Image Guided Endoscopic Tumor Surgery

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Disclosures

• Consultant
  » Sinuwave
  » Laurimed
  » Entrigues
  » Nasoform
  » Olympus Gyrus

• Speaker
  » Stryker
  » Genentech

• Stockholder
  » Entrigues
  » Remedesease
  » Nasoform
Objectives

- To discuss general advantages and limitations of use of image guidance in sinus surgery and endoscopic skull base surgery in:
  - Everyday Use
  - Pushing the Limits of Current Technology
  - What the Future Holds
The Problems with Endoscope…
Perspective and Orientation:
“Seeing the Forest through the Trees”
The Problems with the Endoscope...

- Distortion
Sinusitis Surgery is Dangerous...

“Any surgery in [the ethmoid sinuses] should be simple, but it has proven one of the easiest ways to kill a patient”

− Mosher, H. Trans Am Acad Ophth Oto, 1929
Anatomy of the Sella Region: “High Priced Real Estate”
Historical Aspects of IGS

- Concepts go back to the 50s
- Used in neurosurgery for 20y
  - Mechanical
  - Head fixed in Mayfield frame
- They’ve come a long way
  - Rapid, Simple Registration
  - Calibration and use of surgical instruments and suctions
- Limitations Persist
  - Emphasis on probes or suctions
  - Line of sight with IR; metallic interference with EM
  - Not Real Time
Limitations of IGS

- IGS does not make ESS “safe”
  - Does not replace the need for being a good surgeon
    - Has the capability of allowing a good endoscopist to be a little safer, go a little farther
  - Does not have the capability to allow a poor endoscopist to be safer, go a little farther
  - Does not replace the need for good quality preop CT imaging
Limitations of IGS

- IGS is not “real time”
  - Changes in anatomy are not being determined in real time by the system
    - Particularly important with soft tissue lesions
    - Improved with integration with intraoperative CT and MRI
29 year old man with Htn and OSA presenting with intermittent diplopia
62 year old man found cheering on the University of North Carolina Tarheel football team in Kenan Stadium

- …at night
- ….alone
Minimally Invasive Pituitary Surgery (MIPS)

- Exposing Sella
  - Particularly important in revision surgery
- Also Aids in tumor removal
Minimally Invasive Pituitary Surgery (MIPS)

- Curetting microadenoma under image guidance
- Fusion with 3d imaging
Moving into the Future: Intraoperative Imaging and Integration

- The Greatest Limitation of IGS is that it is not Real Time..
- IGS integration with intraoperative imaging
  - MR
  - CT
- Almost “Real Time”…
Intraoperative CT Imaging

- Changing what we do
- Confirming what we have done

Large Meningoencephalocele
Conclusions

- Imaging technology continues to advance—aiding the rhinologist in endoscopic skull base surgery
  - Pushing the boundaries and advancing endoscopic techniques
- But
  - It is not mandatory for every surgery
  - It is not a substitute for intimate knowledge of the anatomy
“A Fool with an Instrument is Still a Fool”
-Heinz Stammberger, 2005

“A Fool with an Instrument is an Even More Dangerous Fool”
-Mike Sillers, 2005