ORIGINAL ARTICLE

Characteristics of urban versus rural utilization of the Polish Helicopter Emergency Medical Service in patients with ST-segment elevation myocardial infarction

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ABSTRACT

BACKGROUND In patients with acute phase of ST-segment elevation myocardial infarction (STEMI), quick transportation to a specialist therapeutic center is of utmost importance to increase the chances of surviving.

AIMS The objective of this study was to characterize the missions of the Polish Helicopter Emergency Medical Service (HEMS) to patients with STEMI in urban and rural areas and to assess the utilization of air ambulance support as part of an early stage of the therapeutic process.

METHODS This retrospective analysis included 6099 patients with STEMI treated by the Polish HEMS crews from January 2011 to December 2018.

RESULTS The study group included mainly men (68.9%) and persons aged 60 to 79 years (53.9%). The mean (SD) age of the entire group was 64.8 (11.9) years. The level of consciousness measured by the Glasgow Coma Scale score ranged from 13 to 15 (84.8% of patients), the mean (SD) Revised Trauma Score was 11.4 (1.9) points, and the mean (SD) number of points on the National Advisory Committee for Aeronautics scale was 4 (1). In rural areas, the Polish HEMS crews were more frequently dispatched to medical emergencies (99.3% vs 59.6%). Sudden cardiac arrest occurred more often in those areas (6% vs 3.8%), which resulted in the death of the patient (2.4% vs 0.4%; *P* <0.05 for both).

CONCLUSIONS There were differences in utilization of the Polish HEMS in patients with STEMI in urban and rural areas. The results demonstrated a positive impact of the utilization of HEMS in the early stages of the therapeutic process of these patients.

INTRODUCTION The continuous progress in medicine has provided new invasive techniques and medical procedures that increase the chances of surviving the acute phase of myocardial infarction.[1-3] One such technique is primary percutaneous coronary intervention (PPCI), which is used as an emergency treatment in patients with ST-elevation myocardial infarction (STEMI). However, access to hospital performing PPCI is limited for some patients. In urban areas, PPCI is available to most; however, providing access to PPCI to patients living in rural areas constitutes a challenge for healthcare systems in many countries around the world.

WHAT'S NEW?

Our study is the first Polish attempt to assess the impact of the Polish Helicopter Emergency Medical Service (HEMS) crew interventions on the clinical status of patients with ST-segment elevation myocardial infarction. We decided to examine the activity of HEMS crews in urban and rural environments, which differ, among others, in the time of arrival of ground-based medical emergency services, the availability of health services for patients, and the possibilities of reaching medical assistance to the place of the incident. Medical and flight data from all Polish Air Medical Rescue bases from an 8-year period were assessed and we included over 6000 cases. The results demonstrated a positive impact of the actions taken at the scene and the transport to the hospital carried out by the Polish HEMS crews on patients with ST-segment elevation myocardial infarction. Our findings will be of interest to all acute myocardial infraction researchers generally, in particular to those focused on cardiovascular emergencies, sudden cardiac death, and resuscitation.

According to the 2017 European Society of Cardiology guidelines, PPCI should be performed in less than 120 minutes from the diagnosis of STEMI.[1,4-7] To achieve that, helicopter emergency medical service (HEMS) crews transport patients to facilities performing PPCI procedures. Numerous countries, including the United States, Austria, Denmark, or Poland, introduced HEMS in their healthcare systems.[8-13]

In Poland, HEMS crews are part of the Polish Medical Air Rescue and are an integral part of the National Medical Emergency System. HEMS crews work in 21 permanent bases and 1 seasonal base (functioning from June to September) and are dispatched to traffic accidents and medical emergencies. They also transport patients between hospitals in the whole country. All helicopters are equipped with devices and medications necessary to perform medical emergency procedures, including prehospital postresuscitation care.[14,15]

Aims Difficulties associated with the treatment of patients with STEMI and with the availability of specialist medical procedures present an important problem. Therefore, in this study, we aimed to characterize air ambulance missions to patients with STEMI in urban and rural areas and to assess the utilization of HEMS as part of the therapeutic process.

METHODS

Study design This was a retrospective analysis of HEMS missions in urban and rural areas in Poland. The division into urban and rural areas was made according to the administrative criteria: an urban area was defined as an area located within the administrative boundaries of a city, and a rural area as an area located outside such boundaries.

