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Editorial

The avoidable delay in the care of STEMI patients is still a priority issue



The prognosis of patients with ST-segment elevation myocardial infarction (STEMI) has shown a terrific improvement in the last three decades thanks to coronary reperfusion therapy by thrombolysis and primary percutaneous coronary intervention (PCI) [1,2]. A large number of studies has demonstrated that the delay between onset of symptoms and coronary reperfusion in patients with STEMI is a major determinant of outcome. The impact of time delay on prognosis of patients with STEMI undergoing coronary reperfusion was first demonstrated in the era of thrombolysis and later on confirmed in the modern era of primary PCI [3–6]. The relative risk of 1-year mortality increases by 7.5% for each 30-minute delay from symptom onset to PCI [6].

The delay in seeking treatment by patients with STEMI includes three major phases: the time interval from symptoms onset to the patient's decision to seek medical attention, the time interval from the decision to seek medical attention to first medical contact (FMC), and the time interval from the FMC to hospital arrival. Among these phases, the decision time is usually the main factor responsible for the overall delay. Unfortunately, this delay has changed little in recent years despite increased public awareness of the benefit of STEMI early treatment.

The analysis of barriers and facilitators of the decision time in patients with STEMI was first assessed in the '90 in a large multicenter case-control study on 5301 patients conducted in 118 coronary care units in Italy by the Gruppo Italiano per lo Studio della Sopravvivenza nell'Infarto (GISSI) Investigators [7]. Among the patient-related variables, advanced age, living alone, low intensity of initial symptoms, history of diabetes, occurrence of symptoms at night, and involvement of a general practitioner seemed to affect delay significantly. After this pivotal study a large number of studies has been conducted in the past three decades to identify characteristics predictive of increased patient delay in response to symptoms of STEMI. Factors that affect prehospital delay include sociodemographic, clinical, cognitive, and emotional characteristics. The precise knowledge of these variables, possibly different in the diverse geographic areas, is essential in order to plan educational and organizational interventions [8].

In this issue of the Journal Balbaa et al investigated the factors associated with longer time (>180 min) from symptom onset to FMC in patients with STEMI admitted in two hub heart centers of Egypt and Canada, countries with different cultures, socioeconomic status and health system environment [9].

In this observational study all patients with STEMI undergoing primary PCI in a one-year period at the tertiary cardiac center of Aswan heart Center in Egypt (585 patients) and Hamilton General Hospital in Canada (715 patients) were included. In addition, a retrospective

semistructured questionnaire investigating potential factors affecting symptom onset to FMC was carried out for a small sample of 80 patients from each center. The aim of the study was to elucidate factors affecting pre-hospital delays in the two centers of a low-middle income country and a high-income country with different health care infrastructures and culture.

The authors choose to perform an intersite comparison of the baseline characteristics of early and late presenters STEMI patients, while an intrasite comparison of the potential factors affecting symptom onset to FMC derived from the questionnaire was done. This makes a clear presentation of the data difficult. Anyway, pertinent differences between early and late presenters at the two centers were clearly highlighted in the discussion.

Symptom onset to FMC delays were observed in both centers. The mean symptom onset to FMC time was slightly shorter in the Canadian patients with a difference of only 10 min, but the median time difference was 88 min. Among the patient-related variables, low intensity of symptoms seemed to affect delay significantly in both centers. The time of presentation was not different between men and women in Canada, while women were more likely to have a longer symptom onset to FMC delay in Egypt. The most striking difference between the two sites was the mode of transportation to the hospital. The majority of patients at Hamilton arrived at the hospital via the emergency medical system (EMS), with almost all patients having a transport time of less than 20 min. Similarly at Aswan the majority of patients arrived at hospital by taxi and public transport, with almost all patients taking more than 40 min to reach care. On the contrary, when a bystander was present during symptom onset the rate of activation of EMS was similar in the two sites.

The delaying factors in the care of patients with STEMI identified in this study are comparable to other studies. Nevertheless, there were contextual differences in specific barriers in the two geographical areas.

