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The Lessons From use of Heads up Display in 97 Patients Undergoing Intracranial Surgery

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INTRODUCTION:

The use of Heads-up Display (HUD) has helped improve intraoperative navigation by permitting visualization of navigation information through the microscope instead of looking away to the navigation screen while operating on potentially critical and delicate areas. We have used HUD for a wide array of vascular and tumor neurosurgical cases and have found it to be helpful, accurate, and safe.
METHODS:

We retrospectively reviewed 97 patients who underwent HUD-assisted surgery from April 2016 through October 2018. All lesions were assessed for accuracy and those from the latter half of the study were assessed for utility and changes in surgical approach or plan, or incision.
RESULTS:

Ninety-seven patients with 104 pathologies were included. Pathologies included aneurysms (17), arteriovenous malformations (8), cavernous malformations (6), intracranial stenosis (3), meningiomas (33), metastasis (5), craniopharyngiomas (4), gliomas (7), schwannomas (5), epidermoid/dermoids (3), pituitary adenomas (2) hemangioblastoma (2), choroid plexus papilloma (1), lymphoma (2), osteoblastoma (1), clival chordoma (1), cerebrospinal fluid leak (1), abscess (2), and a cerebellopontine angle Teflon granuloma (1). HUD was used during positioning, skin incision, craniotomy, dural opening, corticectomy, arachnoid opening, and intracranial drilling. Seventy lesions were deep and 34 were superficial. Structures identified and marked preoperatively included the lesion (92), vessels (60) and nerves/brain tissue (36). Accuracy was deemed excellent (68.3%), good (22.1%), or poor (9.6%).
CONCLUSION:

HUD can be safely used for a wide variety of vascular and oncologic intracranial pathologies and can be utilized during multiple stages of surgery.
SUMMARY POINTS:
1. HUD can be safely used for a wide variety of vascular and oncologic intracranial pathologies and can be utilized during multiple stages of surgery.
2. Accuracy was deemed excellent (68.3%), good (22.1%), or poor (9.6%).
3. A prospective assessment of the technology with predetermined endpoints is needed.