The study included HEMS missions dispatched to patients with STEMI (I21 and I22 according to the *International Statistical Classification of Diseases and Related Health Problems, Tenth Revision*) from January 2011 to December 2018. We excluded cases in which: the patient was found not to have STEMI, the mission was cancelled, the mission was interrupted due to various causes, there was no patient at the scene, the patient refused first-aid treatment, or cases in which data were missing (46 missions). A total of 6099 patients with STEMI treated by HEMS crews in the analyzed period were included in the final analysis. The director of the Polish Medical Air Rescue gave his consent to conduct the study. Due to the retrospective nature of the study, approval of a bioethical committee was not required.

The following data were extracted during the analysis of the medical records maintained by HEMS crews: gender and age of the patients, the date and place of the mission, operational characteristics of HEMS missions, performed medical emergency procedures and treatment, and the clinical status, assessed using the following scales: the Glasgow Coma Scale (GCS), the Revised Trauma Score (RTS), and the National Advisory Committee for Aeronautics (NACA) score.

The GCS is a scale used to assess the level of consciousness. The highest possible GCS score is 15 and the lowest is 3. The final scores can be divided into 3 categories of impaired consciousness: severe (GCS, 3–8), moderate (GCS, 9–12), and mild (GCS, 13–15). The RTS is a scoring system commonly used to assess the severity of trauma injuries in a prehospital setting. It is a weighted sum of the following variables: the initial GCS, systolic blood pressure, and respiratory rate. Each parameter is evaluated on a scale from 0 to 4 points, the maximum score is 12 points and the minimum, 0 points. The lower the score, the more severe the clinical condition. The NACA score divides patients into 8 categories according to the severity of vital sign abnormalities caused by an injury, disease, or poisoning. The higher the score, the more severe the clinical condition.[16-18]

Statistical analysis Data extracted from HEMS medical records were analyzed with the STATISTICA, version 13 software (StatSoft Inc., Kraków, Poland). Qualitative data were reported as numbers and percentages and quantitative data as means (SD). The Shapiro-Wilk test was used to determine normality. The χ^2 test was used to assess the significant differences between the analyzed qualitative variables. The nonparametric Mann–Whitney test was used to determine the differences between 2 independent groups and the Kruskal–Wallis test was used to analyze more than 2 independent groups of variables. The Wilcoxon signed-rank test was used to compare 2 related variables, namely the GCS and the RTS scores and the respiration rate. A P value of less than 0.05 was considered significant.

RESULTS The study group consisted mainly of men and persons aged over 60; the mean (SD) age of the entire analyzed group was 64.8 (11.9) years. Patients with STEMI were most often treated as cases of medical emergencies, in which the HEMS crew was dispatched as support for ground emergency medical services (GEMS) teams. The majority of patients were transported to hospital by HEMS crew after being managed at the scene. Sudden cardiac arrest occurred in 4.6% of patients. In 1.2%, cardiopulmonary resuscitation was unsuccessful and resulted in death (TABLE 1).

We found that interhospital transport from small facilities to hospitals that could implement appropriate therapeutic procedures constituted over 40% of HEMS interventions in urban areas. In rural areas, HEMS crews were more frequently dispatched to medical emergencies (99.3% vs 59.3%), patients were more often transported to hospital by GEMS teams (1.2% vs 0.6%), and HEMS crews were the first responders (10.0% vs 5.4%). Sudden cardiac arrest occurred more often in rural than in urban areas (5.9% vs 3.9%), and more often resulted in death (2.4% vs 0.4%) ($P < 0.05$). The differences in gender and age of the patients were not significant (TABLE 1).

The analysis of the clinical status of patients treated by HEMS crews revealed that the level of consciousness (measured by the Glasgow Coma Scale) of patients at the arrival of HEMS crew ranged from 13 to 15 (84.8% of patients) (mean [SD], 13.9 [3]), whereas the mean (SD) RTS score was 11.4 (1.9) points. Mean (SD) number of points on the NACA scale was 4 (1). The mean (SD) number of breaths per minute was 14 (4.2), sinus rhythm was the most frequently observed heart rhythm. Systolic blood pressure in the vast majority of patient was higher than 90 mm Hg. Mean (SD) blood glucose level was 170.55 (81.3) mg/dl. The most frequently administered medications were acetylsalicylic acid, clopidogrel, and opioid analgesics. Medical emergency procedures performed at the scene were oxygen therapy, creating intravenous access, and sedation (TABLE 2).