A systematic review of 13 mass-media and 5 personalized educational interventions has found that only half of the interventions to reduce pre-hospital delay in patients with acute coronary syndrome significantly reduced delay times [10]. The overall effect of educational interventions is so far quite small and sometime disappointing. It is possible that a more precise knowledge of the predictors of pre-hospital delay in STEMI treatment, as identified in this study would allow the implementation of tailored educational and organizational interventions. Even a small reduction of the avoidable delay will likely improve the outcome of STEMI patients much better than any amelioration of antithrombotic or interventional treatments. Interventions aimed at reducing the delay should primarily focus on the help-seeking

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behaviour of patients.

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References

- [1] E. Puymirat, T. Simon, G. Cayla, et al., Changes in patient characteristics, management, and 6-month outcomes over a period of 20 years in the FAST-MI Program (French Registry of Acute ST-Elevation or Non-ST-Elevation Myocardial Infarction) 1995 to 2015, *Circulation* 136 (2017) 1908–1919.
- [2] L. De Luca, M. Marini, L. Gonzini, A. Boccanelli, G. Casella, F. Chiarella, S. De Servi, A. Di Chiara, G. Di Pasquale, Z. Olivari, G. Caretta, L. Lenatti, M.M. Gulizia, S. Savonitto, Contemporary trends and age-specific sex differences in management and outcome for patients with ST-segment elevation myocardial infarction, *J. Am. Heart Assoc.* 5 (12) (2016), e004202.
- [3] L. Kristin Newby, W.R. Rutsch, R.M. Califf, M.L. Simoons, P.E. Aylward, P. W. Armstrong, L.H. Woodlief, K.L. Lee, E.J. Topol, F. Van de Werf, Time from symptom onset to treatment and outcomes after thrombolytic therapy, *J. Am. Coll. Cardiol.* 27 (7) (1996) 1646–1655.
- [4] C.P. Cannon, C.M. Gibson, C.T. Lambrew, et al., Relationship of symptoms-onset-to-balloon time and door-to-balloon time with mortality in patients undergoing angioplasty for acute myocardial infarction, *JAMA* 283 (2000) 2941–2947.
- [5] D. Antoniucci, R. Valenti, A. Migliorini, G. Moschi, M. Trapani, P. Buonamici, G. Cerisano, L. Bolognese, G.M. Santoro, Relation of time to treatment and mortality in patients with acute myocardial infarction undergoing primary coronary angioplasty, *Am. J. Cardiol.* 89 (11) (2002) 1248–1252.
- [6] G. De Luca, H. Suryapranata, J.P. Ottervanger, E.M. Antman, Time delay to treatment and mortality in primary angioplasty for acute myocardial infarction. Every minute of delay counts, *Circulation* 109 (10) (2004) 1223–1225.
- [7] M.G. Franzosi, Epidemiology of avoidable delay in the care of patients with acute myocardial infarction in Italy, *Arch. Intern. Med.* 155 (14) (1995) 1481.
- [8] D.K. Moser, L.P. Kimble, M.J. Alberts, A. Alonzo, J.B. Croft, K. Dracup, K. R. Evenson, A.S. Go, M.M. Hand, R.U. Kothari, G.A. Mensah, D.L. Morris, A. M. Pancioli, B. Riegel, J.J. Zerwic, Reducing delay in seeking treatment by patients with acute coronary syndrome and stroke. A scientific statement from the American Heart Council on Cardiovascular Nursing and Stroke Council, *Circulation* 114 (2) (2006) 168–182.
- [9] A. Balbaa, A. ElGuindy, S.J.D. PericakD, Before the door: comparing factors affecting symptoms onset to first medical contact for STEMI patients between a high and low-middle income country, *Int. J. Cardiol. Heart Vasc.* (2022).
- [10] S. Hoschar, L. Albarqouni, K.-H. Ladwig, A systematic review of educational interventions aiming to reduce prehospital delay in patients with acute coronary syndrome, *Open Heart* 7 (1) (2020) e001175.

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