

Organization of High-Tech Neurosurgical Care and Assessment of The Quality of Life of Patients in Navoi Region (Literature Review)

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Abstract

The review article details the historical aspects of the development and organization of neurosurgical care worldwide, neurosurgical treatment of such a serious disease as trigeminal neuralgia, dynamic development of methods and techniques of conservative and surgical treatment. As well as modern methods of neurosurgical treatment of brain tumors, a kind of monitoring after surgical complications. An overview of the effectiveness of modern methods of treating intervertebral hernias of the lumbar spine is presented. Historical aspects of the development of neurosurgery, the main methods of surgical treatment. This publication presents the main methods of surgical treatment, characterizes the positive and negative aspects of each method. Differentiated approach to the treatment of neurosurgical patients. Assessment of quality of life and pain syndrome using questionnaires. Determination of the effectiveness of surgical treatment and the impact on the quality of life of patients.

Keywords: Trigeminal neuralgia, surgical treatment, neoplasms of the brain, intervertebral disc herniation, monitoring is complicated, differentiated approach.

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1. Introduction

Neurosurgery is one of the most dynamically developing sciences and a branch of clinical medicine that studies organic diseases of the peripheral and central nervous systems, treated primarily by surgical methods. Thanks to its advances, the incidence of incurable diseases of the nervous system is declining. Interest in this science is growing among young specialists. Therefore, it is important to study the development of neurosurgery and its emergence as an independent field of medicine.

Modern neurosurgery is one of the newest branches of

surgery, having developed over less than 100 years. For several centuries, surgery of the nervous system developed within the broader framework of general surgery, and only comparatively recently has neurosurgery emerged as an independent discipline.

The history of neurosurgery is very ancient, and its origins are lost in the mists of time. Before civilization developed in the valleys of the Nile, Tigris, Euphrates, and Indus rivers, tribes roamed Western Europe during the Neolithic period, approximately 7000 BC. Skulls with trepanned holes were found in burials in the 17th and 19th centuries [1].

In recent decades, neurosurgical robotics have significantly changed approaches to surgical interventions, opening new horizons for surgical precision and safety. Modern robotic systems allow neurosurgeons to perform complex procedures with high precision, improving treatment outcomes and reducing patient recovery time. This has become possible thanks to advances in robotics, sensor technology, and artificial intelligence. Artificial intelligence and machine learning are becoming an integral part of neurosurgical robotics. In the future, neurosurgery will increasingly rely on high-precision robotic technologies, which will open up new possibilities for the treatment of complex diseases of the central nervous system [2]. In recent years, neurosurgical departments have employed new diagnostic and treatment methods for patients with brain tumors. Non-invasive diagnostic methods allow for the early detection of this disease. Surgical interventions are now performed using microscopy, neuronavigation, stereotactic imaging, ultrasound, and endoscopy. In modern medicine, the primary criterion for assessing treatment outcomes is the patient's quality of life [3].

Despite the development of the healthcare system, the current incidence of adverse outcomes in the treatment of patients with neurosurgical pathology and the level of disability continue to increase. 50-75% of patients receiving inpatient treatment require medical rehabilitation. It is important to assess the rehabilitation prognosis of patients upon admission to the clinic and maximize recovery in the early stages of the disease. However, issues of quality, its assessment, and regulation for neurosurgical services remain underdeveloped [4,6].

Essential tremor (ET) is the most common disorder of the extrapyramidal system. According to a meta-analysis, the average incidence rate is 0.9%, increasing with age and reaching 21.7% in the group of patients over 95 years of age. In recent years, the concept of ET has changed significantly [7]. Vertebral tumors are the third most common cause of spinal cord and root compression, after degenerative diseases and spinal injuries. Most specialists (neurologists, orthopedic traumatologists, and neurosurgeons) are reluctant to consider them a possible cause of back pain, considering them an extremely rare pathology. This leads to delayed diagnosis and an unjustified choice of conservative treatment [8].

Endoscopic microdiscectomy is a high-tech, minimally invasive procedure used for the surgical treatment of intervertebral disc herniations. During endoscopic microdiscectomy, the intervertebral disc and herniated disc

are removed using an endoscope and specialized endoscopic instrumentation [9].

