Treatments for Spasticity In TBI

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Spasticity = Central Motor Neuron Disorder

- Multiple Sclerosis
- Stroke
- Traumatic Brain Injury
- Cerebral Palsy
- Spinal Cord Injury
- Others:
  - Stiff Person Syndrome
  - Adrenal Leukodystrophy
  - Cervical and Lumbar Myelopathy
  - Familial Spastic Paraparesis
  - neurosarcoidosis

Referrals

- Doctors – neurology, neurosurgery, PCPs
- Therapists
- Case managers
- Patient word of mouth
- MS society
- Medtronic website
- Colleagues that I teach
The Spasticity Program

- New patient evaluation in PM&R
- Patient selection
- ITB trial
- ITB Implant
- Dose titration and Rehabilitation
- Pump maintenance and refills
- Trouble Shooting

The Spasticity Program

- New patient evaluation in PM&R
- Review prior treatments
- Assess how spasticity interferes with comfort, range of motion, function, safety
- If an ITB candidate -- education and schedule trial

The Spasticity Program

- Patient selection
- Establish goals of ITB therapy
- Discuss risks and benefits of the trial and the implant
- Assess caregivers educability
- Assess patient expectations
The Spasticity Program

- ITB trial
- Out patient – ambulatory patients
- In patient – 23 hour stay
- -Quadriplegic patients
- -Medically complex patients
- -pre-procedure testing
- -MRI, labs, anticoagulation reversal
- PT, OT evals at 0, 4, and 6 hours
- Lumbar puncture ~9am

The Spasticity Program

- ITB Implant
- Neurosurgery Referral – Dr. Brodkey
- Consultation
- Surgery Scheduled
- Dr. Doble
- -order for the pump and drug entered
- - order for catheter tip level and starting dose entered

Pump Implant

- Abdominal incision
  - make a pocket for the pump no deeper than 2.5 cm or 1 inch
**Ascenda Catheter Design**

- **Thermoplastic PET Braid**
  - Composite body 6x stronger than previous catheters
  - Offers improved resistance to kinking and occlusions

- **Silicone Inner Layer**
  - Drug compatible

- **Polyurethane Outer Layer**
  - Resistance to leaks and breaks

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**The Spasticity Program**

- Dose titration and Rehabilitation
- Post op day 1 - oral meds weaned
  - Therapy evaluations for IPR
  - ITB dose titration started

Medical reasoning for IPR
Physician to see patient daily for dose adjustments, wound care, and collaboration with patient and therapies. Not possible in SARs.

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**The Spasticity Program**

- Pump maintenance and refills
- Patients seen after discharge in 2 weeks
- Dose adjustments continue ~6 months
- Ongoing therapies
- Pump refills about every 3-6 mos – depends on their dose
The Spasticity Program

- Trouble Shooting
  - If treatment efficacy is lost… spasms worse
  - In the office:
    - Bolus dose, CAP aspiration
  - In Radiology
    - CT dye study
- Sometimes we can’t figure out the problem….
- Repeat the trial dose – bypass the system

Injection Therapy

- Anesthetic / Diagnostic Nerve Blocks
  - Procaine
  - Lidocaine
- Neurolytic Nerve Blocks
  - Ethanol
  - Phenol
- Botulinum Toxin
- Myoblock
- Dysport
- Xeomin

Injections

Advantages
- Not permanent
- Reduces focal spasticity, improves function, decreases pain
- Effects are localized - not systemic

Disadvantages
- Not permanent - may need to repeat injections
- Botulinum toxin: more expensive than other injections, may develop antibodies - New: Myobloc, Dysport, Xeomin
**Botulinum Toxin**

- *Clostridium botulinum* injected into the muscle
- No systemic effect
- EMG guidance for small muscles
- Results typically last 3-5 months

**PT and OT**

- Stretching
- Stretching
- Weight bearing
- Weight bearing
- Functional demand activities
- Strengthening
- Splinting
- NEMS

**Neuromuscular Electric Stimulation**

- Surface electrodes
- Held in place by
  - Garments (Wearable Therapy)
  - Splints (Bioness)
  - Goo
  - Tape
- Activates the muscle electrically
ITB Therapy  Patient Selection

- Step 2 – Exclusion Criteria
  - 1. Infection present at time of screening or implantation
  - 2. Hypersensitivity to oral baclofen (rare)
  - 3. Psychosocial or financial impediments to implantation, follow up, or refills ***

