UPDATE ON Craniofacial Pain and Dystonia

Case studies in Blepharospasm and Facial Spasms
Case Studies in
Blepharospasm and
Facial Spasms

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Blepharospasm and Facial Spasms

- Blepharospasm
- Oromandibular dystonia
- Hemifacial spasm
- Tics
- Chorea
- Tardive dyskinesia
- Other stereotypies
- Myokimia
- Psychogenic facial dyskinesias
Blepharospasm Case

- 50-year-old right-handed woman
- 6 months earlier, she noted excessive squinting and light sensitivity
- Gradually worsened; stable for the past two months
- Aggravated by overhead and outdoor lights, and headlights
- 6 weeks ago she gave up driving due to excessive eye closure; now “pretty much housebound”
- The left eye is worse, but both eyes close simultaneously
- Holding her left temple and pulling on the corner of the left eye helps her keep both eyes open
- Symptoms have been partially improved by alprazolam 0.5 mg tablets
Blepharospasm video
Blepharospasm

- A form of focal dystonia
- Dystonia: a motor disorder characterized by inappropriate muscle contraction
  - Sustained (“tonic”) contractions
  - Irregular, unsustained (“clonic”) contractions
- Both contraction types occur in consistent patterns characteristic of each individual
- Both often are present simultaneously
Distinctive features of dystonia

• “Sensory tricks”
  – Physical maneuvers or gestures that ameliorate dystonia
    • in a way that cannot be explained by simple opposition to the dystonic movement
  – Called “sensory”, but mechanism of action unknown

• Task modulation
  – Specific actions may trigger, aggravate or ameliorate dystonia
Blepharospasm

- Focal dystonia of the eye region
- Presents with any combination of:
  - Involuntary eye closure
  - Excessive spontaneous blinking
  - Eye discomfort with burning, dryness or grittiness
  - Light sensitivity
- The simplest dystonia, in that it produces a single direction of movement
- But often disabling due to functional blindness
  - Driving, reading, using computer, watching TV, etc.
Blepharospasm

- Greater tendency to spread to adjacent body parts than cervical or upper limb dystonia
- Strong female preponderance, 2-3/1 ratio females/males
- Peak age at onset between 40-60 years old
Blepharospasm

Exam:

- Stereotyped, bilateral, and synchronous spasms of the orbicularis oculi ± surrounding muscles causing:
  - Forceful eye closure spasms (brief or sustained)
  - Light narrowing or closure of the eyelids
  - Increased spontaneous blink rate

- Other observations may include:
  - Indoor sunglasses (due to photophobia)
  - Sensory trick in up to 70% of patients
  - Associated apraxia of eyelid opening/eyelid freezing
  - Dystonia in adjacent body areas, especially lower face
Pathophysiology poorly understood

- Has been associated with focal lesions in thalamus, lower brainstem, basal ganglia, cerebellum, midbrain, and cerebral cortex
- But > 98% of patients show no related imaging lesions
- Autopsy studies usually normal
Blepharospasm

Treatment options:

• Botulinum toxin injections are the treatment of choice
  – OnabotulinumtoxinA (Botox) and incobotulinumtoxinA (Xeomin) are FDA-approved for this indication
  – Both toxins yield comparable effects
  – Side effects: dry eyes, ptosis, and dry mouth

• Oral medications rarely produce satisfactory results

• Myotomy/myectomy
  – Useful in 80%, but severe complications, high recurrence

• Deep brain stimulation (DBS) modestly/effective
  – 25-50% improvement in 12 patients
  
Reese R, et al. Mov Disord 2011; 26: 691-81
Recommended botulinum toxin dose:

- **Botox**
  - initial dose: 1.25 Units to 2.5 Units per site
  - “There are 3 approved injection sites for BOTOX® in the treatment of blepharospasm” *(equal to 7.5-15 units total)*
  - “The cumulative dose … for blepharospasm in a 30-day period should not exceed 200 Units*
Blepharospasm

Recommended dosage:

- **Xeomin**
  - “The recommended initial total dose of XEOMIN should be the same dose as the patient’s previous treatment of onabotulinumtoxinA”*
    - If not known, the initial dose of XEOMIN should be 1.25–2.5 units/injection site
  - Subsequent dosing should be tailored to the individual patient, based on response, up to a maximum dose of 35 units/eye

*“The potency units for XEOMIN® (incobotulinumtoxinA) are specific to the preparation and not interchangeable with other botulinum toxin A products”
### Xeomin: Median Dose and Median Number of Injection Sites per Eye (Blepharospasm)

