

Intraoperative MRI for resection of intracranial meningioma

Case series

2017

Over a ten-year period, 70 operations were performed on 66 patients with [intracranial meningiomas](#) using the compact, mobile [PoleStar N20](#) iMRI navigation system. A retrospective review was conducted examining patient demographics, surgical characteristics, and outcomes in the Department of Neurosurgery, Hofstra Northwell School of Medicine, Manhasset, [New York](#), USA.

36 [meningiomas](#) were above the [skull base](#) and 30 were [skull base meningiomas](#). Four (5.7%) operations were done for [recurrent meningiomas](#). 63 patients (95.5%) had WHO grade I and 3 patients (4.5%) had WHO grade III meningiomas. 9 (12.8%) patients required additional tumor resection based on iMRI findings, and in 4 patients (6%) iMRI imaging allowed for avoidance of additional dissection near critical neurovascular structures.

Up to 15.7% of patients had surgery positively affected by intraoperative imaging either improving the resection or avoiding unnecessary additional dissection which could potentially harm critical neurologic structures. As iMRI becomes more widely available it may be valuable to use in an appropriate subset of patients with intracranial meningiomas ¹⁾.

2013

Patients undergoing complex meningioma resection using iMRI from January 2007 to January 2011 were included in a study at the Department of Neurosurgery, Kantonsspital [Aarau](#), [Switzerland](#). The indication for iMRI-guided tumor resection included patients presenting with meningiomas located in the skull base or compressing eloquent brain areas in whom a radical resection was considered to be difficult. Intraoperative 0.15-T MRI scan (PoleStar; Medtronic Navigation, Louisville, CO, USA) was performed before and after maximal possible resection using standard microsurgical and neuronavigation techniques. All patients underwent fluorescence-guided resection. The following data were analyzed: tumor localization, histological grade, Simpson resection grade, duration of the procedure, iMRI scan time, iMRI findings, resection extent based on postresection iMRI, hospitalization time, surgical complications and outcome, and MRI follow-up 2-27months postoperation. Twenty-seven consecutive patients undergoing complex meningioma resection using iMRI were included. In this series, only one patient (3.4%) underwent resection of tumor remnant after iMRI, although without improvement of the Simpson resection grade. Temporary neurologic deficits were found in 8 patients (27.6%) postoperatively, whereas 11 patients (37.9%) had permanent postoperative neurologic deficits. In one case (3.4%), fatal postoperative bleeding occurred which was not detected by iMRI. The results show that iMRI has no influence on intraoperative strategy in terms of resection grade or detection of early postoperative complications. The benefits of iMRI in complex meningioma surgery are therefore doubtful; however, it may still prove to be effective in certain subsets of complex meningiomas ²⁾.

1)

Chakraborty S, Zavarella S, Salas S, Schulder M. Intraoperative MRI for resection of intracranial meningiomas. J Exp Ther Oncol. 2017 Nov;12(2):157-162. PubMed PMID: 29161785.

2)

Soleman J, Fathi AR, Marbacher S, Fandino J. The role of intraoperative magnetic resonance imaging in complex meningioma surgery. Magn Reson Imaging. 2013 Jul;31(6):923-9. doi: 10.1016/j.mri.2012.12.005. Epub 2013 Feb 28. PubMed PMID: 23453762.

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