Intrathecal Baclofen for Spasticity

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Neurosurgery
Neurology
Pediatric Neurology
Pharmacy
Physiotherapy
Nursing
Motor disorder characterized by a velocity–dependent increase in tonic stretch reflexes (muscle tone) with exaggerated tendon jerks, resulting from hyperexcitability of the stretch reflex, (clasp-knife response) as one component of the upper motor neuron syndrome.

Intrathecal Baclofen for Spasticity:

Spasticity:
Intrathecal Baclofen for Spasticity:

Spasticity Pathophysiology:

- Partial loss of the inhibitory input from descending pathways like CST, VST, RST.
- Increased output of alpha motor neuron pool.
- Developing corticospinal pathways (cerebral palsy) become redirected to innervate both agonist and antagonist muscles.
Intrathecal Baclofen for Spasticity:

**Spasticity Surgical treatment:**

- Neurectomy
- Myelotomy
- Intrathecal Baclofen Pump
- Selective Dorsal Rhizotomy
Intrathecal Baclofen for Spasticity:

**Spasticity:**

- Baclofen: (β-[4-chlorophenyl]-GABA is a synthetic γ-aminobutyric acid (GABA) agonist that acts selectively on both pre and post synaptic GABA$_B$ receptors (thalamus & dorsal gray matter of SC) to reduce excitatory synaptic transmission.
• **Presynaptic:** Decreased release of excitatory transmitters e.g. glutamate and aspartate (↑ restriction of Ca+2 influx into presynaptic terminals).

• **Postsynaptic:** Prolonged hyperpolarization of the neuronal membrane and decreased neuronal activity (↑ K+ conductance at post synaptic terminals).
Intrathecal Baclofen for Spasticity:

Baclofen, Oral:

- Used since early 1970s.
- Absorbed well.
- Low lipid solubility
- Minimal transport across the BBB
- Dose 5-160 mg /day (40-60)
- Effective for spasticity of spinal origin
- Adverse Effect:
  sedation, behavior changes, ataxia etc.
Intrathecal Baclofen for Spasticity:

Baclofen, Intrathecal:

- Direct instillation of the drug into the subarachnoid space may relieve the spasticity while minimizing the centrally mediated side effects.
- 100 mg orally: 5-10 μg intrathecally
- Baclofen conc. at lumbar cistern = 4X at cisterna magna.
• 1st reported by Penn 1984.
• Efficacy in spinal spasticity is well documented.
• In CP: ITB improved spasticity, functional outcome, patient care, need for orthopedic surgery and athetosis in dystonia.
Intrathecal Baclofen for Spasticity:

Baclofen Pumps Options:

- **Programmable:**
  - Battery powered
  - Adjusting programmer
  - Different doses, conc.
  - Replaced every 4-6 years

- **Non programmable**
  - Fixed flow rate
  - Change of conc.
  - Indefinite life?
Intrathecal Baclofen for Spasticity:

Goals of Therapy:

Be Realistic!!

- Improve quality of life.
- Control of spasticity may unmask function.
- Patient cannot become normal.
- Increased mobility, personal hygiene, better seating, prevention of contractures. Preventing hip dislocation are realistic goals.
Intrathecal Baclofen for Spasticity:

Baclofen, Intrathecal:

Stage 1: Patient Selection
Stage 2: Screening Test
Stage 3: Implant
Stage 4: Maintenance, Follow-up & Rehabilitation
Intrathecal Baclofen for Spasticity:

**Patient Selection:**

- Spasticity interfere with quality of life.
- Failed control with oral medications.
- Patient & caregiver have realistic goal of therapy.
- Sufficient support (financial & technical).
- Successful testing dose.
Intrathecal Baclofen for Spasticity:
Stage 2: Screening Test:

- Desired outcome
- Complications
- Expectations

Bolus: 50 mcg

24 hrs after Bolus: 75 mcg

Positive Response “Implant”
Negative Response “No Implant”

Not a Candidate
Intrathecal Baclofen for Spasticity:

Stage 3: Implantation:
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Complications:

- Mild sedation*.
- Dizziness, blurring of vision.
- Seizures.
- Life threatening overdose; respiratory depression, hypotension, bradycardia & coma.
- Sudden withdrawal symptoms; hallucination, seizures, severe spasticity and hyperthermia.
- Pump failure; 5-10 %
- Infection & hardware fractures.
Intrathecal Baclofen for Spasticity:

Stage 4: Maintenance, F/U & Rehabilitation:

- Support
- Refilling of Medicine
- Observe of system failure
- Rehabilitation
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Role of physiotherapy:

- Preoperative assessment
- Range of movement
- Post testing assessment
- Post operative assessment
- Utilize the gain from treatment in improving Quality of Life
Intrathecal Baclofen for Spasticity:

Some Issues:
Intrathecal Baclofen Therapy for Spasticity: A Compliance Based Study to Indicate Effectiveness

Hussam Abou Al-Shaar
Ahmed Alkhani, MD, FRCS

Conclusions:

• ITB therapy is a relatively safe and effective.

• @ 2yr F/U post implantation, ~ 3 / 4 patients (74.1%) continue to comply with the treatment.
Intrathecal Baclofen for Spasticity:

Conclusions:

- None permanent / need repeated filling.
- Upper & lower extremities effects.
- Effective and improving function.
- Effects are localized - not systemic.
- Support technical and financial.
- Relatively safe

A Valid option
Thanks