Research Article

https://doi.org/10.23934/2223-9022-2023-12-1-140-144

Improving the Provision of Medical Care to Patients With Stroke Using JCI Standards. First Results

R.Sh. Khasanov[1], A.V. Shulaev[2], M.F. Mukhamadeev[2], R.A. Dzhumabaev[2] ✉, Yu.S. Mukhamadeeva[2], B.I. Zagidullin[2], R.M. Yakhin[2]

Admission Department

[1] Kazan State Medical Academy – Branch Campus of Russian Medical Academy of Continuous Professional Education

11, Mushtari Str., 420012, Kazan, Republic of Tatarstan, Russian Federation

[2] Emergency Care Hospital

18, Naberezhnye Chelny Ave., 423803, Naberezhnye Chelny, Republic of Tatarstan, Russian Federation

✉ **Contacts:** Roman A. Dzhumabaev, Deputy Chief Medical Officer, Emergency Medical Care Hospital. Email: roman.dzhumabaev@tatar.ru

AIM OF THE STUDY To compare the dynamics of thrombolytic therapy effectiveness in patients with stroke after the reorganization of medical care using JCI standards.

MATERIAL AND METHODS In 2022, a new system for routing patients with stroke at the level of the emergency department was introduced in the Emergency Care Hospital; and 976 patients with the diagnosis of brain infarction were treated. The analysis of the results was carried out by comparing the mortality rates from ischemic stroke, the number of thrombolytic therapies and procedures of mechanical methods of revascularization, as well as the indicators "Door-CT", "Door-Needle", "Door-Opening" for 2021 and 10 months of 2022.

RESULTS After the introduction of the new routing system for patients with stroke at the emergency department level, there appeared the first positive results. Thus, the mortality rate from brain infarction in 10 months of 2022 decreased by 5.6% compared to 2021. The number of thrombolytic therapies performed increased by 5.2%, and mechanical revascularization procedures by 1.62% over the same period, while the "Door-CT" indicator decreased by 27 minutes, "Door-Needle" by 22 minutes, "Door-Opening" by 31.6 minutes.

CONCLUSIONS The immediate results of the introduction of the new patient routing system at the level of the emergency department have proved successful, primarily due to the significant reduction in the mortality rate of patients with cerebral infarction by 5.6%. However, the process requires further investigation and has application points for further improvement.

Keywords: stroke, brain infarction, quality management, JCI, neurology

For citation Khasanov RSh, Shulaev AV, Mukhamadeev MF, Dzhumabaev RA, Mukhamadeeva YuS, Zagidullin BI, et al. Improving the Provision of Medical Care to Patients With Stroke Using JCI Standards. First Results. *Russian Sklifosovsky Journal of Emergency Medical Care.* 2023;12(1):140–144. https://doi.org/10.23934/2223-9022-2023-12-1-140-144 (in Russ.)

Conflict of interest Authors declare lack of the conflicts of interests

Acknowledgments, sponsorship The study had no sponsorship

Affiliations

Rustem Sh. Khasanov	Corresponding Member of the Russian Academy of Sciences, Doctor of Medical Sciences, Professor, Director, Kazan State Medical Academy – Branch Campus of Russian Medical Academy of Continuous Professional Education; https://orcid.org/0000-0003-4107-8608, ksma.rf@tatar.ru; 20%, general management, research design, results analysis, article editing
Alexey V. Shulaev	Doctor of Medical Sciences, Professor, Head, Department of General Hygiene, Kazan State Medical University; https://orcid.org/0000-0002-2073-2538, alexs_shu@mail.ru; 20%; general management, research design, results analysis, article editing
Marat F. Mukhamadeev	Candidate of Medical Sciences, Chief Physician, Emergency Care Hospital; https://orcid.org/0000-0003-4371-7151, marat.mukhamadeev@tatar.ru 18%, analysis of the results, text editing
Roman A. Dzhumabaev	Deputy Chief Medical Officer, Emergency Medical Care Hospital roman.dzhumabaev@tatar.ru 12%, research, data analysis, interpretation of the results, manuscript writing
Yulia S. Mukhamadieva	Head, Neurological Department for Patients with Stroke, Emergency Medical Care Hospital; yuliya.muhamadieva@tatar.ru; 10%, collection of data on patients with stroke
Bulat I. Zagidullin	Candidate of Medical Sciences, Head, Department of X-ray Surgical Methods of Diagnosis and Treatment, Emergency Care Hospital; https://orcid.org/0000-0001-5294-7288, bulat.zagidullin@tatar.ru 10%, collection of data on the methods of endovascular treatment of patients with stroke
Ruslan M. Yakhin	Head, Radiology Department, Emergency Care Hospital; ruslan.yahin@tatar.ru; 10%, data collection on CT evaluation of patients with stroke

