Hemifacial Spasm

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ComDis 624
Motor Speech Disorders
What is Hemifacial Spasm?

- HFS is a hyperkinetic movement disorder characterized by involuntary spasms.
- HFS affects the muscles innervated by the facial nerve.
- The spasms are uncontrollable and may be clonic (brief) or tonic (continuous) in nature.
What is the Cause of Hemifacial Spasm?

The most common cause is contact between a blood vessel and the root exit zone of the facial nerve.

An artery often causes compression on the facial nerve if it is dilated or hardened.

The arteries most commonly involved are the AICA, PICA, and vertebral artery.

Tunc et al. (2008)
Anatomical Layout of CN VII and Nearby Arteries

- Superior cerebellar peduncle
- Middle cerebellar peduncle
- Cerebellum
- Medulla
- Basilar artery
- Midbrain
- Pons
- Anterior inferior cerebellar artery (AICA)
- Posterior inferior cerebellar artery (PICA)
- Vertebral artery

Causes ctd.

A limited number of cases of HFS have been attributed to tumors, demyelinating disorders, or infections (Park et al., 2008).

A rare study cited by Tunc et al. (2008) found a number of patients with HFS without a localizable lesion.
Clinical Presentation of HFS

A typical spasm...

- begins with involuntary twitching of the orbicularis oculi

- is initially clonic in nature and then a tonic phase takes place, in which the ipsilateral eye is forced closed

- gradually increases in intensity and begins to affect other muscles on the same side of the face

“Emotional stress, voluntary contraction of any facial muscles, and fatigue make it worse. The severity of the spasm fluctuates but tends generally to worsen with time” (Sauvain et al., 2001)

Sauvain et al. (2001) Tan et al. (2002)
Orbicularis Oculi
How do You Diagnose Hemifacial Spasm?

- Use of MRI
- Neurological features
- Clinical features
- Differential diagnosis
Treatments

Current treatments

- Botulinum Toxin injections
- Microvascular nerve decompression
- Oral medications
Botox

- Causes temporary weakness of muscles
- Effects last approximately 3-4 months → need to continuously receive injections
- Some argue that Botox can be used over a long period of time without major side effects
- Site of injections should reflect the individual’s needs however there are common injection sites

Ward et al. (2006), Tan et al. (2002)
Microvascular Nerve Decompression

- Can provide a permanent solution
- Involves placing a barrier in between CN VII and the artery
- Success rate of 85%-97%

Frei et al. (2006), Park et al. (2008), Heuser et al. (2007)
Microvascular Nerve Decompression

Sauvain et al. (2001)
Case Study

K.T.
50-year-old right handed male
Native Cantonese speaker
K.T. Background Information

- Self-referred to Center for Language, Speech, and Hearing in March of 2006 for accent reduction
- Left-sided hemifacial spasm and paralysis observed
- Paralysis secondary to Botox injections the client was receiving to treat the hemifacial spasm = Mild Flaccid Dysarthria!
- Microvascular nerve decompression in October of 2007
Measures of Assessment

- 2 months pre-op., 1 week post-op., 1 month post-op, 5 months post-op.

- Oral Peripheral-Neurological Motor Speech Examination (Mayo Clinic Procedures)

- Photo Articulation Test, 3rd Edition (PAT-3)

- Assessment of Intelligibility of Dysarthric Speech (AIDS)
Oral Peripheral-Nerve Neurological
Motor Speech Examination

- Facial symmetry improvement
- Decreased MPT musculoskeletal tension
- Most salient improvements:
  - Smile on command
  - Lip rounding
Assessments of Speech

PAT-3 ➔ Accuracy

AIDS ➔ Intelligibility

Accuracy vs. Intelligibility?
Photo Articulation Test, 3rd Edition (PAT-3)

- Measured **accuracy** of C’s and V’s in words
- Frequency of errors decreased over time
- ALL errors made can be attributed to ESL
  - For example:
    - [u] for [ʊ], distortion of [l], and devoicing of [z]
- *Treatment* vs. Botox/Surgery??
Assessment of Intelligibility of Dysarthric Speech (AIDS)

- Measured *intelligibility* in words and sentences
- Improvement over time
  - 70% → 100% (WOW!)
- Sentence level intelligibility aided by context
- Treatment vs. *Botox/Surgery*??
Discussion

Why is K.T a unique case?
ESL vs. Mild Flaccid Dysarthria
Accuracy vs. Intelligibility
Speech Tx vs. Botox vs. Surgery
Prognosis → Good!
References


Motor and Sensory Innervation of CN VII

- **Brachial Motor**: Muscles of facial expression & stapedius

- **Visceral Motor**: Innervation of muscles for tears and saliva

- **Special Sensory**: Taste anterior 2/3 tongue; hard and soft palate

- **General Sensory**: Concha of auricle and behind ear
What are the Treatments for Hemifacial Spasm?

- Archaic treatments
  - Irrigation of the facial nerve
  - Injection of toxic compounds
  - Removal of the orbicularis oculi

Eby et al. (2001), Tan et al. (2002)
Common Botox Injection Sites

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<th>2 month pre-op</th>
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