ANALYSIS OF PREHOSPITAL TIME "FROM SYMPTOM TO DOOR" IN PATIENTS WITH ACUTE CORONARY SYNDROME WITH ST-SEGMENT ELEVATION

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Resume. A study of prehospital symptom-to-door time in patients with ST-segment elevation acute coronary syndrome (ST-ACS) was conducted using the "Case Maps - Checklists" data from the monitoring center of the Vitebsk Regional Clinical Cardiology Center. The study included 1,277 patients with ST-ACS in 2022 and 1,510 patients in 2023. It was found that maintaining the "Case Maps - Checklists" improved the monitored metrics of prehospital care for patients with ST-ACS.

Keywords: ST-segment elevation acute coronary syndrome, symptom-to-door time.

Relevance. Thrombotic occlusion of a major coronary artery, typically resulting from disruption of an atherosclerotic plaque, is a well-established primary pathogenetic mechanism in the development of acute ST-segment elevation myocardial infarction (STEMI). The location and persistence of the occlusion determine the extent of myocardial necrosis, which is directly associated with the risk of mortality from major myocardial infarction complications, including heart failure, potentially fatal arrhythmias and conduction disturbances, and myocardial rupture.

Timely removal of the acute occlusion and restoration of coronary artery patency are the cornerstones of STEMI management. Therefore, immediately upon confirming a STEMI diagnosis, all patients–regardless of age or sex–should be considered candidates for reperfusion therapy. Currently, reperfusion strategies for STEMI include primary percutaneous coronary intervention (PCI) and a pharmaco-invasive approach, which involves sequential administration of thrombolytic therapy (TLT) followed by PCI. The choice between these strategies is primarily determined by the availability of facilities capable of performing timely PCI [1].

The interval from first medical contact (FMC) to guidewire passage in the distal segment of the infarct-related coronary artery should not exceed 120 minutes. If primary PCI cannot be achieved within this timeframe, prehospital thrombolysis followed by PCI within 2 to 24 hours is recommended, or emergency "rescue" PCI should be performed in cases where thrombolytic therapy is ineffective [2].

One of the key determinants of STEMI patient prognosis is the adequacy of medical care during the initial hours of the event. The sooner reperfusion therapy is initiated, the higher the likelihood of a favorable outcome. Delays are often influenced by factors such

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as population density, urban versus rural settings, living conditions, population continuity, and the remoteness of settlements.

The success of STEMI management largely depends on the duration of the prehospital phase. Reducing the "symptom-to-door" time directly impacts the timing of primary PCI and, consequently, patient survival and complication rates. Analysis of this interval provides a critical foundation for planning interventions aimed at minimizing time to reperfusion therapy.

Aim: to investigate the prehospital "symptom-to-door" time in patients with STEMI in the Vitebsk region, based on patient checklist data from 2022 and 2023.

Objectives:

1. To evaluate the dynamics of the time interval from onset of chest pain to emergency medical service (EMS) call in 2022 and 2023.
2. To analyze the time interval from EMS call to first medical contact (FMC) in 2022 and 2023.
3. To examine the time interval from FMC to arrival at a PCI center for patients who did not receive prehospital thrombolytic therapy in 2022 and 2023.
4. To examine the time interval from FMC to arrival at a PCI center for patients who received prehospital thrombolytic therapy in 2022 and 2023.
5. To determine the proportion of patients arriving at the PCI center with and without prehospital thrombolytic therapy within target time intervals.
6. To assess the overall impact of implementing "Movement Maps – Checklists" on monitored indicators of prehospital medical care.

Materials and methods. Prehospital "symptom-to-door" times in STEMI patients in the Vitebsk region were studied for 2022 and 2023. A comparative analysis of the "Movement Maps – Checklists" from the monitoring center of the Vitebsk Regional Clinical Cardiology Center was conducted on 1,277 STEMI patients in 2022 and 1,510 STEMI patients in 2023.

Results and their discussion. After expert review, the analysis of the time from onset of chest pain to emergency medical service (EMS) call included 1,090 "Movement Maps – Checklists" in 2022 (data were missing for 168 patients, and 19 patients had chest pain lasting more than 3 days) and 1,359 "Movement Maps – Checklists" in 2023 (data were missing for 51 patients, 53 patients had chest pain lasting more than 3 days, and 47 patients were asymptomatic). The mean time from symptom onset to EMS call in 2023 decreased compared to 2022, amounting to 236.8 ± 13.1 minutes versus 287.9 ± 17.0 minutes, respectively ($F = 5.9$; $p = 0.016$). Within the first 30 minutes after symptom onset, EMS was called by 25.4% of patients in 2022, which increased to 34.5% in 2023, indicating a higher proportion of patients responding promptly to symptoms.

