Gadgets in EOS Imaging and Surgery

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Gadgets

Deep Brain Stimulator
Vagal Nerve Stimulator
Neuromonitoring Needles
Cochlear Implants
Baclofen pump
VP Shunt
Piercings
Pacemakers
Defibrillators
Vagal Nerve Stimulator (VNS)

- Treatment of refractory epilepsy and depression.
- Wire wrapped around vagus nerve in neck
- Implant just under left clavicle
Vagnal Nerve Stimulators (VNS)

MRI

- Safe with ALL models
- exclusion zone C7 – mid thoracic?
- Radiology may refuse to do study
Vagnal Nerve Stimulators (VNS)

- **Surgery**
  - Turn off before surgery
  - Turn on after surgery
  - As long as the device is off during surgery – you **may use the monopolar bovie**
Deep Brain Stimulator (DBS)

• Wires in the brain can regulate abnormal impulses

• Controlled by a pacemaker-like device placed under the skin in the upper chest.

• Treat
  • movement disorders - dystonia
  • psychiatric conditions - OCD
  • reduce seizures
Deep Brain Stimulator (DBS) & Spine Surgery

• Concerns:
  • Damage device
  • Stimulate or shock patient

Put in “Surgery mode” for monopolar and MRI
  - rep can do it
Cardiac Implantable Devices
pacemaker or defibrillator

- A pulse generator /battery
- Wires into heart
Cardiac Implantable Devices
pacemaker or defibrillator MRI

Tested and programmed before and after MRI

MRI in Patients with Cardiac Implantable
Electronic Devices

adverse events are rare, nonexistent, and/or clinically insignificant in the wealth of published data.
Cardiac Implantable Devices

- Surgery - pacemaker shut down with a magnet
  - May use monopolar Cautery
- After surgery - re-programmed

- Call cardiologists before surgery
Spina Bifida
Kyphectomy

- Make sure VP Shunt is working
  - Send to neurosurgeons
- Cutting placode with non-functioning shunt → rapid death
Mayfield, Gardner-Wells, Halo

Feel the length of the tubing before placing a pin in the skull
Body Piercings

- Remove during surgery
- Can hold open hole with plastic spacer
They pulled out my piercings...

I pulled out their spines.
Baclofen Pumps - MRIs

- can be done
- MRI will turn off the pump.
- Must be turned back on by the neurology after the study is complete
Baclofen Pump - Surgery

- Pad around device when positioning
- Leave it on
- Intra Thecal - record how many CM are at dura

***Bovi wont cut it, knife or scissors will cut it***
Baclofen Pump

Ask Rep for catheter repair kit

Verify that the collets are firmly attached. The collets should not move back and forth or rotate.
Cochlear Implants

- MRI - can migrate or cause pain
  - Know exact model of implant and bring documentation to study – ask rep
  - HIGHLY VARIABLE - some must be surgically removed - elective procedure -
  - Newer (within last 2 years) Remove external portion (just like hearing aids)
Cochlear Implants and Spine Surgery: Historical Recommendation: Do NOT use monopolar

Conclusions:
- The cochlear implant devices had no evidence of electrical damage by monopolar cautery, even up to levels of 100 W
- more flexible recommendations should be considered.

Does Electrocautery Damage Cochlear Implants?

Anita Jeyakumar, Neal M. Jackson, Victoria B. Givens, Todd M. Brickman, and Moisés A. Arriaga

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Dermal Discolorations and Burns at Neuromonitoring Electrodes in Pediatric Spine Surgery

Spine, 2016

Austin Sanders, BA,* Lindsay Andras, MD,* Alison Lehman, MS PA-C,* Nancy Bridges, BSN, MBA, CNOR,† and David L. Skaggs, MD, MMM* 

- Bovie pads must NOT touch the needles
- Black discolorations resolve in 6 months
- Full thickness burns
Deep Brain Stimulator Vagal Nerve Stimulator → Call Rep

Baclofen pump → Call Rep & Repair Kit

Pacemakers Defibrillators → Call cardiology

VP Shunt → Clear by Neurosurgery
Don’t put Mayfiled/Halo pin into tubing
Thank You