Learning Objectives

1. Practice applying new knowledge and skills gained from Migraine, Tension, and Cluster Headache sessions, through collaborative learning with peers and expert faculty.
2. Identify strategies that foster optimal management of headaches, within the context of professional practice.
3. Formulate an action plan to implement practice changes, aimed at improving patient care.
Associated Sessions

- Migraine, Tension, and Cluster Headache: Primary Care for Primary Headaches

Audience Engagement System

Step 1
Step 2
Step 3

Agenda

- Demonstrate procedures which may be used safely and effectively within primary care to treat acute and chronic headaches
- List CPT codes for each procedure
- Discuss risks and benefits of occipital nerve blocks, IV magnesium, sphenopalatine ganglion blocks and botulinum A injections

Case # 1-Posttraumatic Headache Disorder

- 42-year-old man involved in a rear-end collision 2 days prior to office visit
- + FH migraine. Pt has no prior headache history
- Stopped at a light in heavy traffic. At time of impact, head was rotated slightly to the right
- Symptoms following impact: "Migraine like headaches" associated with light and sound sensitivity, nausea, neck pain, anxiety, insomnia, fatigue
- Treatment options

Whiplash– Scope of Problem

- Yearly Incidence 4/1,000 $3.9 billion/yr in USA.
- $29 billion with litigation
- 4-42% of pts w MVA related neck injuries with symptoms several years later


Pain Referral Patterns of Whiplash Injuries

Whiplash Injury Disease State Spectrum

- Cervicothoracic:
  - Tear of cervical ligaments
  - Muscle strain
- Other Musculoskeletal:
- Brain Injury, Post Concussive Syndrome:
  - Loss of memory/concentration
- Other Neurological:
  - Weakness of arms and shoulders
- Vestibular Dysfunction-Vertigo
- Psychological:
  - Anxiety
  - Depression
  - Sleep disorders

Common Whiplash Injury Symptoms

<table>
<thead>
<tr>
<th>Cognitive</th>
<th>Physical</th>
<th>Affective</th>
<th>Sleep</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Inattention</td>
<td>- Headache</td>
<td>- Emotional lability</td>
<td>- Increased latency</td>
</tr>
<tr>
<td>- Slowed cognition</td>
<td>- Nausea/vomiting</td>
<td>- Depression</td>
<td>- Fragmentation</td>
</tr>
<tr>
<td>- Amnesia</td>
<td>- Photophobia</td>
<td>- Anxiety</td>
<td>- Increased sleep duration</td>
</tr>
<tr>
<td>- Confusion</td>
<td>- Phonophobia</td>
<td>- Mania</td>
<td>- Decreased sleep duration</td>
</tr>
<tr>
<td>- Vacant stare</td>
<td>- Dizziness</td>
<td>- Incoordination</td>
<td>-</td>
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<tr>
<td>- Loss of consciousness</td>
<td>- Slurred speech</td>
<td>- POTS</td>
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Post-Traumatic Headache Timeline

- Concussion: Transient alteration of brain function as the direct result of biomechanical force. Symptoms persist days to weeks.
- Post-traumatic headache syndrome: Complex pathophysiology, both biological and psychological post concussion. Symptoms persist months to years.
- Chronic effects: Pathophysiology and epidemiology. Chronic traumatic encephalopathy (CTE), suicide risk, depression, cognitive impairment. Symptoms last a lifetime.

Different Headache Types

- Concussion: Functional headache disorder
- Whiplash: Structural headache disorder

Post-whiplash Headache Etiology

- The upper cervical sensory nerve roots that converge on the trigeminal nucleus caudalis contribute to the activation process of the trigeminal nerve, as inciting trauma results in forced flexion and extension of the cervical spine.
- Migraineurs have a genetically weakened neurological system
- Any traumatic event could predispose that migraineur to a chronically weakened neurological protective mechanism
- “Timely, early intervention with appropriate prophylactic therapy may succeed in reversing the pathophysiology, and perhaps even the structural, changes that occur in the brains of migraine sufferers.”