Our analysis revealed that patients treated in rural areas, as compared with those in urban areas, had lower GCS (13.7 vs 14.1) and RTS scores (11.2 vs 11.5), and higher NACA scores (4.1 vs 4). They had higher respiratory rate (14.1 vs 13.9), their ECG more frequently revealed ventricular / supraventricular tachycardia (5.7% vs 4.2%), bradycardia / AV block (5% vs 3.4%), and rhythms related to cardiac arrest (3.9% vs 1.1%). Systolic blood pressure was more often lower than normal (6.8% vs 3.2%). Acetylsalicylic acid (71.8% vs 67.47%), opioid analgesics (60.7% vs 48.5%), crystalloids (28.3% vs 24.9%), and antiemetic medications (26.1% vs 22.1%) were more often administered. These patients more often required an intravenous access (15.9% vs 12.8%) and intubation (8% vs 5.7%). All of the above indicate

TABLE 1 Characteristics of the study group with regard to the area

Variable		Total (n = 6099)	Urban (n = 3880)	Rural (n = 2219)	*P* value
Sex	Female	1893 (31)	1228 (31.6)	665 (29.9)	0.17
	Male	4206 (68.9)	2652 (68.3)	1554 (70)	
Age	<40 y	113 (1.8)	80 (2)	33 (1.4)	0.05
	40–59 y	1912 (31.3)	1179 (30.3)	733 (33)	
	60–79 y	3289 (53.9)	2129 (54.8)	1160 (52.2)	
	≥80 y	785 (12.8)	492 (12.6)	293 (13.2)	
Age, y, mean (SD)		64.80 (11.9)	64.84 (11.9)	64.75 (11.7)	0.38
Further treatment	Transport to hospital by HEMS	5977 (99.1)	3839 (99.4)	2138 (98.8)	0.01
	Transport to hospital by GEMS	49 (0.8)	23 (0.6)	26 (1.2)	
Death		73 (1.2)	18 (0.4)	55 (2.4)	<0.001
Sudden cardiac arrest		285 (4.6)	152 (3.9)	133 (5.9)	<0.001
Type of mission	Flight to medical emergency	4506 (73.8)	2301 (59.3)	2205 (99.3)	<0.001
	Interhospital transport	1593 (26.1)	1579 (40.7)	14 (0.6)	
The first team at the scene	HEMS	433 (7.1)	211 (5.4)	222 (10)	<0.001
	GEMS	5666 (92.9)	3669 (94.5)	1997 (90)	

Data are presented as number (percentage) unless otherwise indicated.

Abbreviations: GEMS, ground emergency medical service; HEMS, helicopter emergency medical service

TABLE 2 Characteristics of the study group and treatment with regard to the area

Variable		Total (n = 6099)	Urban (n = 3880)	Rural (n = 2219)	*P* value
GCS score	1–8	439 (7.5)	236 (6.4)	203 (9.6)	<0.001
	9–12	171 (2.9)	113 (3)	58 (2.7)	
	13–15	5173 (89.4)	3332 (90.5)	1841 (87.5)	
GCS, mean (SD)		13.9 (3)	14.1 (2.8)	13.7 (3.3)	0.002
RTS, mean (SD)		11.4 (1.9)	11.5 (1.6)	11.2 (2.3)	0.02
NACA score, mean (SD)		4 (1)	4 (1)	4.1 (1.1)	<0.001
Breaths, n, mean (SD)		14 (4.2)	13.9 (3.9)	14.1 (4.7)	<0.001
ECG monitoring	Sinus rhythm	4867 (83.2)	3170 (85)	1697 (80.1)	<0.001
	Atrial fibrillation / atrial flutter	330 (5.6)	225 (6)	105 (4.9)	
	Ventricular / supraventricular tachycardia	282 (4.8)	160 (4.2)	122 (5.7)	
	Bradycardia / AV block	239 (4)	128 (3.4)	105 (4.9)	
	Asystole / PEA / VF / VT	127 (2.1)	44 (1.1)	83 (3.9)	
Systolic arterial pressure	≤89 mm Hg	252 (4.5)	113 (3.1)	139 (6.8)	<0.001
	≥90 mm Hg	5344 (95.5)	3438 (96.8)	1906 (93.2)	
Blood glucose level, mg/dl, mean (SD)		170.5 (81.3)	170.1 (82.4)	172.1 (78.5)	0.2
Treatment	Acetylsalicylic acid	4211 (69)	2615 (67.4)	1596 (71.9)	<0.001
	Clopidogrel	3845 (63)	2472 (63.7)	1373 (61.8)	0.15
	Opioids	3232 (52.9)	1882 (48.5)	1350 (60.8)	<0.001
	Heparin	2954 (48.4)	1916 (49.3)	1038 (46.7)	0.05
	Crystalloids	1594 (26.1)	967 (24.9)	627 (28.2)	0.004
	Antiemetic medications	1437 (23.5)	858 (22.1)	579 (26)	<0.001
	Nitrates	802 (13.1)	491 (12.6)	311 (14)	0.13
Medical emergency treatment	Oxygen therapy	2686 (44)	1672 (43)	1014 (45.7)	0.05
	IV access	853 (13.9)	497 (12.8)	356 (16)	<0.001
	Sedation	650 (10.6)	428 (11)	222 (10)	0.21
	Intubation	404 (6.6)	226 (5.8)	178 (8)	<0.001
	Mechanical ventilation	314 (5.1)	191 (4.9)	123 (5.5)	0.29

