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The activity of the Helicopter Emergency Medical Service in Poland based on selected health hazards

Abstract

Introduction

Stroke is a life-threatening condition that requires urgent on-scene intervention and immediate transport to an appropriate therapeutic center for treatment.

In patients in the acute phase of ST-segment elevation myocardial infarction, rapid transport to a specialized treatment center is critical to increasing the chances of survival and recovery.

Cases of out-of-hospital sudden cardiac arrest pose a challenge to health care systems worldwide, with high mortality rates and serious socioeconomic consequences.

In many developed emergency medical systems around the world, the utilization of air support in pre-hospital operations allows shortening the time for qualified medical personnel to reach the scene. Also, air transport makes it possible to reduce to a minimum the time to start definitive treatment in specialized therapeutic centers.

Aim

The study aimed to analyze the actions of helicopter emergency medical teams within the Polish state emergency medical service system in patients with symptoms of stroke, acute ST-segment elevation myocardial infarction, and out-of-hospital sudden cardiac arrest.

Material and methods

This refers to the part of the study dedicated to patients with symptoms of a stroke.

A retrospective cross-sectional study of 3906 missions to patients with stroke symptoms who were transported by helicopters to hospitals after emergency medical procedures by helicopter emergency medical teams was conducted. The study included all Polish Medical Air Rescue aircraft missions from January 1, 2012, to December 31, 2016.

This refers to the part of the study dedicated to patients with ST-segment elevation myocardial infarction symptoms.

The retrospective analysis included 6099 missions to patients with symptoms of ST-segment elevation myocardial infarction treated and transported by helicopter emergency medical service crews in Poland from January 1, 2011 to December 31, 2018. The study analyzes the use of air support in rural and urban areas.

This refers to the part of the study dedicated to patients with out-of-hospital sudden cardiac arrest.

A retrospective cohort study was conducted based on analysis of air and medical records of all helicopter emergency medical service missions in Poland in 2014. Inclusion criteria were met by 574 interventions. The 30-day survival of patients was calculated using information from the nationwide PESEL database.

Results

This refers to the part of the study dedicated to patients with symptoms of a stroke.

During the study period, Polish Medical Air Rescue (PMAR) aircraft performed 48553 missions. The inclusion criteria were met for 3906 interventions, which were further analysed.

Helicopter emergency medical teams were used in 3475 (88.97%) cases as support to ground emergency medical teams. The maximum duration of HEMS operation from activation to transfer of the patient to the hospital did not exceed 108 min, with a median of 60 min. More than 87% of patients, in whom HEMS crews found stroke symptoms, were transported to hospitals with the possibility of thrombolytic treatment. A contributing factor to the patients' deterioration was the increase in the time taken to provide emergency medical procedures at the scene.

This refers to the part of the study dedicated to patients with ST-segment elevation myocardial infarction symptoms.

The inclusion criteria for the study were met for 6099 missions, which were further analysed. The study group was predominantly male (68.9%) and aged between 60 and 79 years (53.9%). The mean age of the entire group was 64.8 (SD 11.9) years. The level of awareness as measured by the Glasgow Coma Scale score ranged from 13 to 15 (84.8% of patients), the mean RTS was 11.4 (SD 1.9) points and the mean NACA scale score was 4 (SD 1). In rural

areas, HEMS crews were more frequently dispatched to emergencies (99.3% vs 59.6%). Sudden cardiac arrest (6% vs 3.8%) resulting in patient death was more common in these areas (2.4% vs 0.4%; P <0.05 for both).

This refers to the part of the study dedicated to patients with out-of-hospital sudden cardiac arrest.

PMAR aircraft performed 8366 missions during the study period. Inclusion criteria were met for 574 interventions, which were further analysed. Most frequently, HEMS crews intervened in cases of out-of-hospital cardiac arrest in men and patients over 60 years of age. The median time of arrival at the scene was 21 minutes (IQR 18-26 min). The median time to provide emergency medical intervention (from arrival to transfer to the hospital) was 50 minutes (IQR 41-64 min). In 58% of all out hospital cardiac arrest (OHCA) cases, the cause was cardiac and the most common first rhythm analysed was asystole. Return of spontaneous circulation was achieved in 237 (41.2%) cases, and 30-day survival was observed in 10.4% of patients in the study population.

Conclusions

The use of HEMS in the Polish emergency medical system has a positive impact on the pre-hospital phase of the therapeutic process in patients with symptoms of stroke, ST-segment elevation myocardial infarction, and OHCA. Effective cooperation with ground emergency medical teams allows to shorten the time of providing emergency medical procedures at the scene of the event and thus minimises the time of initiating definitive, specialist treatment in appropriate therapeutic centres.