Acute Therapy For Whiplash Injury

- Occipital Nerve Block
  - Safe: Injection not near brain, spinal cord, vessels
  - Blocks greater occipital nerve (GON)
  - Effective for cluster, intractable migraine, whiplash, occipital neuritis
- GON= greater occipital nerve

Loder E, et al. Disease modification in migraine: A concept that has come of age. Headache. 2003: 43. 135-143
Occipital Nerve Block Anatomy

ONB Procedure
- Informed consent
- Inject bupivacaine 0.5 % 4cc +/- Kenalog 40 mg (effective in cluster and whiplash)
- Use 25 g needle for injection
- Can spray with Gebauer’s freeze spray
- Position upright
- Warn that ipsilateral side of head injected will go numb for up to 4 hours
- Inject ONLY one side based on palpation of the MOST tender ONB site

ONB Facts
- CPT code: 64405 unilateral
- CPT code: 64405-50 (bilateral)
- Effects may last weeks or months.
- Can repeat if necessary

Risks and Benefits Of ONB
- Benefits
  - Used to treat whiplash injuries, post traumatic headache disorders, cluster, migraine, occipital neuralgia, and shingles
  - Can be used safely in pregnancy and adolescents
  - Effects are immediate and may lasts weeks or months
- Risks
  - Pt will experience ipsilateral numbness for 2-3 hours post procedure
  - Syncope?
  - Difficulty swallowing post procedure
  - Risk factors for prolonged symptoms (> 3 months):
    - Personal or FH of mood disorders
    - Personal or FH of migraine
    - Hx of prior concussion
    - Delayed symptom onset

Management of Post Concussion Headaches
- First 24 hours: Nothing
- Persistent headache > 24 hours: NSAID, steroids, migraine prophylaxis based on "headache phenotype"
- Post concussion syndrome: Migraine prevention and acute therapies

Procedures For Post-traumatic Headaches
- Onabotulinum toxin A
- ONB
- Sphenopalatine ganglion block
- Greater auricular nerve neuromodulation
- Removeable mandibular prosthesis
- Transcranial magnetic stimulation
Patient With Traumatic Brain Injury

- 61 Y/O vet with TBI. Tank rolled over his head.
- Immediate LOC of ? duration.
- Headaches x 30 years. 25 days per month
- On magnesium oxide and Tizanidine
- Post left ONB headaches have decreased in frequency to 4/month

Case # 2 Acute Abortive Therapy For Migraine

- 27 year old female with history of episodic migraine (w/o aura)
- Has 4-6 headache days per month
- Preventive meds: topiramate 50 mg and magnesium oxide 400 mg at bed
- Acute therapy: Sumatriptan 100 mg PO at onset of headache + naproxyn 500 mg + ondansetron 8 mg ODT pm nausea
- Presents to office complaining of persistent headache x 32 hours. + light and sound sensitivity. Unable to work. Pain is 8/10.

Abortive Therapies For Migraine

- Olanzepine 10 mg PO
- Quetiapine 100 mg PO
- Ketorolac 60 mg slow IV push
- ONB
- Depakon 500 mg IV Push over 5-10 minutes
- IV magnesium SO4 1 gram rapid IV push
- OK for children and pregnancy

Rationale For IV Magnesium

- Serum Mg level is an independent risk factor for migraine
- Migraineurs have lower serum mg levels during and between attack compared with healthy controls
- 35 x increase risk of migraine when mg levels are low
- Magnesium can be used as a preventative medication for migraine and pain:
  - 250 mg Magnesium oxide
  - 400 mg Magnesium oxide
  - Give at bedtime

Magnesium and Migraine

Potential causes of magnesium deficiency
- Stress
- Alcohol & caffeine
- Genetics of absorption and renal excretion
- Low dietary intake
- Gastro-intestinal disorders (IBS, colitis, celiac)
- Chronic Illness
### Supplies Needed For IV Magnesium

- Magnesium sulfate 1 gram vial ($3.59)
- 21 g butterfly catheter
- 3 cc syringe to inject Mg
- Tourniquet
- Gloves
- Alcohol pad