Data are presented as number (percentage) unless otherwise indicated.

Abbreviations: AV, atrioventricular; ECG, electrocardiography; GCS, Glasgow Coma Scale; NACA, National Advisory Committee for Aeronautics; IV, intravenous; PEA, pulseless electrical activity; RTS, revised trauma score; VF, ventricular fibrillation; VT, ventricular tachycardia

that patients in rural areas had a more severe clinical status. A detailed analysis is presented in TABLE 2.

Our data showed that missions carried out by HEMS to patients with STEMI in rural areas were connected with longer time of flight (mean, 19.2 minutes vs 18.2 minutes), longer time of transport to hospital (mean, 18.2 minutes vs 15.6 minutes), longer distance to the scene (mean, 51.3 km vs 43.9 km), and longer distance to hospital (mean, 51.0 km vs 42.3 km; $P < 0.05$) No differences were found in response times and procedures performed at the scene (TABLE 3).

The results of HEMS crew interventions at the scene and during the transport to the hospital showed that the GCS and RTS scores increased, and the number of breaths per minute decreased, which indicates an improvement in the patients' clinical status (TABLE 4).

The analysis showed differences in the assessment of the patient at the scene between the value of GCS scale and the age of the patients and the type of mission, the value of the RTS scale and the type of mission as well as the number of breaths and the age of the patients and the type of mission ($P < 0.05$). However, in the second assessment at the patient's handover in the hospital, differences were found between the values of GCS and RTS scales and the number of breaths and the age of the patients and the type of mission ($P < 0.05$). Details are presented in TABLE 5.

TABLE 3 The characteristics of the Polish Helicopter Emergency Medical Service missions with regard to the area

Variables	Total	Urban	Rural	*P* value
Response time, min, mean (SD)	6.8 (6.6)	6.8 (6.4)	7 (7.1)	0.71
Flight time, min, mean (SD)	18.8 (10.6)	18.2 (9)	19.2 (11.3)	0.001
Time of action at the scene, min, mean (SD)	19 (11.6)	18.8 (11.1)	19.3 (12.3)	0.38
Time of transport, min, mean (SD)	17.3 (5.4)	15.6 (4.6)	18.2 (5.6)	<0.001
Distance to the place of call, km, mean (SD)	48.6 (19)	43.9 (17.5)	51.3 (19.3)	<0.001
Distance of transport, km, mean (SD)	47.9 (18.6)	42.3 (16)	51.07 (19.2)	<0.001

TABLE 4 The analysis of the effectiveness of HEMS crew procedures with regard to the area

Variables	Urban		*P* value	Rural		*P* value
	Assessment at the scene	Assessment at patient handover to the hospital		Assessment at the scene	Assessment at patient handover to the hospital	
GCS	14.1 (2.7)	14.6 (1.9)	<0.001	13.8 (3.1)	14.4 (2.3)	<0.001
RTS	11.6 (1.2)	11.4 (1.5)	0.002	11.4 (2.1)	11.5 (1.9)	<0.001
Breaths per minute, n	13.8 (4.1)	13.6 (3.9)	<0.001	14.0 (4.3)	13.7 (4)	<0.001

Data are presented as mean (SD).

