ASSESSMENT OF EFFICACY OF TREATMENT FOR SUPRATENTORIAL BRAIN TUMORS IN CHILDREN

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ABSTRACT

The analysis of data of 97 children with brain tumors of supratentorial localization was carried out. To estimate treatment efficacy was used a rating scale of quality of life. It was determined that the quality of life of patients with brain gliomas depends on localization of neoplastic process, histological properties of tumor, preoperative neurologic deficit and the patient's compensated condition.

UDC CODE & KEYWORDS

■ UDC: 616.8-006-316/616.37 ■ Quality of life ■ Brain glioma ■ Central nervous system ■ Pediatric age

INTRODUCTION

Tumors of the central nervous system (CNS) occupy the second place in the structure of malignant neoplasms in children after leukemia. Hemispherical supratentorial tumors are represented mainly by astrocytic tumors (Connolly et al., 1997; Orlov et al., 2001; Rozumenko, 2003).

Currently, the quality of life is of much attention when evaluating results and efficacy of treatment. In scientific medical literature, the concept of the quality of life has been used since 1977. According to the reports of a conference of the American Society of Clinical Oncology, held in 1990, the quality of life is a main criterion for evaluating results and effectiveness of treatment of cancer patients (Anderson et al., 1999; Bampoe et al., 2000; Gorbunova et al., 2000; Ionova et al., 2000).

At the present, the most important task of neurosurgeons is not only tumor removal, but also improvement of the quality of life of patients by preserving the most important functional brain structures (Orlov, 2001; Rozumenko, 2002; Usatov et al., 2007).

In domestic pediatrics, concept of the study of quality of life developed in the early XXI century. On the one hand, this concept allows returning to a fundamental principle of clinical practice "do not cure the disease, cure the patient", and, on the other hand, offers a well-developed methodology that allows to obtain reliable data of the quality of life of children both in clinical practice and in researches. Along with traditional clinical indicators, evaluation of the efficacy of the child's treatment should be based on the parameters of quality of life. The concept of "quality of life" in pediatrics includes the definition of "child's quality of life", main characteristics of the definition of "child's quality of life", the methodology of the study the quality of life and the main directions of studying the quality of life in pediatric patients (Orlov, 2001).

Hence, the quality of life of children with supratentorial brain gliomas is a main criterion for evaluating the patient's condition and treatment efficacy.

The purpose of study was to assess the efficacy of treatment of patients with supratentorial brain gliomas in the process of comprehensive treatment using a rating scale of quality of life.

Materials and Methods

This study is based on the results of treatment of 97 children with supratentorial brain gliomas at the age from 10 months to 16 years, who were treated in pediatric neurosurgical department of RSCN. Clinical diagnosis and surgical approach were determined based on brain CT and MRI studies. Assessment of quality of life was conducted by a developed programme "scale for determining the quality of life of children with supratentorial tumors".

Comparative analysis of the quality of life was conducted prior to the operation and after surgery at the time of patient's discharge from hospital. In neurological status were observed movement disorders in 55 (56.7%) patients in the form of paresis or plegia, different kind of speech disorders in 34 (35.0%) children, hypertensive symptoms in 91 (93.8%) sufferers, deterioration of psychic activity in 17 (17.5%) patients, and visual impairments in 11 (11.3%) patients, respectively. Epileptiform seizures were noted in 29 (29.9%) patients.

Results and Discussion

Postoperative rehabilitation is a component of comprehensive treatment for cerebral gliomas in children. All 97 patients received restorative treatment (RT) in the postoperative period, which included drug treatment, massage, and electrical stimulation. In the early postoperative period, all patients underwent drug therapy aimed to eliminate brain edema, microcirculatory and neurodynamical disorders. Drug treatment included preparations, improving synaptic transmission, vascular drugs, corticosteroids, and protease inhibitors. After drug therapy, patients had positive dynamics, manifested by increase in volume of motor function, restoration of speech, as well as regression of hypertensive symptoms.

Tumor localization also affected the results of treatment. Accordingly, at defeat of brain speech-motor areas, qualitative indicators were lower, indicating more significant neurological deficit and psychosocial disadaptation.

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Table 1: Scale for determining the quality of life of children with supratentorial tumors

Clinical syndromes	Qualitative characteristics	Scores
I. PSYCHO-NEUROLOGICAL STATUS (80 points)		
1. Level of consciousness	Norm	10
	Stun (response to verbal commands)	5
	Stupor (response only to pain) or coma	0
2. Headache, nausea, vomiting, dizziness (cerebral symptoms)	None	10
	Insignificant	5
	Significant	0
3. Deterioration of psychic activity	Absent	10
	Loss of memory and remembering	5
	Disintegration	0
4. Seizures	Absent	10
	Rare	5
	Frequent	0
5. Motor and sensory disorders	Absent	10
	Hemiparesis and hemihypesthesia	5
	Hemiplegia and hemianesthesia	0
6. Visual impairments	Absent	10
	Reduced vision	5
	Blindness	0
7. Speech disorders	Absent	10
	Partial	5
	Full	0
8. Extrapyramidal disorders	Absent	10
	Partial	5
	Full	0
II. SOCIAL ADAPTATION (20 points)		
Family (home) and labor (social) adaptation	Full employability and self-service (learning abilities and interests to playing activity).	20
	Disability and self-service (learning abilities and interests to playing activity).	10
	Incapacitated and not capable of learning and self-care (needs constant assistance).	0

Source: Author

Table 2: Relationship between quality of life and tumor localization in the preoperative and postoperative periods