Therapy Examination During the Screening Test

- Typically assess at 2 and 4 hours post bolus
- Ashworth or Modified Ashworth Scales (AS or MAS)
- Passive/Active Range of Motion (PROM / AROM)
- Observe movement patterns
- Spasm Scale
- Pain Scale
Reassess for other interventions

- After ITB therapy is optimized – we frequently go back to revisit other treatment options for residual tone, contractures, pain
  - Botulinum toxin, Myobloc
  - Orthopedic interventions
  - Splinting / casting
  - Wheelchair modifications

Assessing the Screening Results

- Looking for decrease in muscle tone
- Decrease in pain, improvement in motor control
- Excessive loss of tone is not a contraindication for ITB Therapy
- Test scores contribute to clinical judgment but do not substitute for it

There are other pumps out there
**Ascenda: Designed to Reduce the Risk of Common Complications**

- **Thermoplastic PET Braid**
  - Composite body 6x stronger than previous catheters
  - Offers improved resistance to kinking and occlusions

- **Silicone Inner Layer**
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**Ascenda Catheter Design**

**Current Research – TBI/CVA**

- ITB is a disease stabilizing factor
- ITB facilitates neural plasticity

- Should we be putting ITB therapy in Severe TBI patients in the ICU? (yes in Scandinavia)
- Should we be putting ITB therapy in dense hemiplegics (CVA)?? (yes in Scandinavia and GB)
After Implant

- Wound care
- Activity limitations
- For 6 weeks – no repetitive bending or twisting at the waist - to prevent the catheter from backing out of the spine
- For 4 weeks – no pool, hot tub or bathtub to prevent infection of the wounds

Inpatient or Outpatient rehab ??
- IPR allows for daily adjustment of the dosing and closer monitoring of the wound. Allows for quicker functional improvements for the patient to be safe at home
- Only two SAR (Heartland and Saline) have PM&R docs that can adjust ITB dosing.
- Patient’s that go home see me weekly for dose adjustments

Patient education about their pump

- Reassure about TVs, microwaves, X-rays
- Precautions around MRI
- Need to inform all health care providers
- Educate about air travel, scuba diving
- Emergency Protocols
- Contact phone numbers
After Implant

- **Dose Titration:**
  - Gradual weaning of oral meds
  - Dose changes every 24 hours as in-patient
  - Weekly as out-patient
  - Monitor response re: tone, spasticity, function
  - Monitor for adverse effects: weakness, hypotonia, nausea, hypotension, urinary retention

Dosing (ITB Therapy™)

- **Start Low – Simple Continuous**
  - Minimum rate
  - Concentration 500mcg/cc

- **Go Slow**
  - **TBI, SCI, CP:** After the first 24 hours, the daily dosage should be increased slowly by 10-30% increments and only once every 24 hours.
  - **MS:** After the first 24 hours, the daily dose should be increased slowly by 5-15% only once every 24 hours, until the desired clinical effects are achieved. Increase by 10-30% per visit as tolerated

- **FLEX Dosing**

Therapist Role Post-Implant

- Propose treatment plan
- Function, splinting, equipment
- Provide input regarding dosing
- Manual Therapy – esp. Foot, Ankle, shoulder, trunk
- Neuromuscular retraining
- Undo “old habits” – esp. Stroke
Risks of ITB Therapy

- Infection
- Catheter and procedural complications may occur
- Overdose
- Withdrawal

Baclofen Pump Infection

- Needs to go to the hospital
- IV antibiotics
- Pump needs to come out (Neurosurgery)

Baclofen Overdose

- Happens after a programming error or dose increase is too much
- Drowsiness - Lightheadedness
- Dizziness - Somnolence
- Respiratory depression
- Seizures
- Hypotonia - floppy
- Loss of consciousness
- Can happen with Oral Baclofen or ITB
Baclofen Withdrawal

- 90% Subacute – no emergency –
- patient comes to office with increased tone
- trouble shoot

- 10% Acute = life threatening
- Sudden discontinuation of the ITB therapy
- Pump empty
- Catheter disconnect or fracture
- pump failure
- Managed in the ER/Hospital

Baclofen Withdrawal

- Acute = life threatening
- Managed in the ER/Hospital
- Hypertonia…rigidity
- Hyperthermia
- Seizures
- MOSF

- Supportive care until problem fixed and Intrathecal Baclofen is restored