Applications of a Hybrid Augmented Reality Neuro-Navigation System During Endoscopic Endonasal Transsphenoidal Pituitary Surgery

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Disclosures

• No disclosures or conflicts of interest
Introduction

• Scopis Hybrid Navigation System is currently FDA-approved for ENT procedures, including intranasal, sinus, anterior skull base, and transsphenoidal surgery

• Many neurosurgical operations increasingly utilize endonasal, transsphenoidal approaches

• We aim to assess the feasibility and utility of this AR system for endoscopic endonasal transsphenoidal pituitary surgery
Methods

• Scopis Hybrid Navigation System was used in 6 endoscopic endonasal transsphenoidal surgeries performed at Keck Hospital of USC
• Tumor, normal pituitary, and ICAs were contoured based on pre-operative imaging
• Pathways developed to provide a superimposed visual trajectory to the sella and target lesion
• Surgery was performed with AR projections of these structures overlaid on the endoscope video screen
• Anatomic accuracy, surgical complications, and clinical outcomes recorded
Results

- 6 patients underwent AR-guided transsphenoidal pituitary surgery
  - 4 female, 2 male
  - Ages ranging 26-62 years

- Pathologic diagnoses
  - 3 nonfunctioning pituitary adenomas
  - 1 GH-producing pituitary adenoma
  - 1 ACTH-producing adenoma
  - 1 Rathke cleft cyst

- Gross total resection achieved in all cases

- No significant intra-operative or post-operative complications
Discussion

• AR projections of vital structures were superimposed on the endoscopic monitor during approach and resection

• Visual pathway guiding surgeon to target tumor was present, helping to avoid surgeon disorientation
  • Proved especially helpful during microadenoma surgery, where it can be difficult to localize tumors within normal pituitary gland

• Issues with anatomic accuracy of the AR neuronavigation technology improved in subsequent cases due to user learning curve
Summary Points

• Scopis AR system has the potential to increase safety and efficiency during endoscopic endonasal transsphenoidal pituitary surgery, as well as improve education for trainees learning complex endoscopic approaches to surgical targets in the sellar and parasellar regions

• Further prospective studies are necessary to quantify the accuracy of this technology