Quality of life in pre and post operative periods		Localization of tumor												Total	
		Fronto-parietal		Fronto-temporal		Fronto-parieto-temporal		Temporo-parietal		Occipital		Medial structures			
		Abs	%	Abs	%	Abs	%	Abs	%	Abs	%	Abs	%	Abs	%
Good	Before surgery	2	11.1	3	17.6	2	11.7	3	23	6	42.8	3	16.6	19	19.5
	After RT	8	44.4	9	52.9	7	41.1	6	46.1	11	78.5	8	44.4	49	50.5
Satisfactory	Before surgery	5	27.7	4	23.5	6	35.3	4	30.7	7	50	5	27.7	31	31.9
	After RT	6	33.3	5	29.4	7	41.1	6	46.1	3	21.4	7	38.8	34	35
Poor	Before surgery	11	61.1	10	58.8	9	52.9	6	46.1	1	7.1	10	55.5	47	48.4
	After RT	4	22.2	3	17.6	3	17.6	1	7.6	0	0	3	16.6	14	14.4

Source: Author

Table 2 demonstrates that the quality of life is lower at localization of tumor in fronto-parietal and fronto-temporal lobes that are responsible for motor and speech functions. The quality of life also depends on the prevalence of tumor in the brain medial structures. At localization of tumor in the occipital lobe, poor quality of life was observed mainly in 1 (7.1%) patient, associated with visual photopsia and quadrant hemianopsia.

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Table 3: Dependence of the quality of life on anaplasia grade of tumor

Quality of life in pre and post operative periods		Grade of malignancy								Total	
		I grade of anaplasia		II grade of anaplasia		III grade of anaplasia		IV grade of anaplasia			
		Abs	%	Abs	%	Abs	%	Abs	%	Abs	%
Good	Before surgery	7	7.2	6	6.1	4	4.1	2	2.06	19	19.5
	After RT	18	18.5	11	11.3	11	11.3	9	9.2	49	50.5
Satisfactory	Before surgery	10	10.3	8	8.2	7	7.2	6	6.1	31	31.9
	After RT	5	5.1	9	9.2	9	9.2	11	11.3	34	35
Poor	Before surgery	7	7.2	9	9.2	13	13.4	18	18.5	47	48.4
	After RT	1	1.03	3	3.1	4	4.1	6	6.1	14	14.4

Source: Author

Table 3 shows that the efficacy of treatment also depended on malignancy grade of tumors. Tumors of I-II grade (Low grade) belonged to tumors of low-grade malignancy, and tumors of III-IV grade (High grade) belonged to tumors of high-malignancy grade. The higher malignancy grade, the lower the quality of life.

Conclusion

The efficacy of treatment of brain supratentorial gliomas depends on the severity of clinical manifestations of disease, localization of tumor, its size, malignancy grade, tumors prevalence in surrounding functionally important brain structures and volume of remote tumors.

The total score of all indicators allows characterizing the quality of life of patients at the time of examination. The increase in total score during patients follow-up indicates in a positive dynamics of the disease course or rehabilitation period, while its decrease indicates a negative trend.

A scale developed by us for determining the quality of life of children with supratentorial tumors is adapted to patients with brain tumors and could be used for children with brain lesions of supratentorial localization of different origin (trauma, cancer, vascular diseases, etc.).

Comprehensive treatment, including surgical removal of tumor and the course of restorative treatment, helps improve the quality of life of patients in the postoperative period.

REFERENCES

- Anderson S. L., Taylor R., & Whittle I. R. (1999). Mood disorder in patients with after treatment for primary intracranial tumors. *British Journal of Neurosurgery*, 13, 480-485.
- Bampoe J., Laperriere N., Pintilie M., Glen J., Micallef J., & Bernstein M. (2000). Quality of life in patients with glioblastoma multiforma participating in a randomized study of brachytherapy as a boost treatment. *Journal of Neurosurgery*, 93, 917-926.
- Connolly B., Blaser S.I., Humphreys R.P., & Becker L. (1997). Long-term survival of an infant with anaplastic astrocytoma. *Pediatric Neurosurgery*, 26, 97-102.
- Gorbunova E.A. & Breder V.V. (2000). The quality of life of cancer patients. *Proceedings of the 4th Russian Conference of Oncologists*, Moscow, 125-127, in Russian.
- Ionova T.I., Novik A.A., & Sukhonos Yu.A. (2000). The definition of quality of life of cancer patients. *Oncology*, 2, 25-27, in Russian.
- Orlov Yu.A. (2001). Assessment of the quality of life of patients with lesions of the nervous system. *Ukrainian Journal of Neurosurgery [Ukrainskiy Neurohirurgicheskii Zhurnal]*, 1, 89-94, in Russian.
- Orlov Yu.A., Verkhoglyadova T.P., & Plavsky N.V. (2001). Tumors of the central nervous system in children (incidence rates in Ukraine for 25 years). *International Journal of Radiation Medicine [Mezhdunarodniy Zhurnal Radiacionnoy Mediciny]*, 3 (1-2), 258-265, in Russian.
- Rozumenko V.D. (2002). Epidemiology of brain tumors: statistical factors. *Ukrainian Journal of Neurosurgery [Ukrainskiy Neurohirurgicheskii Zhurnal]*, 3, 47-48, in Russian.
- Rozumenko V.D. (2003). Brain tumors: current state of the problem. *Proceedings of the III Congress of Neurosurgeons of Ukraine*, 91-93, in Russian.
- Usatov S.A., Zaallum Hatem, & Shopin V.N. (2007). The analysis of early outcomes of surgical treatment for gliomas of supratentorial localization with the use of wake-up anesthesia. *Ukrainian Journal of Neurosurgery [Ukrainskiy Neurohirurgicheskii Zhurnal]*, 2, 25-27, in Russian.