### IV Magnesium Sulfate

- Draw up magnesium sulfate in a 3 cc syringe
- Warn patient of hot flash beginning shortly after injection
- Ask level of pain and presence of any migraine associated symptoms prior to and 30 seconds following injection
- Apply tourniquet to ante-cubital fossa
- Insert catheter
- Inject over 3-5 seconds
- Can give as 1-2 gram infusion in 250 cc NS over 15 minutes

### Risks and Benefits Of IV Magnesium

#### Benefits
- Immediate efficacy (within 30 seconds)
- Can abort severe migraine and status migrainosus

#### Risks
- Hot flash will occur. Pre-warn patients
- If headache does NOT resolve after IV push Mg, reconsider the diagnosis of migraine. (Consider malingering)

### Coding For IV Magnesium

- ICD-10 code is G43.909 (migraine)
- CPT: 96369
- Intravenous infusion, for therapy, prophylaxis, or diagnosis (specify substance or drug); initial, up to 1 hour
- J3475 x 2 (= Mg SO4 1 gram)

### Discussion

**Case 3: Chronic Facial Pain**

- 52 year old man with 12 year history of nasal congestion, post-nasal drip, snoring, and facial pain
- Facial pain is bilateral in the V2 distribution of trigeminal nerve. Chronic runny nose and tearing
- Has tried numerous antihistamines, decongestants, nose sprays and allergy injections with no improvement
Sphenopalatine Ganglion

- SPG has connections to the brainstem which is activated during cluster and migraine
- SPG contains parasympathetic neurons which, when activated results in rhinorrhea, lacrimation, nasal congestion (autonomic features of migraine and cluster)

Candidates for SPGNB

- Acute and chronic migraine
- Nasal congestion
- Perennial allergic rhinitis
- Snoring
- Chronic sinusitis
- Facial migraine

Sphenopalatine Ganglion

- Contains postganglionic sympathetic fibers as well as synapses between pre- and postganglionic sensory fibers of the head and neck
- SPG contains sensory, sympathetic and parasympathetic innervation
- Trigeminal activation during migraine sends impulses to the parasympathetic fibers in the SPG. This causes vasodilation of meningeal vessels and release of neurotransmitters which induce the pain of migraine

Sphenopalatine Ganglion Block Option 1

- Sphenopalatine ganglion nerve blocks:
  - Procedure 1: Pontocaine + afrin solution 50/50. 2 Q-tips inserted to back of nares x 10 minutes weekly for 5 weeks.
  - If not better after 3 weeks, DC procedure

Sphenocath Procedure- Option 2

- Procedure # 2: Sphenocathether
  - 2 % xylocaine
    - Insert sphenocath to back of nose, inject xylocaine bilaterally
    - Apply temp monitors. Blockade of the parasympathetic branch of SPG will raise baseline temp 2 degrees

Treatment Options
• 59 year old retired fireman
• Hx of “chronic sinusitis,” rhinorrhea, post nasal drip x 12 years
• Treated with antibiotics, nasal inhalers, decongestants, antihistamines multiple times. Each month symptoms reoccur.
• SPGNB performed 6 weeks prior to video
• Benefits
  – Immediate relief of nasal congestion and post nasal drip
  – Immediate relief of migraine
  – Can help snoring significantly

• Risks
  – 2% lidocaine may result in dysphagia. Warn patient
  – 2% lidocaine has an unpleasant taste. Give them a mint or gum to chew during procedure

• CPT: 64505
• Medicare pays $135, commercial $170

• SPGNB Risks and Benefits
  • Benefits
  • Risks

• SPGNB Coding
  • Obtain spenocaths from Dolor Technologies
  • Each sphenocath costs $70
  • www.sphenocath.com

• Currently Used Preventive Drugs
  • High efficacy
    – β-blockers: propranolol, timolol
    – TCAs: amitriptyline
    – Divalproex
    – Topiramate
  • Moderate efficacy
    – β-blockers: atenolol, metoprolol, nadolol
    – ARBs: candesartan
    – Some NSAIDs
    – SNRIs: duloxetine
    – Gabapentin

• “Procedure” Discussion

• Case 4: Chronic Migraine
  • 42 year old female with a 20 year history of chronic migraine with aura (> 15 headache days/month)
  • Meds include topiramate 100 mg at hs, doxepin 20 mg hs, magnesium oxide 400 mg, riboflavin 200 mg BID, almotriptan 12.5 mg at onset of headache, clonazepam 10 mg for headache rescue
  • Pain total index = frequency (30 days) * (average intensity (1-10) x duration (in 24 hours). Her PTI is 200 (severe, disabling headaches)
  • Patient treated with Botulinum Toxin A 200 units every 3 months. After 5 days, PTI decreased to 42.

