

**МОДЕЛ УРГЕНТНОГ ЗБРИЊАВАЊА  
СТЕМИ БОЛЕСНИКА****MODEL OF URGENT CARE  
FOR STEMI PATIENTS**

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This monograph defines a novel model of care for ST-elevation myocardial infarction (STEMI) patients, recognizable for all medical specialists and general practitioners. Care for acute myocardial patients is one of the biggest problems of the health care system in general. In this monograph it has been pointed out that acute myocardial infarction is the leading cause of death in developed and developing countries. Therefore, early diagnosis and treatment of these patients is one of the key tasks of urgent care medicine. Postponement of myocardial infarction patient treatment by only two hours increases the death probability for 25%. Treatment of these patients requires good organization and coordination between primary, secondary and tertiary healthcare institutions. Until recently, it has been advised that the patients should be referred to primary health care institutions, then to secondary health care institutions (general hospitals) and, finally, after the examination, to tertiary health care institutions. In this way the “golden period” of two hours, when the primary percutaneous coronary intervention (PPCI) must be done, is lost.

According to contemporary recommendations, after the initial on-sight diagnosis, the

patient is referred from primary to tertiary healthcare level as soon as possible (in the first three hours). After the stenting of the coronary artery is done, the patient is referred from tertiary to the secondary level for further treatment and this aim has been reached in this study by the author.

In case that transportation in the first three hours or more is impossible, the patient is referred from primary to the secondary level. It is necessary to form a new model of coordination between healthcare institutions based on this principle. Creating a model for coordinated urgent medical care of STEMI patients, as an improvement of health outcomes and the ultimate goal of the healthcare system, is a strategic challenge for organization development of healthcare institutions. The author elaborated the model by setting specific goals:

- establishing guidelines of good management practices for urgent medical care of STEMI patients within the following five years;
- examination of applicability of guidelines for urgent care of STEMI patients in Serbia based on urgent medical care in healthcare institutions in the Srem Region within the next five years;

- creating a new model for the adequate urgent treatment of diagnosed STEMI patients within the following five years;
- identifying resources (human, technological, financial) and time needed for implementation of the new organization model for urgent care of STEMI patients in the first three hours within the following five years.

In this monograph, most of important characteristics of the geographic area where investigations were performed have been mentioned. Consequently, adequate solutions have been proposed. Six primary healthcare institutions are situated 30–50 km away from the hospital, and the road network is satisfactory. Primary healthcare institutions have a permanent ambulance service. Transport of patients from the place of accident to the hospital lasts 30–60 minutes on the average. If the patient is referred to a tertiary healthcare institution, additional 60 minutes are needed to reach the closest institution of that kind.

Admission department and urgent medical care treatment of the General Hospital in Sremska Mitrovica is trained for performing cardiopulmonary resuscitation, possesses adequate equipment, of earlier date though. Cooperation with other departments in the hospital is at a satisfactory level. There is no cardiologist on a 24-hour shift, but there is always an internal medicine specialist on duty. Cooperation with Intensive Care Department is fair, anaesthesiologists are 24 hours on shift, resulting in the fact that critical patients are treated in a very short period of time.

Tertiary healthcare is provided in the Institute of Cardiovascular Diseases in Sremska Kamenica. They practice medicine according to recommendations from the year 2009, based on which PPCI has the highest priority and is practiced on tertiary healthcare level, unlike thrombolytic therapy that can also be done on both primary and secondary levels.

In his monograph, after the healthcare institutions network analysis, the author explains the methodology used; it is about the cross-sectional study, which was done from July until November 2012 in the Srem District as a pilot

program for all the districts in Serbia. Firstly, a search of organizational literature, coordination and management of foreign healthcare facilities applied for urgent medical care of STEMI patients was conducted. After that, the analysis of coordination and methods of urgent care was conducted, based on the facilities in the Srem District: Primary healthcare institutions in the Srem District, General Hospital in Sremska Mitrovica and the Institute for Cardiovascular Diseases in Sremska Kamenica. Data from the reports of the included healthcare facilities have mostly been used for this part of research. For the missing data, a new form has been made. The triangulation method has been used for an assessment of adequate approaches for improving urgent care of STEMI patients, using quantitative and qualitative indicators and literature review. Initially, the retrospective analysis was performed in order to define indicators of the functioning of health facilities for urgent care for STEMI patients in the Srem District in the period 2009–2011.