The safety of surgical procedures on the structures of the central nervous system remains a key issue in modern neurosurgery. Removal of brain tumors and epileptogenic foci located in functionally important areas responsible for spontaneous movement, speech, and vision is associated with an increased risk of severe iatrogenic complications and patient disability. Currently, one of the most reliable methods for determining the size of the resection zone located near functionally important areas, primarily speech, is awake craniotomy [10].

The appropriateness and timeliness of medical care for neurotrauma is often a fundamental factor in avoiding premature death or permanent disability. Significant difficulties in providing specialized medical care arise in secondary trauma centers, which, in terms of equipment and staffing, include most hospitals in suburban areas of cities and rural hospitals. In a number of countries, particularly where there is a shortage of qualified physicians or in remote areas, remote consultations are widely used. Telecommunication technologies are helping to make modern, specialized, and qualified medical care more accessible [11].

In terms of research and clinical methods, neurosurgery is one of the fastest-growing subspecialties of medicine, driven by the interdisciplinary integration of tools from imaging, molecular biology, oncological neurology, electrophysiology, brain mapping, neuroengineering, computational biology, bioinformatics, and robotics [16].

Neurosurgical simulation can be performed on cadaveric, animal, or physical 3D models or by adopting augmented reality (AR) techniques. Of these, only AR has the potential to cost-effectively offer seamless and unlimited use along with a realistic reproduction of physical reality. AR refers to a range of applications that combine (i.e., superimpose) virtual and real-world images, such as 3D models with live camera feeds. At one end of the spectrum lies physical reality, while at the other end lies virtual reality, where all visual images are computer-generated and the user is completely immersed in a digital environment [18].

Quantum computing utilizes the principles of quantum mechanics to provide unprecedented computing power by processing data in a fundamentally different way than classical binary computers. Quantum computers use "qubits," which represent 0s and 1s. Because qubits can exist in multiple states simultaneously, quantum computers

can perform "quantum parallelism," in which data is processed simultaneously rather than sequentially. Quantum parallelism is what allows a computer to have exponentially greater processing capacity and simultaneously consider all potential outcomes to arrive at solutions [19].

Significant advances in neurology and neurosurgery have spurred technological innovation, particularly with Hans Berger's invention of electroencephalography (EEG) in 1924, which revolutionized the recording of brain activity. This has led to further advances in neurotechnologies, including neural prosthetics such as deep brain stimulators, which have played a significant role in the treatment of conditions such as stroke and epilepsy. Furthermore, the recent integration of robotics and virtual reality has improved the management of neurological conditions, enhancing patient outcomes [20].

Optical technologies have gained significant traction in neurosurgery over the past few decades. The use of 5-aminolevulinic acid-induced fluorescence in glioblastoma surgery for margin detection has become commonplace. More recently, various other methods have been explored for tumor margin detection, including quantitative exogenous fluorescence, endogenous lifetime fluorescence imaging, and [6–8]. Vertebral tumors are the third most common cause of spinal cord and root compression, after degenerative diseases and spinal injuries. Most specialists (neurologists, orthopedic traumatologists, and neurosurgeons) are reluctant to consider them a possible cause of back pain, considering them an extremely rare pathology. This leads to delayed diagnosis and an unjustified choice of conservative treatment [8].

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Specialized healthcare in Finland must offer timely treatment, and neurosurgical clinics must adhere to treatment guarantees despite declining resources. Variability in the resources and experience of physicians and nurses, as well as a shortage of available hospital resources, lead to challenges in resource allocation. Demand for specialized neurological and neurosurgical care may increase, possibly without a corresponding increase in resources, which may even decrease. This highlights the need for continuous improvement and problem-solving in healthcare [29].

In the current state of medicine, what do neurosurgeons respond to patients who are expected to undergo elective intracranial procedures and who ask, "Doctor, will I be the same person after surgery?" Traditional concerns of the neurosurgical community certainly take into account potential postoperative personality changes in patients, but compared to established feedback based on neurobiological data on language, movement, and perception, feedback on potential changes in personality and sense of self is not yet established [30].

Currently, the adoption of uniform, accessible, and reliable electronic consent applications for online consent will likely improve the informed consent process and improve the patient experience, and may also reduce the medico-legal consequences of inappropriate consent. A systematic review and meta-analysis were conducted to evaluate the usefulness of new electronic informed consent tools in

surgical patients and discuss their application in neurosurgical cohorts [31].

