens* 2012; 30: 1681-9. [CrossRef]

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## Initial results of code blue emergency call system: First experience in Turkey

To the Editor,

Despite advances in medical technology, the mortality of in-hospital cardiac arrests is high. Many countries prefer experienced medical emergency teams (MET) for in-hospital cardiopulmonary resuscitation (CPR) (1, 2). Because of its activation criteria involving vital signs of physiological instability happening in 80% of arrest patients 24 h prior to the emergency, MET reaches patients before sudden death and cardiopulmonary arrest. Therefore, sudden death and cardiopulmonary arrest ratios decreased in in-hospital patients after establishment of MET (1-3). No study has examined the efficacy of the code blue system in Turkey since the Turkish Ministry of Health Care Services initiated an application similar to MET called Code Blue in 2009 (4).

In Elazığ Harput State Hospital where study was conducted, a code blue call is activated by pressing a button located on every floor of the hospital. Call buttons activate a central speaker system that is audible throughout the hospital and specifies the location of the code blue.

A total of 166 code blue calls made in a level 2 hospital between January 2010 and December 2010 were evaluated retrospectively. A total of 144 (84.9%) patients required CPR, and 22 (13.3%) required other medical treatments. Three calls were for non-emergency situations. A total of

76 (53.9%) patients were in the mortality group, in whom resuscitative efforts were unsuccessful (group 1). A total of 65 (46.1%) patients achieved return of spontaneous circulation (ROSC) after CPR (group 2). The demographic data of patients are shown in Table 1.

ROSC ratios vary in different countries and even in different regions of countries (1). No study has evaluated the code blue system, or the CPR results of the system, in Turkey so far. We observed an ROSC ratio of 46.1%.

Age is a controversial variable in predicting the outcome of CPR. ROSC ratios are lower in patients with end-stage malignancies (1). Because age and co-morbid diseases, such as end-stage malignancies are able to affect the respond to the CPR, these events, while ROSC ratios being are noticed, should be taken into consideration.

ROSC ratios are affected by the quality of the medical emergency team system, time of arrival to the scene and CPR equipment (2). In our code blue system, the MET arrived to all calls in less than 4 min.

Arrhythmias causing sudden cardiac death and cardiac arrest are the most common ventricular tachycardia (VT) and ventricular fibrillation (VF) (5). However, VT/VF rhythms were solely determined in four patients with cardiopulmonary arrest in this study (Table 2). As a cause of this condition, we think that data involving VT/VF could have been missing in some files because electrocardiographic findings were evaluated retrospectively from the blue code forms.

ROSC ratios are determined by the quality of the medical emergency team system, early activation of the code blue system, early

**Table 1. Demographic data of patients**

		Total n (%)	Group 1 n (%)	Group 2 n (%)	P
Gender	Male	78 (55.3%)	39 (50%)	39 (50%)	0.301
	Female	63 (44.7%)	37 (58.7%)	26 (41.3%)	
Age, years	<75	64 (45.4%)	35 (54.6)	29 (45.4)	0.865
	>75	77 (54.6%)	41 (53.2%)	36 (46.8%)	
<b>Co-morbid disease</b>					
Respiratory		47 (33.3)	23 (48.9)	24 (51.1)	0.044
Cardiac		35 (25.8)	16 (45.7)	19 (16.1)	
Cerebrovascular		25 (17.7)	17 (68)	8 (32)	
Malignity		14 (9.9)	11 (78.6)	3 (6.5)	
DM		5 (3.5)	0	5 (100)	
Renal failure		8 (5.7)	5 (62.5)	3 (37.5)	
Others		7 (4.1)	4 (57.1)	3 (42.9)	
Group 1. Patients no achieved return of spontaneous circulation after CPR, Group 2- Patients achieved return of spontaneous circulation after CPR					

**Table 2. Initial rhythms**

		Total n (%)	Group 1 n (%)	Group 2 n (%)	P
Initial rhythm	Asystole	80 (56.7%)	46 (57.5%)	34 (42.5%)	0.012
	Bradycardia	29 (20.6%)	12 (41.4%)	17 (58.6%)	
	PEA*	23 (16.3%)	17 (73.9%)	6 (26.1%)	
	VT/VF**	4 (2.8%)	0	4 (100%)	
	Unknown	5 (3.5%)	1 (20%)	4 (80%)	
*PEA-pulseless electrical activity, **VT/VF-ventricular tachycardia/ventricular fibrillation Group 1- Patients no achieved return of spontaneous circulation after CPR, Group 2- Patients achieved return of spontaneous circulation after CPR					

response of the MET and effective CPR. Our code blue system helped the MET to arrive at all the calls. Code blue system that may help to decrease in-hospital mortality should be established in all hospitals. In addition, efforts should be sustained in order that code blue systems existing in some hospitals of our country become more effective.

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## References

1. Peberdy MA, Kaye W, Ornato JP, Larkin GL, Nadkarni V, Mancini ME, et al. Cardiopulmonary resuscitation of adults in the hospital: a report of 14720 cardiac arrests from the National Registry of Cardiopulmonary Resuscitation. *Resuscitation* 2003; 58: 297-308. [\[CrossRef\]](#)
2. Devita MA, Bellomo R, Hillman K, Kellum J, Rotondi A, Teres D, et al. Findings of the first consensus conference on medical emergency teams. *Crit Care Med* 2006; 34: 2463-78. [\[CrossRef\]](#)
3. Franklin C, Mathew J. Developing strategies to prevent in-hospital cardiac arrest: analyzing responses of physicians and nurses in the hours before the event. *Crit Care Med* 1994; 22: 244-7. [\[CrossRef\]](#)
4. Republic of Turkey the Ministry of Health. Ensuring Patient and Employee Safety and Health Authority for the Protection and Care Law on Procedures and Principles April 29, 2009. Retrieved February 15 2014, <http://www.resmigazete.gov.tr/main.aspx?home=http://www.resmigazete.gov.tr/eskiler/2009/04/20090429.htm/20090429.htm&main=http://www.resmigazete.gov.tr/eskiler/2009/04/20090429.htm>
5. Özaydın M, Türker Y, Erdoğan D, Karabacak M, Varol E, Doğan A, et al. Effect of previous statin use on the incidence of sustained ventricular tachycardia and ventricular fibrillation inpatients presenting with acute coronary syndrome. *Anadolu Kardiyol Derg* 2011; 11: 22-8. [\[CrossRef\]](#)

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