Clinical Uses of Botulinum Toxin: Case Presentations

Albert C. Clairmont, MD
Associate Professor-Clinical
Department of PM & R
The Ohio State University

OBJECTIVES

• Review common clinical problems caused by spasticity and movement disorders
• Define management strategies available to clinicians
• Learn to identify appropriate candidates for botulinum toxin therapy
• Understand when (and how) to employ botulinum toxin
OBJECTIVES

• Understand when and how to employ other agents
• Be aware of the value of combination therapy
• Become familiar with techniques to identify muscles likely to benefit from interventions
• Be aware of the value of combination therapy
• Understand when and how to employ other agents.
Problems related to spasticity & movement disorders

- Pain and discomfort
- Impaired use of limb(s); walking, transfers, transfers,
- Inability to perform activities of daily living
- Incoordination
- Weakness
- Deformity
- Lowered self esteem
- Personal hygiene
- Burden of care
- Non restful sleep
- Issues of intimacy
- Decreased social contacts
- Lowered self esteem
- Personal hygiene
- Burden of care
- Non restful sleep

Problems related to spasticity & movement disorders

- Deformity
- Weakness
- Incoordination
- Inability to perform activities of daily living
- Impaired use of limb(s); walking, transfers,
- Pain and discomfort

Problems related to spasticity & movement disorders
Functional Objectives

- Improve potential for therapeutic outcomes
- Improve mobility
- Improve ADL
- Maximize pain relief
- Improve tone
- Improve range of motion (ROM)
- Decrease effect of hypertonicity on quality of life

Functional Objectives

- Improve outcomes from the PT/OT
- Improve ADL
- Improve mobility
- Improve potential for therapeutic outcomes
Major categories of objectives

1. Comfort (usually pain relief and issues of hygiene)
2. Function
3. Hygiene

Plus

Primary lateral sclerosis

Stroke
CASE PRESENTATION

- Assessment: What are the problems and limitations imposed by her spasticity?
- Goals: Evaluate options

CASE PRESENTATION

88 y.o. w complicated history
- Stroke: recovered; could walk w walker and AFO after stroke

- Required kidney stent; two attempts
- Tone R side
- Regressed to walker, then wheelchair

CASE PRESENTATION

- Goals: Evaluate options
- Limited imposed by her spasticity
- Assessment: What are the problems and limitations imposed by her spasticity?
CASE PRESENTATION

• Experiencing lower limb dystonia & severe inner thigh pain
• Difficulty with personal hygiene
• Difficulty with toileting related to time required for transfers. ON LASIX!!
• Cognitive function excellent
• Distressed

Neurologist Dx: Primary lateral sclerosis
Distressed
Cognitive function excellent

Goal: TOILETING.

Note: She is sitting in a wheelchair. R knee is in flexion and cannot move actively or passively.
L knee 3/4 MAS, hip 3, ankle 1+/4
R knee 4/4 MAS, hip 3, ankle 4/4

Rx options

CASE PRESENTATION
CASE PRESENTATION

Six % phenol or 98% alcohol

Pros and cons

Intrathecal baclofen pump: Had severe reaction to oral baclofen requiring hospitalization. Lost consciousness

Botulinum toxin injections

Pros and cons

Botulinum toxin type A

23-gauge 75 mm Injectable needle electrode

Day of injection, hip adductors 4/4 MAS

Six years post stroke

Total 600 Units

L adductor longus 50 U x 6

R adductor longus 50 U x 6

23-gauge 75 mm Injectable needle electrode

Botulinum toxin type A

Day of injection, hip adductors 4/4 MAS

Six years post stroke

CASE PRESENTATION
CASE PRESENTATION

• 3 weeks after botulinum toxin injections
• “I am happy”
• No thigh pain
• 90% reduction in toileting accidents
• Easier to transfer
• Hip adductors: Low side of 3/4 MAS
• Still on LASIX

CASE PRESENTATION
Multiple Sclerosis

- 63yr. old woman w long H/O MS

Obligatory wheelchair user

- Co-existent schizophrenia and ischial pressure sore
- C/O chronic stiff, tight, painful lateral bent neck

Multiple Sclerosis

CERVICAL DYSTONIA

MULTIPLE SCLEROSIS
Guadabutolinumtoxina

Right side
• Sternocleidomastoid 30 U
• Levator scapulae 10 U
• Sprenius capitis 20 U
• Cervical Trapezius 20 U