Abbreviations: see TABLE 2

TABLE 5 Analysis of the clinical status of patients at the first and subsequent assessment

Variable		Assessment at the scene			Assessment at patient handover in the hospital		
		GCS	Scale RTS	Breaths per minute, n	GCS	Scale RTS	Breaths per minute, n
Gender	Female	13.9 (2.9)	11.5 (1.8)	14.1 (4.1)	14.4 (2.2)	11.6 (1.8)	13.8 (3.9)
	Male	13.9 (3)	11.4 (1.9)	13.9 (4.3)	14.4 (2.3)	11.6 (1.8)	13.6 (4)
	P value	0.39	0.69	0.19	0.09	0.62	0.08
Age	<40 y	13.9 (2.9)	11.6 (1.5)	13.2 (4)	14.6 (1.8)	11.8 (1.1)	13 (3.3)
	40–59 y	14 (3)	11.4 (1.9)	13.8 (4.1)	14.5 (2.2)	11.6 (1.7)	13.4 (3.8)
	60–79 y	13.9 (3)	11.5 (1.9)	14 (4.3)	14.5 (2.2)	11.5 (1.8)	13.7 (4.1)
	≥80 y	13.8 (2.9)	11.4 (2)	14.2 (4.1)	14.2 (2.6)	11.4 (2)	13.8 (4.1)
	P value	0.003	0.13	<0.001	<0.001	<0.001	<0.001
Type of mission	Flight to medical emergency	14.1 (2.7)	11.6 (1.2)	13.8 (4.1)	14.6 (1.9)	11.6 (1.5)	13.6 (3.9)
	Interhospital transport	13.8 (3.1)	11.4 (2.1)	14 (4.3)	14.4 (2.3)	11.5 (1.9)	13.7 (4)
	P value	<0.001	<0.001	0.001	<0.001	0.03	0.02

Data are presented as mean (SD).

Abbreviations: see TABLE 2

DISCUSSION The main findings of our study are: 1) patients with STEMI treated by HEMS are mainly men and persons over 60 years of age; 2) patients from rural areas were in a more severe clinical condition, more often required urgent medical interventions, and more often had sudden cardiac arrest and deaths; 3) HEMS in rural areas are mainly utilized as a support for GEMS, whereas in urban areas they are equally often utilized as a support for GEMS and in interhospital transport (the majority of treated patients were transported to the target hospitals by air); 4) proper continuation of the therapeutic process by HEMS crews initiated at the scene by GEMS or in a hospital without PPCI resulted in the improvement of patients' clinical condition when transferred to target facilities.

Our results demonstrated that the analyzed group consisted mostly of men and patients aged 60 to 79 years (mean age, 64.8 years). Wejnarski et al[13] assessed interhospital transports and HEMS missions to patients with acute myocardial infarction (AMI) or acute trauma and also concluded that men and persons over 60 years of age prevailed. Funder et al[8] assessed the impact of HEMS interventions on mortality of patients and the eligibility of patients for PPCI. They found that the study group consisted mostly of men and patients aged 18 to 60 years. Gunnarsson et al,[11] in their study concerning the characteristics and the assessment of the impact of transport of patients with STEMI by HEMS crews with and without a physician on board, reported that male sex was also prevalent and the mean age of the patients transported by crews with a physician was 60.4 years, and without a physician, 61.3 years. In his work on the strategy of AMI treatment in the elderly, Van de Werf[19] suggests to consider a modification of prehospital and in-hospital pre-PPCI treatment in patients over 60 years of age. It seems justified, therefore, to emphasize the issue of treatment of STEMI in the elderly in the HEMS crew training process.

We showed that in patients in rural areas the mean GCS and RTS scores were lower and the NACA score and the respiratory rates were higher as compared with patients in urban areas. This indicates a more severe clinical status of these patients. The analysis also showed that the cases of sudden cardiac arrest were more frequent in rural areas and that cardiopulmonary resuscitation was more often unsuccessful. In the study group, the most commonly administered medications were: acetylsalicylic acid, clopidogrel, opioid analgesics, and heparin. These results show the compliance of HEMS crew procedures with the current recommendations for the treatment of AMI.[20] Trimmel et al[12] who analyzed GEMS interventions to patients with STEMI found that acetylsalicylic acid, heparin, and ticagrelor were the most frequently administered medications.