Quality of life is studied in many areas of medicine. Such areas of medicine as palliative care, cardiology, transplantology, oncology, surgery, psychiatry, endocrinology, gerontology, neurology, and neurosurgery are particularly susceptible to quality of life studies. Other areas of medicine are certainly not in the minority and are also being progressively studied and researched [13, 14].

Quality of life can be considered a separate, independent indicator of a patient's health, and quality of life assessment during treatment plays an equally important, and sometimes even greater, role in assessing the stage of disease development. Improving the ability to assess quality of life in various diseases is a pressing task in modern medicine. Quality of life is considered a system of indicators that characterize the level of achievement of life strategies and the fulfillment of intended plans [5, 12].

The issue of quality of life is one of the most pressing in all areas of science and healthcare. The increased interest in the study of quality of life can be explained by the fact that, in connection with large-scale problems caused by the economic and environmental crisis, the population is beginning to realize the need to solve such global problems [32,33,34]. Quality of life includes information on key life domains: psychological, physical, social, economic, and spiritual. This allows for the differential impact of disease and treatment on a patient's condition to be determined. According to modern requirements, these questionnaires should be short and yet possess psychometric properties such as reliability, validity, and sensitivity. Reliability is a measure of the accuracy and consistency of measurements. Early diagnosis and improvements in treatment of patients with intracranial meningiomas have drawn attention to quality of life and neurocognitive functioning as outcome indicators. Patients completed questionnaires based on their feelings and well-being [16,35,36,37,38].

Thus, the organization of neurosurgical care is a pressing issue for healthcare in many regions of any developing country. Due to the rapid development of medicine and the introduction of new innovative technologies, it is necessary to establish modern neurosurgical departments to improve treatment outcomes and patient quality of life. In order to save financial costs, emergency posts are recommended first, followed by inpatient beds within surgical departments. If necessary and justified, neurosurgical departments are created. Given the above, this research topic remains relevant and not fully explored.

