

Ablation of intracerebral glial tumors with the application of laser technology guided by ultrasonography and neuronavigation



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Biography

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Abstract

Background: Since the first use of a laser in human patients with malignant gliomas was reported in 1966 the utility of lasers as a neurosurgical instrument has been researched extensively. This paper describes a laser-assisted surgical technique which has been used so far in patients for a variety of intracranial lesions, under the control of tumor ablation radicalism guided by ultrasonography and neuronavigation.

Materials and Methods: Following MRI image reconstruction we used ultrasound and neuro-navigation to appreciate the operability of the tumor and the outcomes of the resection. Afterwards an open surgery was performed. Then, with the use of PhotoMedex 980-25W diode-laser in clinical practice, 3 methods of laser thermodestruction of intracerebral gliomas are used:

1. Laser thermodestruction of the walls of the lodge after traditional microsurgical tumor ablation
2. Laser thermodestruction of the tumor with spread in critical areas of the brain (without contact)
3. Selective thermodestruction of hypervascularized tumors (hemangioblastoma, hemangiopericytoma).

Also, new research demonstrates the ability of 980-1064 nm laser light to disrupt or break the local blood-brain barrier, which normally protects the brain from toxins and prevents the penetration of chemotherapeutic preparations and, respectively, has limited treatment options for brain cancer patients.

Results: Thirty two brain tumours (primary and secondary) were operated on during 2016-2021 and then performed laser thermodestruction of the borders of the glial tumours. The complication rate probably related to surgery was 1.6%, morbidity 1.6%, mortality 0%.

Conclusion: The modern arsenal of laser technologies used as a complement to traditional neurosurgical instruments under the control of ultrasonography and neuronavigation allows for less manipulation and invasion of normal brain tissue, also allows to ensure a new level of surgical treatment of cerebral gliomas. Laser microsurgical thermodestruction of tumors is the progressive surgical method in neurooncology.



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