Abstract

Analysis of interventions of Emergency Medical Teams in myocardial infarction

Introduction

Cardiovascular diseases have been the leading cause of death and disability in the world for many years. In Europe one in six men and one in seven women die from a heart attack. Mortality in myocardial infarction depends on numerous factors, and one of the most important is the time of treatment implementation from the onset of symptoms. The system of emergency medical services plays main role in this respect. The task of Emergency Medical Teams (EMT) is to recognize and initiate treatment of myocardial infarction as soon as possible and to transport the patient to the appropriate cardiological center with the hemodynamics laboratory. Careful analysis of factors affecting the quality of pre-hospital management may contribute to delay reduction, and thus increase the chances of survival and return of the patient to normal activity.

Aim

The primary aim of the dissertation was to analyze the interventions of EMTs in myocardial infarction and factors that may delay the treatment.

Material and method

The study was a retrospective analysis of the collective medical records of patients treated in the Clinical Cardiology Clinic of the Provincial Hospital No. 2 in Rzeszów and the Cardiology Department of the Independent Public Health Care Center of the Ministry of Internal Affairs and Administration in Rzeszów and the analysis of the Dispatch Orders of the EMTs and emergency medical services forms. The data have been linked to together in such a way as to reproduce the continuity of the course of the proceedings with the patient from the moment of EMT dispatching to discharge of the patient from the hospital.

The study group consisted of 829 patients treated in the period from 1 January 2014 to 31 December 2016 due to myocardial infarction, who were transferred to the hospital by EMTs of the Regional Ambulance Station in Rzeszów.

Results

In the study group, the majority of patients (64.41%) were men ($p = 0.0000$). EMTs were most often dispatched due to a heart attack in patients aged 76-85. Specialist teams performed

54.64% of all interventions, most calls took place in Rzeszów. 49.46% of all EMTs interventions concerned STEMI while 46.80% NSTEMI.

In the three-year period, 40.66% of patients treated for myocardial infarction in two Rzeszów cardiac centers were transferred by EMTs. Myocardial infarction was the cause of 1.12% intervention of EMTs.

The delay associated with the operation of the emergency medical system accounted for approximately 13% of the total delay time in STEMI and approximately 4% in NSTEMI. The pre-hospital delay was on average 47 minutes (median 44 minutes) in STEMI and in NSTEMI 50 minutes (median 46 minutes). The distance from the haemodynamics laboratory, sex, age of the patient, the location of the call, the site of the call, the type of EMT and the time of the day had a significant influence on the prehospital delay.

In-hospital mortality in the study group was 8.2%, in STEMI 5.15%, and in NSTEMI 2.29%. In-hospital mortality was significantly affected by prehospital delay ($p = 0.0165$).

The most common reason for the call was chest pain 63.09%, also in connection with other ailments, followed by myocardial infarction (10.23%). The reason for the call significantly affected pre-hospital delay ($p = 0.0000$). EMTs most often transmitted patients to the hospital with the diagnosis "chest pain" (48.13%) and "myocardial infarction"(25.57%). EMT diagnosis had a significant effect on pre-hospital delay ($p = 0.0000$).

EMTs used acetylsalicylic acid (ASA) (45.96%), oxygen (33.66%), nitrates (27.5%) and morphine (24.37%) in patients with myocardial infarction. 3.02% of patients were administered Clopidogrel and 6.03% unfractionated heparin. All these drugs apart from ASA were statistically more frequently used by specialist EMTs. The most frequently performed medical rescue services were blood pressure measurement (94.81%), vital signs monitoring (91.68%), patient examination (91.31%), intravenous access (86.25%) and 12-lead ECG (74, 79%).

Teletransmission of ECGs to the invasive cardiology center was performed in 14.6% of cases, statistically significantly more often by basic EMTs ($p = 0.000$) and in STEMI ($p = 0.0000$). Execution of teletransmission did not significantly affect prehospital delay ($p = 0.873$), but had a significant effect on shortening in-hospital delay ($p = 0.0000$)).

Conclusion

Two out of five patients treated for myocardial infarction were admitted to the hospital in an emergency procedure as a result of transfer by EMTs, and the intervention of EMTs due to myocardial infarction comprised 1.12% of all interventions. The pre-hospital delay was influenced by various factors related to the work of EMT, whereas the prehospital delay had a significant impact on in-hospital mortality. The pre-hospital delay was significantly shorter if

EMT diagnosed myocardial infarction. The most commonly used drugs were acetylsalicylic acid, oxygen, nitrates and morphine, and antiplatelet and anticoagulant drugs were rarely administered. Most patients had ECG. The Basic EMTs were twice as likely to perform teletransmission. EMTs performed teletransmission on average in one in seven interventions in myocardial infarction. Execution of teletransmission statistically significantly reduced intra-hospital delay, however, it did not significantly influence the mortality rate before discharge from the hospital.