Following expert review, the analysis of the interval from EMS call to first medical contact (FMC) included 996 "Movement Maps – Checklists" in 2022 (182 patients went directly to outpatient clinics, 59 patients directly to hospitals, and 40 had missing data) and

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1,106 checklists in 2023 (284 patients went directly to outpatient clinics, 90 directly to hospitals). A non-significant trend toward reduced mean EMS-to-FMC time was observed, with 25.1 ± 1.1 minutes in 2023 versus 32.0 ± 4.3 minutes in 2022 (F = 2.6; p = 0.107). The proportion of patients reaching FMC within 20 and 30 minutes remained largely unchanged, with 66.5% and 79.9% in 2022 versus 64.2% and 79.4% in 2023, respectively.

For patients who did not receive prehospital thrombolytic therapy (TLT), the analysis of the FMC-to-PCI center interval included 697 "Movement Maps – Checklists" in 2022 and 939 in 2023. The mean time from FMC to arrival at the PCI center showed a decreasing trend in 2023 compared to 2022: 71.0 ± 4.4 minutes versus 74.9 ± 4.9 minutes (F = 0.361; p = 0.548). Within 60 minutes, 76.9% of patients reached the PCI center in 2022 versus 79.3% in 2023; within 90 minutes, 85.4% versus 89.5%; and within 120 minutes, 91.0% versus 92.9%. The proportion of patients arriving after 120 minutes decreased from 9.0% in 2022 to 7.1% in 2023.

For patients who received prehospital TLT, the FMC-to-PCI center analysis included 440 "Movement Maps – Checklists" in 2022 and 381 in 2023. The mean time showed an increasing trend in 2023 compared to 2022 (208.7 ± 11.1 minutes versus 185.9 ± 11.0 minutes), although the difference was not statistically significant (F = 2.098; p = 0.148). Within 120–180 minutes, the proportion of patients arriving at the PCI center after TLT was 62.0% and 66.1% in 2022, and 50.4% and 61.9% in 2023, respectively.

Conclusions:

1. In 2023, compared to 2022, the time from onset of chest pain to EMS call significantly decreased. However, despite this positive trend, only about 30% of patients called EMS promptly after symptom onset, which undoubtedly impacts STEMI mortality.

2. Although there was a trend toward a reduction in the EMS-to-FMC interval, no statistically significant change in this metric was observed.

3. No statistically significant changes were found in the FMC-to-PCI center interval for patients transported without prehospital thrombolytic therapy (TLT). Within 60 minutes, 76.9% and 79.3% of such patients arrived at the PCI center in 2022 and 2023, respectively; within 90 minutes, 85.4% and 89.5%. Similarly, no significant change was observed in patients who received TLT, with 66.1% arriving within 180 minutes in 2022 and 61.9% in 2023.

4. Implementation of "Movement Maps – Checklists" contributed to improvements in monitored indicators of prehospital medical care for STEMI patients.

Literature

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АНАЛИЗ ДОГОСПИТАЛЬНОГО ВРЕМЕНИ «ОТ СИМПТОМА ДО ДВЕРИ» У ПАЦИЕНТОВ С ОСТРЫМ КОРОНАРНЫМ СИНДРОМОМ С ПОДЪЁМОМ СЕГМЕНТА ST

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Резюме. Было проведено изучение догоспитального времени «от симптома до двери» у пациентов с острым коронарным синдромом с подъемом сегмента ST (ОКСпST) на основании данных «Карт движения – Чек-листов» мониторингового центра УЗ «Витебского областного клинического кардиологического центра» у 1277 пациентов в 2022 году и 1510 пациентов в 2023 году с ОКСпST. Установлено, что ведение «Карт движения – Чек-листов» позволило улучшить контролируемые показатели оказания медицинской помощи пациентам с ОКСпST на догоспитальном этапе.

Ключевые слова: острый коронарный синдром с подъёмом сегмента ST, время «от симптома до двери».

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