ACVA – acute cerebrovascular accident
CT – computed tomography
JCI standards – international standards developed by Joint Commission International
MRI – magnetic resonance imaging
neuroICU – intensive care unit of the neurological department
RCA – Root Cause Analysis

INTRODUCTION

In 2012, within the walls of the State Autonomous Healthcare Institution of the Republic of Tatarstan "Emergency Care Hospital" (ECH) a quality management system was created based on a process approach to improving the work of a medical organization [1]. For ten years of experience in the quality management system, the hospital received quality certificates of EFQM, ISO, the Voluntary Certification System "Quality and Safety of Medical Activities", and since 2015 has been continuously participating in accreditation according to international JCI standards.

These standards have been in development since 1995 by Joint Commission International (JCI), USA [2]. Obtaining accreditation is closely related to the cultural and religious features of a country, that is why the standard has a wide range of variability. The basic parameters for assessing an institution include [3]:

- the quality of provided medical services and its stability;
- safety of medical services for patients and staff of the institution;
- the institution's work on quality in continuous mode.

Each medical organization is assessed using more than 1000 measurable elements [4]. Accreditation programs are constantly updated and reviewed by a special working group of international experts, and today there has been already the 7th edition, which entered into force on January 1, 2021.

Based on the JCI standards, our hospital has implemented the concept of continuous improvement of medical care, and the use of technologies recommended by the JCI makes it possible to identify critical processes that can lead to the collapse of the entire system [5].

The study shows how the JCI standards have improved the care of patients with stroke.

Aim of the study: to evaluate the effectiveness of JCI standards in improving the provision of medical care to patients with acute cerebrovascular accident (ACVA).

MATERIAL AND METHODS

The study was conducted at the ECH in 2021–2022. A problem in the provision of medical care to patients with ACVA was identified - a delay at the level of the Admission department. In order to identify the root causes of the problem Root Cause Analysis (RCA) was used [6]. After identifying the root causes, the hospital introduced a new system for routing patients with ACVA at the level of the Admissions department. The study included all patients with a diagnosis of cerebral infarction who were admitted to the ECH Emergency department. The analysis of the obtained results was carried out by comparing the mortality rates from ischemic stroke, the number of thrombolytic therapies and mechanical revascularization procedures, as well as the indicators "Door-CT", "Door-Needle", "Door-Opening" for 2021 and 10 months of 2022.

BASELINE ASSESSMENT AND ROOT CAUSE ANALYSIS

When analyzing the initial state, the logistics of the patient at the level of the emergency room was assessed.

The patient was delivered by an ambulance team without prior informing the Admission department, after that the dispatcher of the Admission department sorted the patient according to the severity of the disease. Depending on the severity of patient condition, the patient was sent to room No. 1 (for stable, walking patients), room No. 2 (for stable, wheelchair patients), anti-shock room (for patients in need of replacement of vital bodily functions), after which a neurologist was invited. After examination, the patient was prescribed tests according to the list approved by the Order of the Ministry of Health of the Russian Federation No. 928n dated November 15, 2012 "On approval of the procedure for providing medical care to patients with acute disorders of cerebral circulation" (with changes and additions), as well as neuroimaging (computed tomography – CT, – or magnetic resonance imaging – MRI). The initial examination sheet was filled out, after that the patient was transported to

the CT or MRI room, where he waited in line. After completing the study, the patient returned to the original room. The neurologist, after receiving the results of the study, evaluated them and made a decision whether to prescribe magnetic resonance angiography in order to determine the presence of blockages in the blood flow of the intracardiac vessels. If the study was scheduled, the patient underwent a peripheral catheter insertion and was transported to the CT or MRI room, where he waited in line.

The results obtained were re-evaluated by the neurologist and a decision was made on further strategy for managing the patient:

— hospitalization of the patient in neuroICU, and systemic thrombolytic therapy;

- hospitalization of the patient in neuroICU, and the use of mechanical revascularization (thromboextraction) or combined methods;

— hospitalization of the patient in neuroICU, and conservative treatment.

By the application of the RCA method, it was revealed that the main time losses occur at the stage of transportation for neuroimaging, as well as hospitalization to neuro-ICU. The following root factors were identified:

- lack of informing from ambulance personnel about the delivery of a patient with ACVA;

- long and repeated logistics of the patient between the halls of the Admission department and the neuroimaging rooms;

—long patient's waiting in the neuroimaging room;

- the time spent on the installation of a peripheral catheter;

- long logistics of the patient after the study before the start of thrombolytic therapy or the use of mechanical methods of revascularization.