Analysing the problems of the existing approach, the root cause has been determined. Based on solving the main causes of the problems, and according to the guidelines of good practices, an organisational model that provides a more rapid way of treating STEMI patients has been presented. In the last stage of the research, the resources and time needed for the implementation of the new organisational model of patient treatment in the first three hours after the accident have been determined. The results will be analysed using descriptive and inferential statistics.

From 2009 until 2011, 325 STEMI patients were diagnosed and treated in the Coronary Care Unit of the Sremska Mitrovica General Hospital. The percentage of patients treated with thrombolytic therapy was 47%. The number patients referred to PPCI was 10%. The average time from diagnosis until hospitalisation was 90 minutes. The average time from hospitalisation in general hospital until the admittance in Sremska Kamenica was 12–24 hours. Mortality rate of STEMI patients was 10.44% in total.

Transport of the patients from the place of accident to the hospital and the initial

hospitalisation on secondary level was disabling the urgent care of STEMI patients using PPCI method. Solving this problem will greatly affect the outcome of patient treatment in the Srem District, mortality rate, lethality rate and shorten the period of hospitalisation.

A multicentric study with the aim to compare treatment methods of STEMI patients in thirty European countries showed that 90–312 out of 100,000 people have an infarct, which is close to yearly results in our region. In majority of the European countries, PPCI method is used for urgent treatment, which is not the case in Serbia. Mortality rate of patients treated by PPCI is significantly smaller and amounts to 2.7–8%, while the mortality rate of patients treated with thrombolytic therapy is 3.5–14%. Infarction mortality rate in General Hospital in Sremska Mitrovica was 10.44% and could be reduced using new organisational methods.

According to the guidelines of good practices for treating STEMI patients, PPCI is performed with STEMI patients with clear clinical picture and evident ECG changes (ST elevation in at least 2 outlets) or LBBB (left bundle branch block) with STEMI clinical picture. Acute STEMI diagnosed by ambulances anywhere in the Srem District is admitted in tertiary healthcare facility (Cardiology Clinic) in the first 90–120 minutes, with no prior treatment in General Hospital in Sremska Mitrovica. Transport calls for one trained doctor and, if possible, two paramedics as well as the complete resuscitation set. Informing the tertiary facility of the arrival of a STEMI patient and

leaving the mobile phone number of the doctor in charge of transportation is obligatory.

Admission department of the tertiary level facility informs the operating room about the arrival of a patient that should be treated PPCI. In the case that more than 120 minutes pass from the first symptoms until hospitalisation in the tertiary level facility, the patient should be treated with thrombolytic therapy and referred to the General Hospital in Sremska Mitrovica. After PPCI procedure is done, if there were no complications and if the glycoprotein medications (IIb/IIIa) were not needed, the patient goes back for further treatment to Sremska Mitrovica in an ambulance 24 hours later.

During the preparation of this monograph, an interview with 30 employees from health care institutions of the Region of Srem has been performed. The results were processed by Fishbone diagram, Pareto diagram, nominal group technique and Levin analysis. The new model of coordination and ways of emergency treatment of STEMI patients in Serbia has been described, based on the example of institutions in the Srem District.

Overall hospital lethality rate of STEMI patients has decreased from 10.44% (during 2009–2011) to 8.28% in 2012. If a new model of urgent care for STEMI patients is established, the overall in-hospital lethality rate can be expected to decrease by 2.16%, in a year. This model of emergency care for STEMI patients could be implemented throughout the country in order to significantly reduce early hospital mortality rate from myocardial infarction.

У овој монографији аутор дефинише модел новог збрињавања пацијената са акутним инфарктом миокарда са елевацијом СТ сегмента на ЕКГ-у (СТЕМИ). Из прегледа стручне и научне литературе издвојене су актуелне смернице за организацију, координацију и менаџмент здравственим установама за ургентно збрињавање пацијената са СТЕМИ инфарктом миокарда. На основу резултата истраживања изнет је предлог новог модела координације и начина

ургентног збрињавања у нашој земљи на примеру установа у региону Срема. Применом новог модела ургентног збрињавања СТЕМИ пацијената, укупни леталитет ових пацијената смањено се на 8,28% у 2012. години са 10,44% од укупног броја умрлих у периоду 2009–2011. Овај модел ургентног збрињавања је применљив у другим регионима у Србији у циљу снижавања раног леталитета од инфаркта миокарда.