References

1. Azhibekov N.O., Alkhozhaev S.S., Nabiev E.N. / Evaluation of the effectiveness of various methods of neurosurgical care for two-level degenerative diseases of the cervical spine (literature review) // *Phthisiopulmonology*. 2023. No. 2. Pp. 34-41.
2. Annaorazova A., Kakamyradova D., Gaitnazarova M. / Modern advances in neurosurgical robotics: the future of precision surgery // *Scientific discoveries 2024: collection of materials of the LV International in-person and correspondence scientific and practical conference: in 3 volumes*. Moscow, 2024. Pp. 37-41.
3. Gabidullin A.F., Danilov V.I., Alekseev A.G. / Neurological deficit in patients after removal of brain tumors using high-tech neurosurgical methods and optimization of treatment of this group of patients // *Neurological Bulletin*. 2015. Vol. 47, No. 2. Pp. 26-29.
4. Dubinin I.P., Makirov T.R., Dokuchaeva O.Yu. / Organizational measures to optimize neurosurgical care // *Scientific vanguard: collection of articles of the IV Scientific and practical conference and Interuniversity Olympiad of residents and postgraduate students*. Moscow, 2022. Pp. 110-114.
5. Evsina O.V. / Quality of life in medicine - an important indicator of a patient's health status (literature review) // *Electronic scientific journal "Personality in a changing world: health, adaptation, development"*: 2013. No. 1. - Pp. 119-133.
6. Zharova E.N., Kiryanova V.V., Moguchaya O.V., Simonova I.A. / Experience in organizing rehabilitation of neurosurgical patients in a specialized clinic // *Physiotherapy, balneology and rehabilitation*. 2015. Vol. 14, No. 3. pp. 36-39.
7. Katunina E.A., Gryaznev R.A., Shipilova N.N., Katunin D.A., Malykhina E.A. / Essential tremor: a modern view of the problem and new possibilities of neurosurgical treatment methods // *Medicine of extreme situations*. 2024. Vol. 26, No. 1. pp. 23-31.
8. Kit O.I., Zakondyrin D.E., Grin' A.A., Rostorguev E.E., Yundin S.V. / Experience in treating spinal tumors complicated by compression of the spinal cord and its roots // *Innovative Medicine of Kuban*. 2022. Vol. 7, No. 1. Pp. 5-11.
9. Koss V.V., Elizarov M.V. / Neurosurgical minimally invasive method for treating stage 3-4 intervertebral hernias with persistent pain syndrome using the Koss method // *Surgical Practice*. 2018. No. 2 (34). Pp. 5-8.
10. Lobanovskaya O.N., Sidorovich R.R., Vasilevich E.N., Rodich A.V., Terekhov V.S., Rakot G.Ch. / Awake craniotomy for various neurosurgical pathologies: optimization of the method and our experience of use // *Russian Neurosurgical Journal named after Professor A.L. Polenov*. 2022. Vol. 14, No. S1. P. 181.
11. Moguchaya O.V., Shchedrenok V.V. / Features of emergency neurosurgical care for neurotrauma in a region with low population density // *Population health and quality of life: Proceedings of the V All-Russian with international participation correspondence scientific and practical conference 2018*. Pp. 207-214.
12. Nikolaev E.L. / Assessment of health-related quality of life: are doctors healthier than teachers? // *Bulletin of the Chuvash University*. - 2014. - No. 2. - Pp. 310-315.
13. Novik A.A. Guide to the study of the quality of life in medicine / A.A. Novik, T.I. Ionova. 3rd edition, revised and supplemented; edited by Academician of the Russian Academy of Medical Sciences Yu.L. Shevchenko. – Moscow: RAEN, 2012. – 528 p.
14. Shevchenko Yu.L. / Modern Approaches to the Study of Quality of Life in Healthcare // *Bulletin of the Interethnic Center for Quality of Life Research*. - 2003. - No. 1-2. - P.
15. Adam J.W., Ryan K.M. / Mortality as an indicator of quality of neurosurgical care in England: a retrospective cohort study // *Wahba AJ, et al. BMJ Open* 2022;12: e067409. doi:10.1136/bmjopen-2022-067409.
16. Akshulakov S., Aldiyarova N., Ryskeldiyev N. et al. / Introduction of Questionnaires for Quality of Life of Patients with Malignant Tumors of the Central Nervous System into Neurosurgical Practice in the Republic of Kazakhstan // *Asian Pac. J. Cancer Prev*. 2016. Vol 17, № 2. P 873-876. DOI: 10.7314/apjcp.2016.17.2.873. PMID: 26925695.
17. Alankar K., Vishwanath S., Joshua D.B., Alfredo S. A., Pablo A.V. / Hyperspectral imaging in neurosurgery: a review of systems, computational methods, and clinical applications // *Journal of Biomedical Optics* February 2025 • Vol. 30(2) 023511.
18. Alessandro I., Victor Gabriel E.-H., Fabio M.M., Erik E., Maria G., Adrian E.-T., Andrea de G. and Mario R.E. / Reality in Neurosurgical Education: A Systematic Review // *Sensors* 2022, 22, 6067. <https://doi.org/10.3390/s22166067> <https://www.mdpi.com/journal/sens>
19. Ali A. Mohamed, Emma S., Camberly M., Cooper W., Syed M. Sh. / Quantum Computing in the Realm of

