INTRODUCTION TO INTRAOPERATIVE NEUROMONITORING (IONM)

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WHAT IS NEUROMONITORING?
AKA IONM FOR INTRAOPERATIVE NEUROMONITORING

• **Stimulating** nervous system & **recording** responses
• Assesses neurological functionality throughout surgery
• Some monitorable nervous system components:
  • Movement
  • Sensation
  • Audition
  • Vision
  • Cerebral perfusion

(Morley 2023)
HOW DOES IT WORK?

• Lots of electrodes! Placed on patient, connected to IONM equipment
• Setup before incision
• Data continuously monitored for throughout case
• Screen-sharing neurologist for interpretation
• Ongoing communication with surgeon
WHY USE IONM?

• Fewer post-op neurologic complications
• Seastnan data: average of 5-8 "alerted" cases/month per hospital
• Examples of alerts:
  • Poor limb positioning
  • Pedicle screw misplacement (spinal fusions)
  • Loss of sensory/motor function after medical device placement, decompression, tumor resection
  • Inadequate cerebral perfusion during vascular surgery
• Surgical intervention after alert can prevent post-op deficits

(Morley 2023)
COMMON IONM CASES

- Spine
  - Fusions
  - Unstable fractures
  - Decompressions around nervous structures
- Brain
  - Neurovascular procedures
  - Tumor resections around nervous structures
- Vascular
  - Carotid endarterectomies
MODALITIES: EMG

- Monitors muscle activity caused by nerve stimulation
  - Spontaneous: nerve irritated by surgical activity
    - Ex: decompression of tissue too close to nerve root
  - Triggered: stimulation from probe to identify location of nerve
    - Ex: nerve embedded in tumor

Data looks like spikes, bursts, scratches

(Morley 2022)
MODALITIES: SOMATOSENSORY EVOKED POTENTIALS (SSEPS)

- Monitor somatosensation
- Stimulation at peripheral nerve
- Recording at scalp (or periphery)
- Signals from multiple locations in pathway look like waves

(Morley 2022)
MODALITIES: TRANSCRANIAL MOTOR EVOKED POTENTIALS (TCMEPS)

- Monitor voluntary movement
- Stimulation at scalp
- Recording at muscles throughout body
- Causes whole body twitch

(Morley 2022)
COMMUNICATION

• Neurophysiologist reports pertinent information to aid optimal outcome of case
  • Data updates help surgeon know whether patient remains neurologically stable or experiencing changes
  • If changes, surgeon can evaluate & assess next steps
• Regular communication with anesthesia & surgeon essential to provide best patient care
ABOUT SEASTNAN MEDICAL

• Founded in 2012 by Olivia Fisher with one hospital
  • 100% woman-owned business
  • Team has grown to about 10 surgical neurophysiologists
  • Provides intraoperative neuromonitoring to hospitals surrounding Kansas City, Topeka and Lawrence
• On-call weeknight and weekend hours taken on rotation
• Currently no overnight travel
• Daily schedule variable, but weekly average OR hours generally <40
IN-HOUSE TRAINING PROGRAM

- Training program established in 2019
- Introduction IONM trainee program consists of 10 didactic units (roughly 10 weeks)
  - Didactic curriculum concurrent with clinical training
  - Progress from trainee to independent technologist to CNIM certified
- Advanced surgical procedure and IONM modality courses to follow
  - Complex spine and craniotomy cases requiring additional modalities
- Typically initiate training class in January and in summer (following winter and spring graduations)
QUESTIONS?

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