The following indicators were identified to evaluate the effectiveness of the study:

— "Door–CT" time — the time from the moment of patient's entry into the medical organization to neuroimaging;

- "Door-Needle" time - the time from the moment of patient's entry into the medical organization to the start of systemic thrombolytic therapy;

- "Door-Opening" time - the time from the moment of patient's entry into the medical organization to the beginning of the opening of the cerebral vessel which led to the development of cerebral infarction.

CHANGES MADE TO THE PROCESS

In 2022, based on the identified root causes, the routing of patients with ACVA at the Admission department level was completely revised.

The ambulance team informs the dispatcher of the Admission department by the allocated telephone number about the delivery of a patient with ACVA, who, in turn, calls a neurologist and informs the CT room. The ambulance team installs a peripheral catheter for possible further contrast studies. The CT room stops its work 5 minutes before the expected arrival of the patient, thus forming a "green corridor". The neurologist meets the patient at the entrance to the emergency room, bypassing his delivery to one of the halls, and examines the patient, accompanying the patient to the CT room, which is already ready to receive the patient. The patient undergoes a native CT scan of the brain, which is immediately interpreted jointly by the neurologist and the radiologist. In the absence of contraindications to thrombolytic therapy, the patient undergoes CT angiography of extra- and intracranial arteries and aortic arch. Further strategies are being determined.

When deciding on systemic thrombolytic therapy, the patient is given a bolus dose of Alteplase directly in the CT room or in the emergency department, after that the patient is hospitalized to the neuroICU.

If the tactics of mechanical thromboextraction is chosen, the patient receives the entire dose of Forteplase directly in the CT room or in the Emergency department, after that the patient is transported to the angiographic operating room for the procedure.

RESULTS

After the introduction of the new system for routing patients with ACVA at the level of the Admission department using JCI standards, a positive effect was obtained for all the selected indicators.

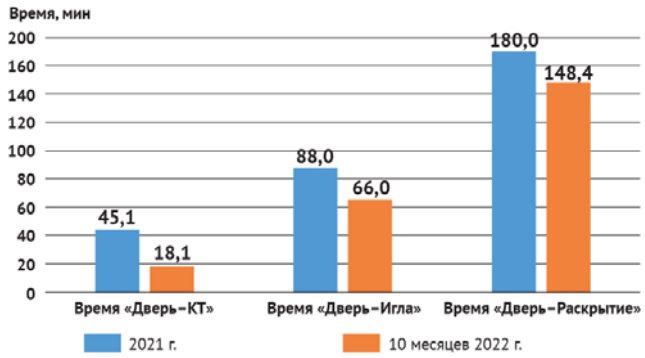

Fig. 1. Diagram of the dynamics of the “Door–CT”, “Door–Needle”, “Door–Opening” indicators for 2021 and 10 months of 2022

Thus, thanks to the accelerated logistics of the patient, there has been achieved a significant decrease in the indicators:

- "Door-CT" - by 27 minutes;
- "Door-Needle" - by 22 minutes;
- "Door-Opening" - by 31.6 minutes.

Accelerated delivery of the patient to the end point of the application has a positive effect on the number of thrombolytic therapy procedures and the use of mechanical circulatory support methods. For 10 months of 2022, 142 thrombolytic therapy procedures were performed, which is already 29 procedures more than in the whole of 2021. The number of cases with mechanical revascularization for 10 months of 2022 amounted to 41 procedures against 7 cases performed in 2021.

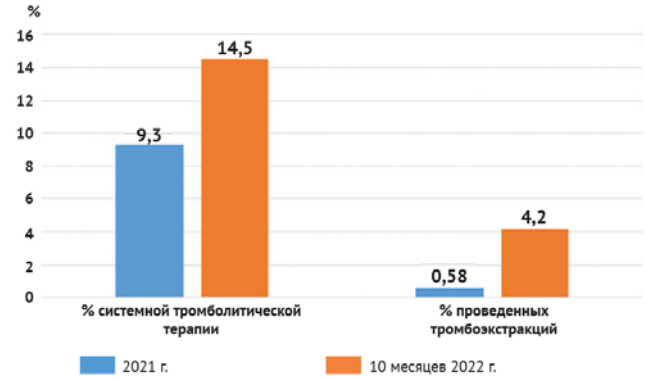

Fig. 2. Dynamic of indicators of the number of performed systemic thrombolytic therapies and thromboextractions for 2021 and 10 months of 2022

The increase in availability for the patient of such methods of treatment as systemic thrombolytic therapy and mechanical methods of revascularization made it possible to reduce mortality in patients diagnosed with cerebral infarction from 16.7% to 11.1% over the analyzed period.