<table>
<thead>
<tr>
<th>Injection Area</th>
<th>Median Units per area</th>
<th>Median Number of Injection Sites (Min-Max)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temporal Area</td>
<td>13</td>
<td>2 (1 – 6)</td>
</tr>
<tr>
<td>Eyebrow Area</td>
<td>5</td>
<td>1 (1 – 4)</td>
</tr>
<tr>
<td>Upper Lid Area</td>
<td>10</td>
<td>2 (1 – 4)</td>
</tr>
<tr>
<td>Lower Lid Area</td>
<td>8</td>
<td>2 (1 – 3)</td>
</tr>
<tr>
<td>Orbital Rim</td>
<td>5</td>
<td>1 (1 – 3)</td>
</tr>
</tbody>
</table>
Blepharospasm

Pretarsal vs. preseptal injections: greater efficacy and duration
Blepharospasm

Real-world use of botulinum toxin in a recent case series

• Mean (SD) doses:
  - Botox 71.8 (±30.1) units
  - Xeomin 76.4 (±26.4) units

• 88% “very satisfied” with peak effects of injections
  – Yet impairment of at least one activity of daily living ranged from 29% (driving) to 39% (reading)

• 70% noted deterioration within 10 weeks of injections

49-year-old right-handed woman
6 months earlier noted knitting of her eyebrows, followed by clenching eyes shut, first while playing tennis, then when gardening
“I got real stressed out” 4-5 months ago and “started doing funny things with my mouth”, including puckering movements of her lips
Movements now occur mainly when she is talking;
  – when talking on the phone alone at home, she will have to rest afterward because of fatigue from the excessive facial movement
If she puts something in her mouth, e.g., a finger or the stem of her eyeglasses, forcefully opens her eyes, or smiles, she can abolish the extraneous movements even while speaking.
• She also remarked “I didn’t do it in front of my psychiatrist for a long time” as well

• However, she denied any ability to control the movements voluntarily (other than the “tricks” noted above). She said she had been told that it is a “bad habit” that will resolve

• She is taking clonazepam 0.5 mg q.a.m. without benefit
Oromandibular Dystonia

- Multiple possible components, alone or in combination
  - Jaw closing, tonic (trismus) or clonic (bruxism)
  - Jaw opening
  - Lateral jaw deviation
  - Lower facial grimacing
  - Labial dystonia (lip pursing, tightening, puckering, etc.)
  - Lingual dystonia

- May be disabling for speaking or eating
In comparison to blepharospasm

- Less likely to occur in pure form, without dystonia elsewhere
- Similar response to sensory tricks
- Similar epidemiology
  - Essentially, this is the same patient group with a different distribution of dystonia
- Similar lack of understanding of pathophysiology
- Similar treatment options
Oromandibular Dystonia

Botulinum toxin injections

- Only partially FDA-approved ("VII nerve disorders")
  - And then only for onabotulinumtoxinA (Botox)
  - No formal dose recommendations

- Injection sites vary with movement pattern
  - Jaw closing: masseter, temporalis
  - Jaw opening: bilateral lateral pterygoids, anterior digastric
  - Lateral jaw deviation: unilateral lateral pterygoid
  - Lower facial grimacing: facial muscles of expression
  - Labial dystonia: orbicularis oris
  - Lingual dystonia: low-dose geneoglossus, hyoglossus (high risk of dysphagia)
Oromandibular Dystonia

Published on abobotulinumtoxinA dosages


- Masseter 24.5±17.7 units (range 2-100)
- Temporalis 18.5±11.9 units (range 2-75)
- Medial pterygoid 16.3±8.1 units (range 5-40)
- Lateral pterygoid 15.9±8.7 units (range 2.5-60)
- Anterior digastric 9.8±4.6 units (range 3.75-30)

- Due to complexity of movement, only ~ 2/3 show moderate improvement or better
  - Functional improvement for jaw opening/closing/deviation: 37-45%
Hemifacial Spasm Case

- 47-year-old right-handed woman
- 8 years earlier first noted “fluttering” in right lower eyelid
- Twitching progressively spread to involve the whole right side of her face
  - her lower face became involved in the last 2 years
- Also progressively more frequent, now almost constant
- Symptoms are aggravated by self-consciousness, smiling and drinking, but not by visual stimuli
- No pain, but aches from continued muscle pulling.
- MRI of the head was normal.
- Trials of carbamazepine, gabapentin and oxcarbazepine were ineffective
Hemifacial Spasm video
Hemifacial Spasm

- Intermittent “twitching” of muscles innervated by the same facial nerve
- 90% begin in orbicularis oculi, causing sudden eye closure
  - Patients may complain of both rapid, blink-like movements and sustained eye closure
- Spreads to a variable degree upward and downward
  - Also, spasms become more frequent
  - Stabilizes after one to several years
- Almost always unilateral (> 98%)
- May be disabling for visual function
- Female preponderance: 2/1 ratio, females/males
- Typical age at onset between 40-80 years old
  - ~ 5% before the age of 30
Hemifacial Spasm

