The impact of intraoperative MRI examination in glioma surgery. A prospective study

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Introduction

Intraoperative MRI examination (iMRI) in glioma surgery can increase the extent of resection and it also helps to achieve radical resection in many cases.

Methods

Patients undergoing the glioma surgery with iMRI were prospectively followed in this study. During the surgery iMRI (GE Signa HDxt 3.0 T, Maquet VIWAS table) was performed based on surgeon´s request. Acording to iMRI image the radical resection was achieved if no residual tumor was detected on T2-wighted images in low-grade gliomas (LGG) or postcontrast T1-weighted images in high-grade gliomas (HGG). All iMRI examinations were analyzed by independent neuroradiologist.

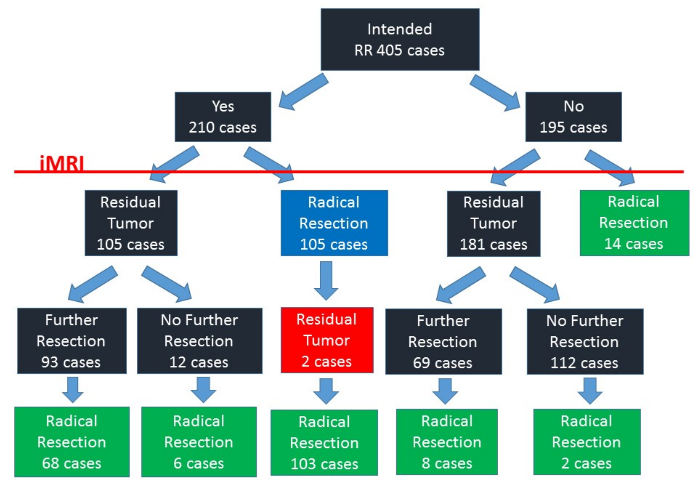
Fig. 1

Operating theatre setup

Results

From April 2008 to October 2013 405 glioma patients underwent surgery with intraoperative MR examination (biopsies were excluded). In group of intended partial resection (PR) (195 cases) in 67 cases resection continued after the first MR. In 24 of PR cases radical resection (RR) was achieved. In group of 210 cases, where RR was planned, resection continued because of residual tumor in 93 patients after MR examination and RR was achieved in 68 of them. In the remaining 117 cases the procedure was stopped after MR examination. In this group RR was achieved in 109 patients. Probable tumor remnant was suspected according to iMRI in 12 patients, but it was decided not to continue with the surgery. In this group the residual tumour was confirmed on postop. MR in 6 cases. In other 2 cases small tumor remnant was revealed on postop. MR examination. In the whole series in 160 cases (39,5% of all cases) iMRI helped to detect the tumor remnant and to extent the resection and in 76 patients RR was achieved. That represents 47,5% of further resection group and 18,7% of the whole series.
In the whole series the tumor was removed completely in 49% of all cases.

Fig. 2



The decision scheme and achieved RR

Conclusions

The Intraoperative MR examination significantly increases the possibility to achieve radical resection in glioma patients. In almost 40% of all patients iMRI makes possible to continue the surgery and in half of them to remove the tumor completely.

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Learning Objectives

Importance of intraoperative MRI examination in glioma surgery