Left side
• Sprenius capitis 10 U
• Cervical Trapezius 10 U

Total = 100 U

Multiple Sclerosis
TORTICOLLIS
TORTICOLLIS

24 y.o. "referee" in domestic dispute
• intervened in cat vs dog confrontation
• Cat bit his left hand, dorsal aspect
• Hospitalized 1 ½ days; given I.V. antibiotics
• Persistent hand pain & swelling
• Difficulty turning or controlling the neck
• Neck stiffness causing increasing neck pain
• C/O progressively increasing neck spasms,

Presents for evaluation about 4 months later

Abnormal neck positioning began @ DC

TORICOLLIS

Neck stiffness
• Difficulty turning or controlling the neck
TORTICOLLIS. TREATMENT

LEFT
- Cervical trapezius 20/10 U
- Trapezius ridge 10 U
- Levator scapulae 10 U
- Splenius capitis 20/10 U
- Total = 200 U

RIGHT
- Sternomastoid 10 U
- Latissimus dorsi 5 U
- Trapezius ridge 20/10 U
- Cervical trapezius 20/10 U
- Total = 200 U

BEFORE TREATMENT
AFTER BOTULINUM TOXIN
Intramuscular Injection Technique

Capsule Splenius Capitis

Multiple Sclerosis

Distonia
Multiple Sclerosis

• 71 yr. old woman w 20 yr. H/O MS
• Right hand dominant
• Severe ROM restriction at right elbow
• Lost ROM right elbow one year ago
• Frozen elbow after 3-week hospitalization
• Cannot cook or do bimanual activities
• Cannot perform ADLs
• Donning a blouse or any top is difficult
• Emotional distress secondary to above
• Restricted types of dress wear

Partial List of Problems

• Cannot cook or do bimanual activities
• Cannot perform ADLs
• Donning a blouse or any top is difficult
• Emotional distress secondary to above

Obligatory wheelchair user

• R. hand works but is limited by elbow issue
• Lost ROM right elbow one year ago
• Frozen elbow after 3-week hospitalization
• Severe ROM restriction at right elbow
• Right hand dominant

71 yr. old woman w 20 yr. H/O MS

Multiple Sclerosis
Physical Examination
• Right elbow fixed in fully flexed position
• Passive ROM < 20º from flexed position
• ¾ Modified Ashworth Scale at the elbow
• No forearm pronation or supination
• Full finger function and good wrist flex/ext
• Shoulder ROM to 100º of abduction
• No forearm pronation or supination
• ¾ Modified Ashworth Scale at the elbow
• Passive ROM > 20º from flexed position
• Right elbow fixed in fully flexed position

Major Goals
• Active function of right upper limb
• Improve ROM right elbow
• Improve all aspects of ADLS
• Cook breakfast

Physical Examination
Treatment

- Botulinum Toxin Type A 200 Units
- Biceps brachii 50 U x 2
- Brachioradialis 50 U, 30 U, and 20 U
- Only 2 MUAPs recorded in biceps w maximum voluntary effort or strong pull on flexed elbow (disuse/suppressed axons)
- Botulinum Toxin Type A 200 Units
6 WEEKS AFTER BOTULINUM TOXIN INJECTION
12 WEEKS AFTER INJECTION

Cooks Breakfast Regularly

Wears any style of clothing that she please

Full interference pattern on EMG of right biceps
Neuropathic Pain
Lumbar stenosis
Incomplete spinal cord injury
Spasticity & Neuropathic Pain

68 y.o. man w complicated history

• SCI at age 23. Complete tetra → Incomplete, w “normal function”
  • Residual lower limb weakness; walked without assistive device
  • SCI at age 23, Complete tetra ← Incomplete, w 68 y.o. man w complicated history
  • 1994: Dx spinal stenosis → Surgery Feb 2011
  • Fusion L2-3, L3-4 → “good results”
  • Recurrent back pain → Surgery Feb 2011

Spasticity & Neuropathic Pain

• Persistent back pain starting 3 hrs after Pt.
  • Started Pt April 2011; hamstring stretch
  • Fusion L2-3, L3-4
  • 1986, toured Europe independently
  • 1994, back pain referred to the L foot
  • Residual lower limb weakness; walked without assistive device
Spasticity & Neuropathic Pain