Exam
- Myoclonic (unsustained) facial spasms may be punctuated by tonic (sustained) spasms
  - Synchronous in involved muscles in facial nerve distribution, from frontalis down to platysma
  - Spasms may occur in paroxysms after forceful contraction
- Occasional evidence of prior facial nerve injury:
  - Weakness of all, or a portion of, the muscles innervated by the ipsilateral 7th nerve
  - Synkinesis of muscles innervated by the ipsilateral 7th nerve
- Neurologic exam otherwise normal
Hemifacial Spasm

- Distinction from blepharospasm:
  - Vertically rather than horizontally distributed
  - Sensory tricks are rare
  - Simultaneous frontalis and orbicularis oculi contractions (eyebrow raising with eye closure, a.k.a. “the other Babinski sign”)
  - Frequently due to identifiable causes
    - Compression of CN VII at the root exit zone by an aberrant/ectatic vessel, most commonly the anterior inferior cerebellar, superior cerebellar, or vertebral artery
    - Bell’s palsy
    - Cerebellopontine angle neoplasms, aneurysms, cysts, etc.
    - Demyelinating disease, infarcts, and other brainstem lesions
    - Others
Vertebrobasilar dolichoectasia: seen in 15.5% of HFS patients vs. 3.2% of controls

Kim K, et al. Park Rel Disord 2016; [Epub ahead of print]
Hemifacial Spasm

Other differential diagnostic considerations

- Focal motor seizures
- Epilepsia partialis continua
- Tics
- Psychogenic facial movements
Treatment options:

- **Medications**
  - No established agents: benzodiazepines, anticonvulsants, muscle relaxants are most popularly prescribed
  - Limited efficacy, significant side effects

- **Botulinum toxin injections**
  - The treatment of choice, if surgery not mandatory
  - Thorough knowledge of facial musculature required

- **Surgery**
  - Reversal of structural lesions requiring surgical intervention (neoplasms, aneurysms, etc.)
  - Vascular decompression of the 7th cranial nerve
Hemifacial Spasm

Botulinum toxin injections

- Only FDA-approved ("VII nerve disorders") for onabotulinumtoxinA (Botox)
- High success rate, 75-100%
  

- Start with periocular injections
  - The eye often acts as a trigger for the rest of the face
    - When neutralized, the lower face may follow suit
  - Lower facial injections often result in intolerable cosmetic side effects

- Side effects: facial paresis (23%), diplopia (17%), and ptosis (15%)
Hemifacial Spasm

- No manufacturers’ dosage recommendations specific to HFS

Published onabotulinumtoxinA dosages
  

- Orbicularis oculi  5-30 units in 3–6 sites
- Procerus        2.5-7 units in 1 site
- Orbicularis oris 2-7.5 units in 2–3 sites
- Mentalis        2.5-5 units in 1 site
- Platysma        5-20 units in 1–6 sites
58-year-old right-handed woman
Tics began around the age of 8 with excess blinking
Other tics, including at least one sonic tic (throat clearing)
“Sometimes if you see other people ticcing, you pick up these tics"
Blinking has remained her main tic all along
Diagnosed only 16 years ago
Treated with clonazepam up to 4 mg per day
  - experienced sedation and "ran into a tree" in her car.
Still takes clonazepam 1 mg daily
Tics

- Episodic, irregular, stereotyped movements & sounds
  - Not a simple involuntary movement, but a conscious response to unconscious urge
  - Thus often suppressible
- Facial tics usually part of larger tic disorder
  - Gilles de la Tourette syndrome (GTS)
    - Motor and sonic tics, simple or complex
    - Onset in childhood, usually by age 12
    - Strong male preponderance: males/females: 4/1
    - Family history is common
- Face is the most common site of onset of GTS
- Occasionally, motor tics remain limited to the faces
Tics

Treatment options:

- Oral medications
  - Presynaptic catecholamine depletors, e.g., tetrabenazine
  - Dopamine receptor blockers, e.g., risperidone, fluphenazine
  - Others: benzodiazepines, clonidine

- Psychological strategies

- Botulinum toxin injections

- Deep brain stimulation surgery
Botulinum toxin injections for tics

- Not specifically FDA-approved, but facial tics qualify as “VII nerve disorders” for onabotulinumtoxinA (Botox)

- Facial tics should be treated with an approach similar to injections for blepharospasm, OMD and HFS, depending on muscles involved in tics
  - Similar dosage and technique
Conclusion

1. Facial spasms may have many causes
2. Correct diagnosis depends on clinical recognition
3. Botulinum toxin is the treatment of choice
   • Exception: facial tics as part of a generalized tic disorder
4. Knowledge of facial muscular anatomy is key to successful treatment