Three-dimensional Intraoperative Ultrasound-based Frameless Navigation with Neuromonitoring and 5-ala Assistance in Patients with Astrocytoma Grade IV WHO

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Introduction

Accuracy of intraoperative orientation is one of the

factors that significantly affect both the success of neurosurgical

intervention and long-term outcome. "Brain shift" phenomena that

occurs during surgery really disturbs orientation of a surgeon

and can lead to serious functional complications (especially in eloquent and

near-eloquent brain areas).

Methods

Intraoperative three-dimensional ultrasound-based

frameless navigation (SonoWand Invite) in combination with 5-ALA

fluorescence imaging and intraoperative neuromonitoring was used in 36 patients with GBM between July-October, 2012. In all cases we use different types of probes according to tumor depth and size.

Results

Intraoperative 3D ultrasound has shown sufficient sensitivity

in delineating tumor border from normal brain tissue before removal and during procedure. We find that ultrasound characteristics cannot be easily interpreted according to histological properties of the tissue. 5-ALA is a valuable method for additional verification of tumor tissue and in combination with ultrasound and intraoperative neuromonitoring (MEP and SSEP) it helps to perform gross-total resection in more safety and easy way

Conclusions

Modern 3D ultrasound-based frameless intraoperative

navigation combined with neuromonitoring and molecular imaging with 5-ALA can be used as a faster, cheaper and very promising method to achieve extended and safe

resection in GBM patients.

Learning Objectives

By the conclusion of this section, participant should be able to: 1) describe the importance of intraoperative visualization including 3D ultrasound and metabolic navigation

2) Estimate role of intraoperative imaging such as ultrasound in the treatment plan of patinets wish glioblastoma

3) Limitations of ultrasound use and possibilities offered by metabolic imaging