Summary

Sudden cardiac arrest is the third leading cause of death in Europe. Scientific societies related to the subject of cardiac arrest forecast that future statistics may deteriorate due to the aging society. The European Resuscitation Council indicates that the survival rate ROSC for discharge from hospital ranges from 3% -6% (Asia) to around 25% in the US. Hospitals with non-persistent or DBR protocols achieve a good neurological effect in 90% of ROSC patients, in contrast to centers where protocols are not applied and the percentage of patients with poor neurological prognosis is 50% of which 33% are patients in a vegetative state.

The most important factors influencing the patient's survival include quick diagnosis, calling for help and introducing BLS by witnesses of the incident, operation of local emergency medical systems, early inpatient care and high-quality post-resuscitation care, an extremely important element of which is treating the cause of SCA and implementing TTM to minimize the effects of post-resuscitation brain injury. The ERC guidelines from 2021 indicate the need for the immediate initiation of TTM in SCA patients in both defibrillation and non-defibrillation mechanisms. The recommendations indicate the need to maintain body temperature in the range of 32-36°C for at least 24 hours and to avoid temperature rise above 37.7°C for at least 72 hours after ROSC. It should be noted that the use of HT does not show better therapeutic results compared to the TTM 36°C, while the patient is at greater risk of complications such as: coagulopathy, bleeding and hemodynamic instability. The most common methods of TTM and the implementation of TH are systems such as cold air duvets or ice covering the main arteries or the supply of cold infusion fluids.

The aim of the study was to analyze the frequency of increases in body temperature in patients with ROSC above 37°C, to compare the effectiveness and speed of reaching the temperature below 36°C of selected cooling methods that are easy to apply in emergency departments. Additionally, the analysis included the influence of the patients' cooling time on the occurrence of the so-called rebound hyperthermia
in patients chilled for 12 or 24 hours. Parameters such as pH, lactate, sodium, potassium, troponin and creatinine levels at specific patient cooling time points were also analyzed.

123 patients of the University Teaching Hospital in Białystok, treated in the Hospital Emergency Department, who had ROSC after SCA, were qualified for the study. In the first stage of the study, the occurrence of an increase in body temperature in patients above 37°C was analyzed. The second stage of the study assumed the implementation of cooling by

leaving the patient under a thin cover that guarantees the patient's intimacy, the use of ice packs on the course of large arteries, a device generating cold air flow through a specially dedicated quilt, combination of ice drapes

with the flow of cold air and the use of the CritiCool device, cooling the patient through the circulation of cold water in a specially dedicated drape. Body temperature measurements were taken at the time points: at the beginning of cooling, 2, 4, 8 hours after the beginning of cooling, 12 or 24 hours after the beginning of cooling, and 6 and 12 hours after the end of cooling of the patient.

The conducted tests confirm the occurrence of temperature increases

in patients after cardiac arrest. The use of three main methods in keeping the patient in the normothermic borderline was compared: leaving the patient under a thin cover, covering with ice, using cold air and a combination of the last two methods. The research clearly confirms that the use of a combination of the cooling technique in the form of a quilt with cold air and the ice cover reduces the risk of temperature increase and allows to maintain the correct body temperature 12 hours after the end of cooling the patient. Research confirms that leaving the patient only under a thin cover does not protect him adequately against fever and the occurrence of temperature increase after the end of cooling. The analysis of the data showed that patients left only under a thin cover achieved significantly lower pH values compared to the other groups, also the values of partial pressure of carbon dioxide were significantly lower in the group of people cooled with ice and cold air. In the remaining analyzed variables, no significant statistical differences were found between the methods. The analysis of death predictors showed a relationship between the age of the patients (risk of death increased by 8% each year of life) and the pH at the beginning of cooling (a 15% decrease in the chance of death when the pH was increased by 0.01). A strong relationship was shown with the cooling time and the risk of death. Patients chilled for 24 hours had an 88% lower risk of death compared to those chilled for 12 hours. TTM should be used in all patients with ROSC for 24 hours and temperature control methods should be quick and easy for emergency personnel to implement. Patients after ROSC should be closely monitored for vital signs, with particular emphasis on monitoring body temperature. The method is based on the application of ice covering the main arteries and the use of dedicated blankets with the flow of cold air seems to be an effective and easy to apply method.