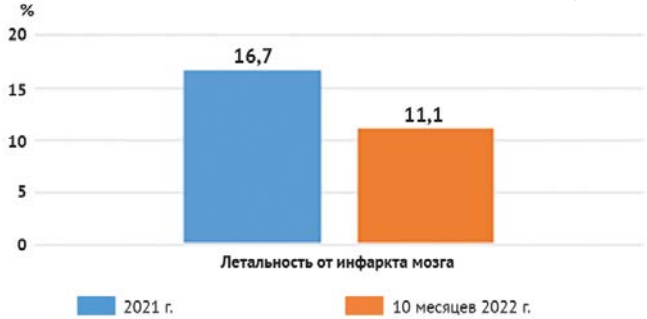

Fig. 3. Diagram of mortality from brain infarction for 2021 and 10 months of 2022

DISCUSSION

The obtained results testify to the effectiveness of the methods voiced in the JCI standards for optimizing the processes of providing medical care to patients with ACVA. Root cause identification is one of the most important methods in implementing quality improvement processes. Properly identified root causes allow us in the future to select the necessary tools for their correction [7].

The main loss of time in the logistics of the patient with ACVA is at the level of the Admission department. When they are eliminated, the time spent by patients in the emergency room is significantly reduced, the speed of their delivery to such methods of treatment as thrombolytic therapy or thromboextraction is accelerated, as evidenced by the increased number of procedures performed.

An increase in the number of procedures performed has a positive effect on the mortality rates of patients from cerebral infarction.

However, there are still ways to improve the process, such as abandoning traditional CT diagnostic methods and referring the patient directly to the angiographic operating room for rotational angiography with the possible further use of mechanical revascularization methods. This issue requires further study.

CONCLUSIONS

1. JCI standards allow us to study the problem more widely and in more detail, as well as offer solutions applicable to a particular organization.

2. Elimination of the identified defects using the RCA method triggers a positive chain of events, which leads to an increase in the number of thrombolytic therapy procedures to 14.5% and mechanical revascularization methods to 4.2%, and, as a result, to a decrease in mortality to 11.1%.

REFERENCES

1. Mensah Abrampah N, Syed SB, Hirschhorn LR, Nambiar B, Iqbal U, Garcia-Elorrio E, et al. Quality improvement and emerging global health priorities. *Int J Qual Health Care*. 2018,30(S1):5–9. PMID: 29873793 https://doi.org/10.1093/intqhc/mzy007
2. *Joint Commission International Accreditation Standards for Hospitals Including Standards for Academic Medical Center Hospitals*. 7th ed. 2020 at:https://www.jointcommissioninternational.org/-/media/jci/jci-documents/accreditation/hospital-and-amc/jci-errata-standards-only_7th-ed-hospital.pdf [Accessed Feb 21, 2023] (Rus. Ed.: Ivanov IV, et al. (tr.). *Standarty akkreditatsii Joint Commission International dlya statsionarov. Vklyuchaya standarty dlya meditsinskikh organizatsiy, osushchestvlyayushchikh nauchnuyu deyatel'nost' i prakticheskuyu podgotovku obuchayushchikhsya. 7th ed*. Moscow, 2020).
3. Dahrouge S, Armstrong CD, Hogg W, Singh J, Liddy C. High-performing physicians are more likely to participate in a research study: findings from a quality improvement study. *BMC Med Res Methodol*. 2019;19(1):171. https://doi.org/10.1186/s12874-019-0809-6
4. Bord S, Sass I, Hayms G, Moskowitz K, Baruch H, Basis F. Involvement and skepticism towards the JCI Accreditation process among hospital's four sectors employees: suggestions for cultural change. *Isr J Health Policy Res*. 2021;10(1):74. PMID: 34906237 https://doi.org/10.1186/s13584-021-00507-4
5. Pourmohammadi K, Hatam N, Shojaei P, Bastani P. A comprehensive map of the evidence on the performance evaluation indicators of public hospitals: a scoping study and best ft framework synthesis. *Cost Ef Resour Alloc*. 2018;16:64. PMID: 30534009 https://doi.org/10.1186/s12962-018-0166-z
6. Voskanyan YuE. The safety of patients and related unfavorable occurrences in medicine: the systematic review. *Problemy sotsialnoy gigieny, zdravookhraneniya i istorii meditsiny.* 2019;27(4):408–413 (In Russ.) http://doi.org/10.32687/0869-866x-2019-27-4-408-413
7. Ginnyatulina RI. International practices of quality management in healthcare (a review). *Science and Innovations in Medicine*. 2019;4(4):38–43. (In Russ.) http://doi.org/10.35693/2500-1388-2019-4-4-38-43

Received on 01.11.2022

Review completed on 20.12.2022

Accepted on 27.12.2022