Our results also demonstrate that the majority of patients with STEMI were transported to hospitals with PPCI by HEMS crews. Rzońca et al[21] found that patients were more often transported to hospitals by HEMS than GEMS crews and that the cases of death of patients before the HEMS crew arrival at the scene were more frequent than when the GEMS were supported by HEMS crews. Whereas in the study conducted by Newgard et al,[22] the majority of patients were transported to hospitals by GEMS teams and death cases were more frequent in rural areas.

Our results revealed that HEMS crews were more often dispatched as support for GEMS teams, which was also confirmed by Wejnarski et al,[13] Rzońca et al,[21] and Lyon and Nelson.[23] In urban areas, almost half of the air ambulance missions to patients with STEMI were interhospital transport from hospitals without PPCI abilities to facilities with higher referral rates. There were almost no interhospital transports from rural areas since hospitals are almost exclusively located in urban areas.

Dispatching HEMS crews to places difficult to access by GEMS teams or to rural areas allows to reduce the time to reach the patient and the time of transport to hospitals, including specialist treatment centers, which was emphasized by Knudsen et al[24] and Moens et al.[25] Our study revealed that missions carried out to patients with STEMI in rural areas had longer times of flight to the scene and of transport to the hospital performing PPCI as well as longer distance to the scene and distance to the hospital performing PPCI. Funder et al[8] found that the time between performing a diagnostic ECG to the arrival of the patient to the facility performing PPCI transported by HEMS crew was reduced in comparison with the time of transport by GEMS team, but the distance from the scene to the hospital was longer in the case of the transportation carried out by HEMS crews.

Medical procedures performed by HEMS crews should be treated as a continuation of the process initiated by GEMS at the scene or by staff in facilities without PPCI, which was taken into consideration in our analysis. The GCS and RTS scores and the respiratory rate, which were assessed at the first contact of the HEMS crew with the patients, were reassessed for the second time at patient handover in the hospital. Our study shows that both GSC and RTS scores are significantly higher and the respiratory rate lower at patient handover by the HEMS crew in the hospital compared with the first measurement. Despite lack of unambiguous evidence to confirm the impact of the use of HEMS to treat and transport patients with AMI, the use of air transport reduces the time to reach a specialist center as well as places that are difficult to access or distant from healthcare facilities, which was confirmed by numerous studies.[8,11,26-29] According to Werman et al,[26] advanced life support and quick transport to the facility performing PPCI, especially in the case of sudden cardiac arrest in patients with acute coronary syndrome is justified, as these patients require immediate coronary intervention. According to Topol et al,[27] helicopter transport of patients with AMI is safe and the early use of thrombolytic treatment increases coronary artery patency and relieves arrhythmias after reperfusion. Studies by Gunnarsson et al,[11] Youngquist et al,[28] and Hesselfeldt et al[29] also confirm that air transport of patients is safe and reduce the time of transport to the target hospital, which is of particular importance in rural areas where the estimated time of arrival may be too long to start effective treatment. Funder et al[8] reported that helicopter transport did not seem to be connected with decreased mortality or better survival of patients admitted to hospitals for PPCI procedure when the estimated time of road transport was longer than 25 minutes.

The main limitation of our study is the retrospective nature of the analysis, which affects the quality of data. The analysis concerns only prehospital setting and clinical status assessment based on the information available in the medical records of HEMS crews, which makes it impossible to follow the entire therapeutic process of patients. Lack of access to data on procedures performed by GEMS and medical staff in hospitals without PPCI did not allow to create a control group and precisely determine how the specific medical procedures undertaken by the HEMS crew conditioned the change in clinical status of patients with STEMI. Further, preferably prospective, studies with a properly selected control group and access to follow-up are needed.

Conclusion Among patients with STEMI treated by HEMS crews, men and persons aged over 60 years old prevailed. The utilization of HEMS in patients with STEMI differs in urban and rural areas in Poland. Factors determining the clinical status of patients with STEMI and treatment taking into account the place of the event (rural vs urban area) were further proceedings, the type of mission, and the first team at the scene. Moreover, the clinical status of the patients treated in rural areas was more severe according to the GCS, RTS, and NACA scores. Flights to patients with STEMI in rural areas took more time and distance as well as a more time and distance to the hospital performing PPCI.

The GCS and RTS scores were significantly higher and the respiratory rate lower in patient handed over by HEMS crews to the hospital, which indicates a positive impact of air ambulance support as a part of early-stage therapeutic process in patients with STEMI.

ARTICLE INFORMATION

CONFLICT OF INTEREST None declared.

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