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Intraoperative Resektionskontrolle mit Hochfeld-MRT bei der transsphenoidalen Operation von Makroadenomen der Hypophyse

Intraoperative MRI in transphenoidal surgery of pituitary macroadenomas

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Objective

To evaluate the influence of intraoperative MRI on the course of transphenoidal surgery for pituitary macroadenomas with special regards to the extent of resection, which is reported to be complete in 50-60% in large intra- and suprasellar adenomas.

Methods

A 1.5 T Magnetom Sonata (Siemens Medical Solutions, Erlangen, Germany) was used for pre- and intraoperative imaging. T1, later in the study T2 weighted sequences were applied before and during surgical resection. Additional T2 weighted HASTE sequences were used for a fast image acquisition and first assessment. The surgeons' estimate of the extent of tumor removal was documented and compared with the actual extent as evidenced by first intraoperative imaging results. Results of repeated inspections, necessary further resection, and final imaging results were also documented.

Results

Intraoperative MRI was used in 112 patients with pituitary macroadenoma. Complete resection was considered to be possible in 89 of these prior to surgery. In 56 of these resection was already complete when the first intraoperative images were obtained. In another 23 patients tumor remnants were detected which then could be removed

completely. Thus, intraoperative resection control led to an increase in the rate of complete tumor resection from 63% to 88%.
There were some cases (n=4) in which initial intraoperative MRI showed suspect intrasellar findings but a repeated inspection revealed no further tumor but rather some blood clot.
Operative technique had to be adapted (esp. with regards to hemostasis) in order to achieve MR images of sufficient quality. A reliable evaluation of suprasellar tumor resection was possible in all cases, parasellar part and compression or invasion of the sinus cavernosus could be evaluated in the mayority of cases. An intraoperative expansion of the sinus cavernous is a frequently observed occurrence whereas a shift of the carotid arteries is seldom seen even in large tumors.
There is a correlation of the dimensions of the tumor, notably its suprasellar extension, and the benefit of intraoperative MRI. Patients with large intra and suprasellar lesions benefit most from intraoperative imaging.

Conclusions

Intraoperative MRI used during transsphenoidal surgery of pituitary adenomas can increase the rate of complete resection in particular for lesions with a large suprasellar extension.