

I. STRESZCZENIE W JĘZYKU ANGIELSKIM

Sudden cardiac arrest (SCA) is an arrest of the heart's mechanical activity causing cessation of blood circulation, secondary respiratory arrest, and, as a consequence, irreversible brain damage. Following the Chain of Survival (consisting of early recognition and a call for help by bystanders, early initiation of cardiopulmonary resuscitation (CPR), early defibrillation, and post-resuscitation care) provides the best chance of saving a person suffering from cardiac arrest. The cooperation of the medical dispatcher with the witness of the event and the quick use of the Automated External Defibrillator (AED) have a key impact on the improvement of survival in out-of-hospital cardiac arrest. This device will guide the bystander through the entire CPR procedure, recognize the heart rhythm, and defibrillate a person with ventricular fibrillation (VF) or pulseless ventricular tachycardia (pVT) cardiac arrest. The lack of public awareness of this device's usefulness and the inadequate placement of the AED result in its too rare use by witnesses to the event.

The aim of the study was to analyze cases of out-of-hospital cardiac arrest in the city of Białystok and to create a map/plan showing the optimal location of AED devices.

The material for the analysis consisted of 49,649 emergency medical team (EMT) cards at the Provincial Ambulance Station in Białystok from the period of two years (2018-2019). The study covered the area of the city of Białystok. The inclusion criterion included cases

in which a patient's cardiac arrest occurred. The above criteria were met by 787 cases in the study group. The study was carried out in the Department of Primary Health Care, Faculty of Health Sciences of the Medical University of Białystok. In order to optimally plan potential AED locations, a cluster analysis was performed using the K-means algorithm. The data were statistically analyzed in STATISTICA 13.3. The study was approved by the Bioethics Committee of the Medical University of Białystok No. R-I-002/610/2018.

Based on the study, it was found that the incidence of out-of-hospital cardiac arrest in Białystok was 133.1/100,000 inhabitants per year. SCA most often occurred in the place of residence (78.27%). The most common reason for calling an ambulance in case of suspected SCA was lack of breathing (41.80%). Shockable rhythms – VF/pVT accounted for 10.10% of cases. VF/pVT observed as the first cardiac arrest rhythm was associated with a higher rate

of return of spontaneous circulation (ROSC) (58.62%). In the above group of patients, ROSC occurred more often when endotracheal intubation was not performed (83.33% vs. 58.73%). Among all patients with out-of-hospital cardiac arrest, ROSC was obtained in 36.41% of cases during medical emergency procedures by the EMT. The greatest impact on the patient's ROSC was the initiation and conduct of CPR by a bystander, as well as the use of an AED. In the years 2018-2019 in Bialystok, the city AED was not used by witnesses to the event even once.

The analysis conducted showed that the current location of AED devices in Bialystok is inadequate in relation to the places where SCA most often occurs.

Due to the non-optimal location of AED devices in Bialystok, their number should be increased and placed in optimal locations in accordance with the established points. When building an AED network, it is important to consider placing them in housing estates as well. Changing the location of the already existing semi-automatic external defibrillators and identifying appropriate location points for AED devices may lead in the future to an increase in the survival rate and improve the safety of residents and all other people staying in Bialystok. Providing dispatchers and the public with a list and map of current AED locations can improve access to them. Society should be educated and trained in first aid with the use of AEDs; information campaigns should be conducted; and public access to defibrillation should be promoted. Furthermore, to increase the rate of ROSC in VF/pVT rhythms, alternative airway management should be used in order to avoid delaying defibrillation. It is important to continue carrying out research on out-of-hospital cardiac arrest cases and to cooperate with foreign authorities by providing them access to the latest case records.