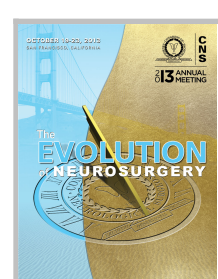


Precise and Accurate Neurosurgery with Intra-operative High-Field-Strength MRI and Multimodal Neuronavigation: A Single Center Experience in 1000 cases

Bai-Nan Xu; Xiaolei Chen MD, PhD; Xianghui Meng; Fangye Li; Guocheng Sun; Jiashu Zhang; Tao Zhou; Dingbiao Zhou



Introduction

To review the a single center clinical experience with intra-operative 1.5T magnetic resonance imaging (MRI) of neurosurgical procedures in 1000 cases.

Methods

One thousand cases (mean age, 44.8 years; range, 6-76 years), most of whom had gliomas or pituitary adenomas, were operated in a dual-room intra-operative MRI suite with a movable 1.5T MRI. A navigation microscope placed inside the 0.5-mT zone and used in combination with a ceiling-mounted multimodal navigation system enabled integrated microscope-based neuro-navigation. The extent of resection depicted at intra-operative imaging, the surgical consequences of intra-operative imaging, and the clinical practicability of the operating room setup were analyzed.

Results

Two hundred resections with a transsphenoidal approach, 711 craniotomies, 82 biopsies, 4 ablations, and 3 catheter insertions were performed. In 282 (31.0%) of 911 patients, intra-operative MRI had immediate surgical consequences (eg, extension of resection in patients with pituitary adenomas or gliomas). In 870 patients the navigation system was used, and for 850 of those patients, functional imaging data were integrated into the navigation system. There was nearly no difference in quality between pre- and intra-operative images. Intra-operative workflow with intra-operative magnet transport for imaging was straightforward, and imaging in most cases began less than 6 minutes after sterile covering of the surgical site. No complications resulted from high-field-strength intra-operative MRI.

Conclusions

The high-field-strength MRI was successfully adapted for intra-operative use with the integrated neuro-navigation system. Intra-operative MRI provided valuable information that allowed intra-operative modification of the surgical strategy.

Learning Objectives

By the conclusion of this session, participants should be able to: 1) Describe the clinical value of intra-operative MRI, 2) Discuss, in small groups, for safe and efficient protocol for intra-operative MRI.

[DEFAULT POSTER]