Botulinum Toxin for Headache
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I. Botulinum Toxin
   A. 7 different neurotoxins
   B. Produced by bacteria Clostridium botulinum
   C. Type A – Botox (Allergan)
      Dysport (Ipsen)
      Xeomin (Merz)
   D. Type B – Myobloc (Solstice)
   E. Inhibits release of acetylcholine at neuromuscular junction
   F. No direct muscle damage

II. Botox
   A. 50 units vial or 100 units vial of botulinum toxin
   B. Reconstituted with sterile non-preserved 0.9% NaCl
   C. Use within 4 hours, can last up to one month
   D. Initial effect at 3–5 days, maximal 1–2 weeks
   E. 3–6 months duration of action

III. Myobloc
   A. Premixed
   B. 3 dosing volumes
      1. 2,500 U/0.5 mL
      2. 5,000 U/1 mL
      3. 10,000 U/2 mL

IV. Xeomin
   A. Does not need to be refrigerated
   B. “Naked injectable” – no additives
   C. Less likely to develop antibodies
   D. Unit-to-unit equivalent with Botox

V. Toxin Precautions
   A. Infection or inflammation
   B. Pregnancy or lactation
   C. ALS or myasthenia gravis
   D. Aminoglycosides

VI. Antibodies
   A. 5% of those treated
   B. Increase time between injections
   C. Minimize overall dose
   D. Change neurotoxins

VII. Botulinum Toxin for Headaches
   A. Migraines
   B. Tension-type headache
   C. Chronic daily headache
D. Cervicogenic headache
E. Cluster headache

VIII. Mechanisms of Action
A. Reduction in peripheral pain
B. Indirect
   1. Reduced muscle contractions
   2. Reduced mechanoreceptor stimulation
   3. Reduced afferent signals – decreased brainstem nociceptive stimulation
C. Direct effect on peripheral sensory nerves
D. Inhibits release of neuroactive substances
E. Blocks extracranial inflammatory responses

IX. Botulinum Toxin for Chronic Migraine
A. FDA-approved 10/15/2010
B. Meets criteria for migraine without aura
   1. 2 of 3: unilateral, pulsatile, moderate or severe intensity, aggravated by routine activity
   2. 1 of 2: nausea and/or vomiting, photophobia and phonophobia
C. > 14 headache days per month for 3 months
D. Headache lasts > 4 hours (untreated or unsuccessfully treated)

X. Candidates for Botulinum Injection
A. Headache refractory to preventive treatment
B. Patient preference
C. Noncompliance with oral medications
D. Contraindications to standard prevention
E. Adverse events from standard prevention
F. Coexisting jaw, head or neck muscle pain

XI. Strategies for Injection
A. Fixed symmetric sites
   1. Best for chronic migraine - PREEMPT trial
B. Follow the pain
   1. Adjust to symptoms
   2. Best for tension-type and chronic head and neck pain
C. Combination
   1. Fixed site and follow the pain

XII. Osteopathic Manipulation as Adjunct Therapy
A. Cranial base release
B. Muscle energy technique to shorten trapezius
C. Occipital condyle decompression
D. 4th ventricular compression

XIII. Summary
A. Botulinum toxin outcomes are best when used in conjunction with other therapies
B. Migraine medications and aggressive migraine abortive management
C. Physical therapy
D. Oral appliances for TMD and maintenance of normal mechanics in the neck