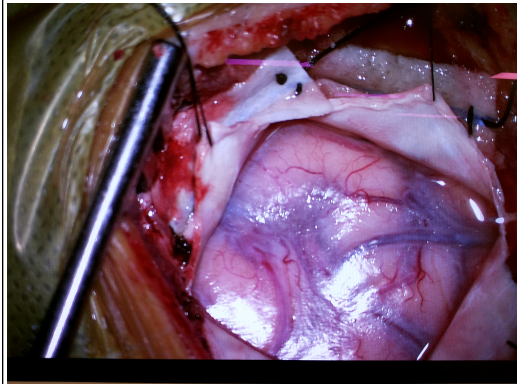


Figure 1a



No tumor tissue could be recognized under normal microscope visualization

Introduction

Extent of the resection with the use of 5-aminolevulinic acid (ALA) and blue filter 400 nm have been shown to be increased in recent studies about gliomas. However, the use of 5-ALA may have side effects and is an expensive application. The drug should be orally administered 3 hours prior to the induction of the general anesthesia, in order to provide adequate 5-ALA uptake by the tumor cells. In brain, areas of disrupted blood-brain barrier and tumor tissues are intensely staining with Sodium fluorescein (NaFL). Tumor tissue can be easily distinguished from normal tissue and extensive or complete resection may be possible with the new microscope system (YELLOW 560 nm, Pentero 900, Carl Zeiss Meditec, Oberkochen, Germany). In this report, we present our initial experience with the use of low dose NaFL and 560 nm filter YELLOW microscope system in 10 patients with brain tumors.

Methods

200 mg NaFL (3-4 mg / kg) was administered intravenously in 10 patients who underwent a total of 11 surgeries. NaFL for tumor localization was assessed as “effective” or “ineffective”. NaFL enhancement in the tumor margins or the cavity walls was assessed by the responsible neurosurgeon. In case of an enhancement, the extent of resection was widened and Na-FL use was defined as “useful”, otherwise it was defined as “not useful”.

Results

Neuronavigation (Medtronic, stealthstation® S7®) was used in all instances and neuromonitorization was used in selected cases according to the tumor location. The ages of the patients were between 28 and 78 (mean age 51). There were five female and five male patients in the study group. Histopathological evaluation revealed gliomas in 8 patients (2 of grade I and II, 2 of grade III and 2 of grade IV), while two tumor metastasis was detected in a single patient and one central nervous system lymphoma was encountered in one patient. All high grade tumors (grade III&IV), lymphoma and metastases showed intense florescein staining which helped the detection of these tumors and increased the extent of the resection, whereas low grade tumors did not or very slightly stained with NaFL, except the patient with ganglioglioma. No NaFL related side effects, mortality and morbidity were observed in this series.

Table

No	Age/Sex	Symptoms/ Signs	Localization	Pathology	Na-FL for tumor localization	Na-FL for tumor resection	Extent of Resection
1	57/m	Left hemiparesis	Right frontal (motor cortex)	GBM WHO Grade IV	effective	useful	T
2	37/f	Headache, seizure	Left frontal (recurrent trig)	Oligoastrocytoma WHO Grade II	ineffective	not useful	T
3	78/m	Vertigo, ataxia	Right temporal+ Left cerebellar	Metastasis (Lung)	effective	useful	T
4	54/f	Dysphasia, right hemiparesis	Left frontotemporal	GBM WHO Grade IV	effective	useful	T
5	48/m	Headache, vertigo	Left frontal-intraventricular	Piloicytic astrocytoma WHO Grade I	ineffective	not useful	NT
6	41/f	Apathy	Left frontal	Ganglioglioma WHO Grade I	effective	useful	T
7	28/f	Left hemiparesis, seizure	Right insular	Oligodendroglioma WHO Grade II	effective	useful	ST
8	47/f	Seizure	Left frontal	Oligodendroglioma WHO Grade II	effective	useful	T
9	62/m	Seizure, right hemiparesis	Left frontal	Primary CNS lymphoma	effective	useful	T
10	53/m	Headache	Right occipital	Oligodendroglioma WHO Grade I	ineffective	Not useful	ST

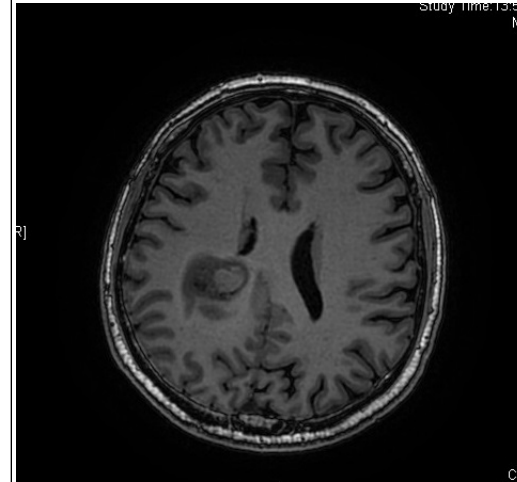
T: Total, NT: Near-Total, ST: Subtotal

Table shows patient demographics.

Conclusions

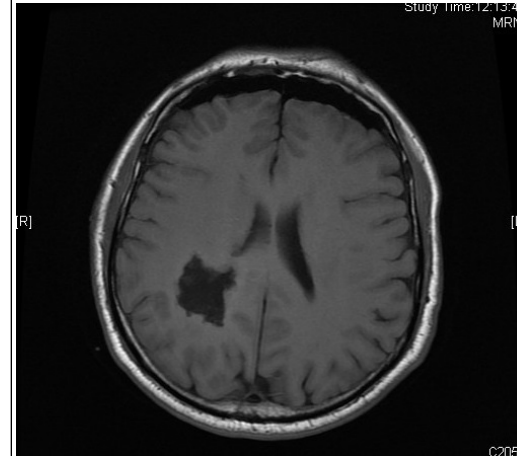
Operation with the use of NaFL and a new generation of YELLOW 560 filter microscopes was found to be safe and feasible. However, to confirm the efficacy and to prove the impact on patient survival; prospective randomize studies with larger patient sample and with long term follow-up need to be done.

Figure 2a



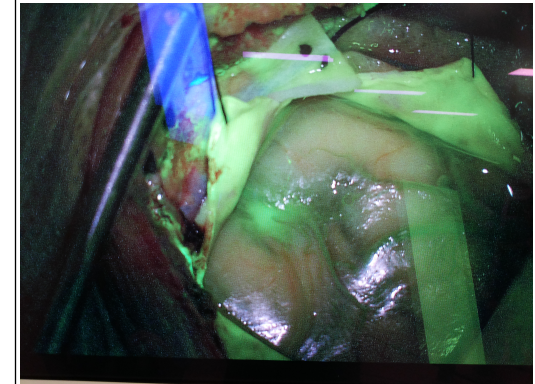
Preop MRI of the Patient 1 showing a tumor on the right frontal (motor cortex)

Figure 2b



Postop MRI of the same patient shows total resection of the tumor

Figure 1b



Tumor tissue could be easily identified with NaFL staining under Yellow filter

Learning Objectives

With this poster presentation the participants should emphasize the importance of NaFL and 560 nm filter YELLOW microscope system on the brain tumor resection.

References

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