



Introduction

Diffusely infiltrating gliomas represent one of the most common primary brain tumors that are classified according to histopathological criteria in slow growing low-grade gliomas and rapidly progressive high-grade gliomas. Neurosurgical resection is the primary treatment in the majority of these gliomas.

Fluorescence-guided resection (FGR) is a technique used to enhance visualization of tumor margins in order to increase the extent of tumor resection in glioma surgery.

Methods

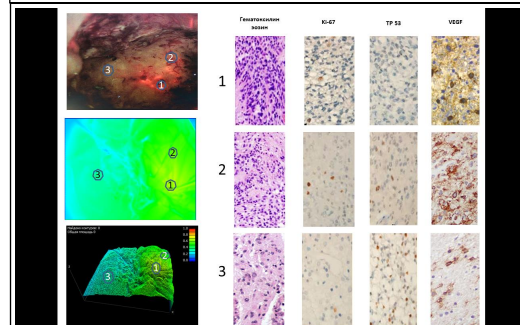
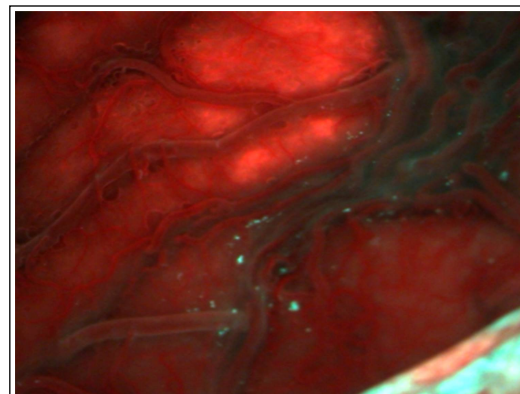
For visualization of chlorine e6 fluorescence during neurosurgical procedures, we use at our department intravenous solutions body weight. Generally, 1mg/kg bodyweight are administered intravenous approximately 2 hours before induction of anesthesia.

Dosage form: concentrate for the preparation of a solution for infusions of 50 mg / 10 ml (5 mg / ml) in bottles of dark brown glass.

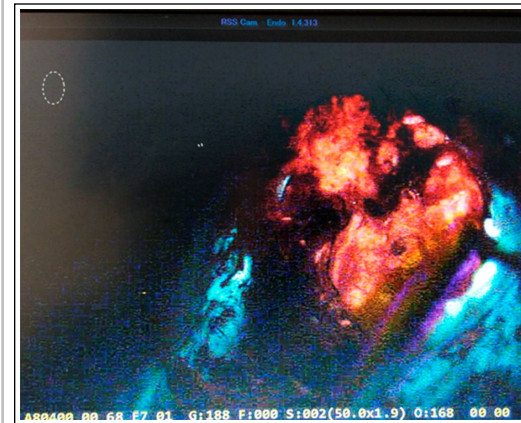
The Leyca OHS-1 microscope (Germany), equipped with a fluorescent attachment, was used to determine the fluorescence of

Results

For surgery of gliomas of Grade I-II sensitivity method – 68,3%, specificity – 60,1%. For surgery of gliomas of Grade III-IV sensitivity method – 85,4%, specificity – 76,2%. Extent of achievement of GTR (gross total resection) in surgery of gliomas of Grade I-II – 79,3%, for surgery of gliomas of Grade III-IV – 95,6%.



Drawing. Comparative analysis of the comparability of the fluorescence regions of the perifocal zone with the morphological results with glioblastoma. 1 - area of intense fluorescence; 2 - region of weak fluorescence; 3 - region of absence of fluorescence. (hematoxylin-eosin, Ki-67, TP53, VEGF-vasoendothelial growth factor).



	Fluorescence photosensitizer	Intensity of Fluorescence	Histology	Ki-67	%	p53	Immunopositivity
Normal brain		-			0		-
Cell infiltration zone		++			14		++
Compact part tumor		+++			31		+++
Necrosis		-			1		+

Comparative analysis of fluorescence with the results of morphological studies.

Conclusions

Intraoperative fluorescent diagnostics with use of chlorine e6 in surgery of glial tumors of various histologic structure is a highly effective, highly sensitive and highly specific method, that allows to increase gross total resection of glial tumors.

Learning Objectives

We evaluated 31 patients undergoing microscopic fluorescence-guided resection for cerebral lesions suggestive of high- and low-grade gliomas, aiming for better intraoperative visualization of tumor and adjacent tissue. By using chlorine e6, we hoped for more rapid surgery due to the better visualization of tumor tissue, while operating on a brighter background, as previously reported.

References

1. Eljamel S., Michael R. 5-ALA Fluorescence Image Guided Resection of Glioblastoma Multiforme: A Meta-Analysis of the Literature // *Int. J. Mol. Sci.* 2015. Vol.16, ?5. P.10443–10456.
2. Jaber M., Wolfer J., Ewelt C. The value of 5-aminolevulinic acid in low-grade gliomas and high-grade gliomas lacking glioblastoma imaging features: an analysis based on fluorescence, magnetic resonance imaging, 18F-fluoroethyl tyrosine positron emission tomography, and tumor molecular factors // *Neurosurgery.* 2016. Vol.78, ?3. P.401–411.
3. Kaneko S. Fluorescence-Guided Resection of Malignant Glioma with 5-ALA // *International Journal of Biomedical Imaging.* 2016. Vol.11, ?2. P.1–11.
4. Su X., Huang Q.F., Chen H.L., Chen J. Fluorescence-guided resection of high-grade gliomas: A systematic review and meta-analysis // *Photodiagn. Photodyn. Ther.* 2014. ?11. P.451–458.