- Neurosurgery // World neurosurgery, <https://doi.org/10.1016/j.wneu.2024.09.131>.
20. Awuah W.A., Ahluwalia A., Darko K. et al. / Bridging Minds and Machines: The Recent Advances of Brain-Computer Interfaces in Neurological and Neurosurgical Applications // World Neurosurgery. 2024. Vol 189. P 138-153. DOI: 10.1016/j.wneu.2024.05.104. PMID: 38789029.
21. Damon D.P., Émile L., Katherine E., Martin P., Michel P., Léo C., Kevin P., Frédéric L. and Daniel C.C. / Rise of Raman spectroscopy in neurosurgery: a review// Journal of Biomedical Optics 050901-1 May 2020 • Vol. 25(5).
22. Edzhem C., Karl R., Christian D. / Perioperative quality indicators among neurosurgery patients: A retrospective cohort study of 1142 cases at tertiary center// PLOS ONE | <https://doi.org/10.1371/journal.pone.0297167> February 6, 2024.
23. Eesha Y., Nimirta S., Dua A. Z., Shiza A., Fatima S., Shahzad A. Kh., Bipin Ch., Saad J. / Intersection of Care: Navigating Patient-Hospital Relationships in Neurosurgery // World neurosurgery, <https://doi.org/10.1016/j.wneu.2024.10.077>.
24. Enrica F., Davide C., Maria F., Marco C. / A novel method of neurophysiological brainstem mapping in neurosurgery // Journal of Neuroscience Methods 405 (2024) 110096.
25. Giuseppe C., Francesco S., Lili L., Laura C., Iacopo D., Matteo de N. / Multimodal use of indocyanine green endoscopy in neurosurgery: a single-center experience and review of the literature// Neurosurgery Rev (2018) 41:985–998 DOI 10.1007/s10143-017-0858-4.
26. Grace H., Michael G., Ashley C. and Brandon L-W. / Augmented Reality in Neurosurgery: A New Paradigm for Training // Medicina 2023, 59, 1721. <https://doi.org/10.3390/medicina59101721> <https://www.mdpi.com/journal/medicina> Medicina 2023, 59, x for peer review.
27. Ignatius N.E., Saleh S. B., Ahmed A. / Evidence-based neurosurgery Basic concepts for the appraisal and application of scientific information to patient care (Part II) // Neurosciences 2016; Vol. 21 (3).
28. Joseph D., Hani J.M., Susruta M., Ara D. / Simulation for skills training in neurosurgery: a systematic review, meta-analysis, and analysis of progressive scholarly acceptance // Neurosurgical Review (2021) 44:1853–1867 <https://doi.org/10.1007/s10143-020-01378-0>
29. Jukka H., Timo K. / Optimizing neurosurgery clinic operations: a comparative study of interventions in Finland’s public healthcare system // International Journal for Quality in Health Care, 2024, 36(4), mzae106 DOI: <https://doi.org/10.1093/intqhc/mzae106> Advance Access Publication Date: 19 November 2024.
30. Karl S., Giannina R.I., Pavo O., Sophie B., Julien H., Colette B., Sixto A.-B., Dorian F. A., Garin B.H., Hyeong-Dong P., Christoph M.M., Olaf B. / The perspectives of mapping and monitoring of the sense of self in neurosurgical patients // Acta Neurochir (2021) 163:1213–1226.
31. Mirza A.B., Khoja A.K., Ali F. et al. / The use of e-consent in surgery and application to neurosurgery: a systematic review and meta-analysis // Acta Neurochir. (Wien). 2023. Vol 165, № 11. P 3149-3180. DOI: 10.1007/s00701-023-05776-3. PMID: 37695436. PMCID: PMC10624752.
32. Mirzaev A. U., Kariev G. M., Akhmediev M. M. / Quality of life in patients with Trigeminal Neuralgia after Microvascular decompression of the Root of the Trigeminal Nerve modified access // German medical journal. - 2019. - №25. - P. 58-67 (English-Arabic).
33. Mirzaev A. U., Kariev G. M., Akhmediev M. M. / Quality of life in patients with Trigeminal Neuralgia after Microvascular decompression of the Root of the Trigeminal Nerve modified access // German medical journal. - 2019. - №25. - P. 58-67 (German-Russian).
34. Moritz U., Rene H., Lucas R., Katharina B., Arwin R., Andreas K., Christoph J.G. / Christoph Schwartz Surgical treatment of meningiomas improves neurocognitive functioning and quality of life – a prospective single center study // Acta Neurochirurgica (2024) 166:402 <https://doi.org/10.1007/s00701-024-06295-5>
35. Mortimer G., Nadja J., Dennis T.T., Plachta C. S., Christian S., Petra C. G. / Mastication after craniotomy: pilot assessment of postoperative oral health related quality of life // Acta Neurochirurgica (2022) 164:1347–1355 <https://doi.org/10.1007/s00701-021-05020-w>
36. Philip D., Arturo O., Ahmed E.D., Andreas U., / Adverse events in neurosurgery: a comprehensive single center analysis of a prospectively compiled database // Acta Neurochirurgica (2023) 165:585–59.
37. Ronald C., May T., Natalie P., Liying Z., Arjun S., David C., Hany S., Cyril D., Carlo D.A., Sherlyn V., Edward C.D. / Patients with brain metastases selected for whole brain radiotherapy have worse baseline

quality of life as compared to those for radiosurgery or neurosurgery (with or without whole brain radiotherapy)? *Annals of Palliative Medicine*. // All rights reserved. apm.amegroups.com *Ann Palliate Med* 2016;5(1):1-12.

38. Ronald C., Yi G., Bing X., Wenbin M. / The Initial Stage of Neurosurgery in China: Contributions from Peking Union Medical College Hospital // *World neurosurgery*, <https://doi.org/10.1016/j.wneu.2020.12.122>.