• Botulinum Toxin A (BTA)
  • FDA approved for treating chronic migraine (> 15 headache days/month, lasting more than 4 hours) in 2010
  • Between 150-200 units injected every 3 months
  • Caution: Postmarketing studies have suggested that BTA may diffuse from its intended site to cause symptoms of botulinum toxicity (dysphagia, fatigue, urinary incontinence, respiratory distress).
  • If not injected correctly may cause ptosis and increased headaches
  • Advise all “injectors” to become proficient at mixing BTA and injecting
**Botulinum A Toxin MOA**

Botulinum A Toxin (BTA) blocks the release of acetylcholine (ACH) at the presynaptic neuromuscular junction, inhibiting muscle contraction.

**OnabotulinumtoxinA Injection Site**

- 31 injection sites, divided across 7 specific head/neck muscle areas.

**BTA Injection Paradigm**

- The phase 3 BOTOX® pivotal studies for Chronic Migraine patients have established a treatment paradigm:
  - The patient population, recommended dose, and injection paradigm were established based on 10 years of studies assessing various patient types, muscle groups, and doses.
  - 155 Units of BOTOX® are administered as 31 fixed-site, fixed-dose injections across 7 specific head/neck muscle areas.
  - For each injection site, the injection volume will be 0.1 mL.
  - Each muscle has a fixed:
    - Total dose
    - Number of injection sites
    - Location of injection sites

**PREEMPT Study**

- 1334 patients treated for migraine at 122 sites in 6 countries
- Pts were age 18-65 with chronic migraine
- 24 week double-blind phase and a 32 week open label. In the DB phase, pts were randomized to receive either BTA or PBO
- BTA given at a dose of 155U (+/- additional 40 U) in fixed-site, fixed-dose injections with 5 u given at 31 sites in head and neck
- Injections given at weeks 0, 12, 24, 36 and 48
- Primary endpoint was the change in headache days/month
  - At baseline, mean frequency was 19.0 days for BTA and 19.1 for PBO
  - At 24 weeks, BTA resulted in a reduction to 11.5 days/month. PBO reduced 13.2 days/month

**BTA Candidates**

- Chronic migraine with or without aura of > 3 months duration
- History of significant migraine associated symptoms
- Cluster patients (off label)
- Patients who fail 2 preventative agents
- Make certain patient is NOT overusing opioids or other analgesics prior to injecting

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BTA Risks and Benefits

• Benefits
  – Effects seen within 5 days
  – Patients not significant reduction in headache frequency, intensity and duration
  – Women love the look of no wrinkles

• Risks
  – Will not work if patient is on opioids and multiple analgesics
  – Expensive although covered by most insurance when “Chronic Migraine” is coded
  – If injected incorrectly the patient will have asymmetric facial features or ptosis x 3 months
  – Systemic uptake of BTA can result in respiratory depression
  – If injected into the neck patient may have difficulty keeping head upright
  – Keep ice on face for 5 minutes after injections to minimize facial swelling

Practice Recommendations

• Occipital nerve blocks are safe and effective interventions for patients with migraine, whiplash and occipital neuralgias. (SOR A)
• Sphenopalatine nerve blocks can be used in patients with facial migraine, rhinitis, snoring and cluster headaches. (SOR A)
• Botulinum Toxin A is effective in managing patients with chronic migraine – defined as having ≥ 15 headaches/month lasting ≥ 20 hours. (SOR A)

BTA Coding and Costs

• CPT Coding For Administration of BTA
  – 64612 (face)- ($331)
  – 64613 (neck)- ($331)

• Cost= $550/ 100 units.

Questions