- Back pain worsens with wearing clothes
- Max tolerance 4-5 hrs; must doff clothes
- Many modalities tried without success
- Local anesthetic block → limited relief x 1
- More surgery excluded
- Many modalities tried without success
- Max tolerance 4-5 hrs; must doff clothes
- Back pain worsens with wearing clothes

Pain Medications @ Evaluation

- Fentanyl 50 mcg TD Q 3 days
- Oxycodone 30 mg Q 6 h prn
- Gabapentin 1200 mg bid
- Lyrica 750 mg po bid
- Tizanidine 4 mg bid
- Acetaminophen 650 mg 2 tabs Q 8 h prn
- Diazepam 15 mg Q hs

Spasticity & Neuropathic Pain
Pain Medications @ Evaluation

• Capsaicin, 1 application tid prn
• 5% Lidocaine patch, apply 1-3 Q 12 h
• Voltaren 1% gel, 2 applications Q 4 h
• 5% Lidocaine patch, apply 1-3 Q 12 h
• Capsaicin, 1 application tid prn

Physical Examination

• Multiple scars on back
• Tender spot on left flank/quadratus lumbo rum
• Slight ↓ tone in the lower limbs ~ ¼ Modified Ashworth at the R knee

PAIN MODALITY: TENS
Impression

1. Left low back pain
2. Incomplete spastic tetraparesis
3. Complex regional pain syndrome
4. Late effect of spinal cord injury
5. Lumbar stenosis
6. Late effects of low back surgery (failed back surgery syndrome)
Quadratus lumborum

30 U x 1

10 U x 7

5 U x 7

Intradermal Injections

ONABOTULINUMTOXINA
RESULT

- Pain resolved
- L flank spasticity pain ~ 2 1/2 months
- Inter-injection interval pain free for
  neuropathic pain
- Can ride in an automobile freely
- Can wear garments 11-12 hours/day
- ↓ use and intensity of TENS
- Pain resolved

HYPERHIDROSIS

• 34 y.o. male with acute onset of hyperhidrosis 8 months previously
• ↑ Sweating of palms & soles
• Changes 4 pairs of socks/day
• Progressively worse. ↑↑ intake H₂O
• 1st morning sample of urine is Dark & strongly scented

HYPERHIDROSIS

• Various medications tried without success
• Endocrinopathy w/u negative
• No family H/O hyperhidrosis

Consultation request for botulinum neurotoxin injections or iontophoresis
HYPERHIDROSIS

- Iodine & corn starch to highlight areas
- Initial Rx: OnabotulinumtoxinA 200 units
  - 2 mL Pres free Saline per 100 unit vial
  - 1 mL syringe: 50 units/mL
  - ~ 1-2 cm Grid
  - 2.5 U/site
  - Local anesthesia
  - 1 ml syringe: 50 units/ml
  - 2 ml Pres free Saline per 100 unit vial
- Initial Rx: OnabotulinumtoxinA 200 units
  - Iodine & corn starch to highlight areas
Parkinson's

- 85 y.o. man with long H/O Parkinson's
- Does not know why he is at the office
- Left upper limb rigid and painful
- Hand fisted, impossible to open voluntarily
- Cannot clean left palm
- 4/4 modified Ashworth Scale
- Rigid left elbow
- Typical tremor of right upper limb
- Hard of hearing

Physical Examination

- Tightly fisted left hand, without tremor
- Typically fisted left hand, with out tremor

Parkinson's
PRIOR TO TREATMENT

OBJECTIVES

• Pain relief, left upper limb
• Decrease tremor of right upper limb
• Open left hand for cleaning
• Pain relief, left upper limb
TREATMENT

• Botulinum Toxin Type A 500 Units
• FCU 10 units
• R. side: FCU, FDS, FDP, total 60 U
  • L. side: 440 Units
  • Reapplication to R. upper limb p 10 months
• Persistent right upper limb tremor
  • Long head of biceps brachii 10 units
  • FCR 10 units
  • Triceps 30 U; FPL 30 U; BR Radialis 30 U
  • FDP, FDS, FCR total 340 U
  • R. side: FCU, FDS, FDP total 60 U
  • L. side: 440 units

Botulinum Toxin Type A 500 Units
5 MONTHS LATER

PAROXYSMS

AFTEB BOTULINUM TOXIN INJECTIONS

5 MONTHS LATER