Intraoperative fluorescent navigation (IFN) and intraoperative photodynamic therapy (IPDT) for brain metastases treating

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Introduction: Each year the amount of oncologic patients grows steadily, herewith the mortality level from malignant neoplasm takes the second place stepping back to the mortality from cardiovascular diseases. One of the most difficult localization for treatment is brain metastases. There is no any statistics of brain metastases in Russian Federation, any way, judging by the facts, there are revealed on the average, 14-16 new brain metastases ceases to 100 000 of population yearly [1]. The brain metastases are revealed among 15-20% of the patients with extra cranial malignant neoplasm. The most occurred cases – are lung cancer metastases, then descending – breast cancer, melanoma, renal cell carcinoma, colorectal cancer and others. [2, 3].

At present median survival with brain metastasis without treatment is approximate 1 month, with addition corticosteroids- 2 months, with whole-brain radiotherapy- 4-6 months and 12-14 months, if applies local therapies, such as surgery or radio surgery, combined with whole-brain radiotherapy [4]. Disadvantages of this surgery - impossibility of radical brain-tumor resection with localization in functional zone of brain, high frequency of postoperative extended growth.

All the above mentioned makes us to search the new technologies, to improve the patients treatment results of this category, without bad influence on quality of life. One of such technologies, on our point of view, can be intra operative photodynamic therapy (IPDT) in complex with intra operative fluorescent navigation (IFN) with 5-aminolevulinic acid.

Materials and methods: For clinical purposes IFN and IPDT be used native prosensitizer Alasens (5-aminolevulinic acid hydrochloride, the producer is FSUE “SSC “NIOPIK”, Moscow, Russia) – the natural biochemical heme predecessor, which provoke the photo sensitizer fusion and accumulation – Pp IX (protoporphrin IX) in tumor cells. Alasens penetrates easily through BBB (blood brain barrier)

Treatment technique: patient takes Alasens attennuated in 100 ml of steel water (dose 20 mg/kg) - 3 hours before IFD. Then, during the operation under IFD control, is realizing maximum radical tumor resection, than there is applies the IPDT process with irradiation the sides of the deleted tumor cave for destruction tumor microfossils.

To evaluate the efficiency criterion of IFD and IPDT technology was controlled the radicality of resection judging by the postoperative CT with contrast enhancement, applied during the first 24 hours after the operation, and the duration of recurrence free period (cases follow up postoperative period, controlling MRI each 2-3 months).

Results: Nowadays in P.A. Hertzen Moscow Res. Oncology Inst., is resumed the experience of applying the IFD and IPDT brain metastases among 20 patients (the median observation - 14 months.), and 30 patients without IFD and IPDT (the control group): in IFD and IPDT group - metastases long-lasting growth –5%; in control group - metastases long-lasting growth – 26,67%.
**Example:** non-small cell lung cancer metastases in the right fronto-parasagetal region

**Conclusion:** surgical treatment with IFD and IPDT of brain metastatic tumors results sufficiently harmless technology, without any anabasis. The first experience of applying PDT on metastatic brain tumors demonstrates the perspective of this technology. This work was supported by Moscow City Government.

**Literature**

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