Trigeminal autonomic cephalalgias: TACs

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Trigeminal autonomic cephalalgias: TACs

- Trigeminal autonomic cephalalgias: TACs
- Cases
- Work up and secondary causes
- Generator locations
- Treatment
Case 1

- 36 yo man presents for the first time
- 3 weeks history of left sided pain
- Maximal in and around eye
- Radiates to upper teeth and neck
- Excruciating, like “a knife in my eye”
- Pain lasts 30 mins but “seems like forever”
- Left eye tears and nostril runs during pain
- 3 attacks daily but mild pain between attacks
Case 1, continued

- Has had similar bouts last 2 years
- Each cycle of daily pain lasts about a month
- ENT and dental exams were normal
- Sinus CT normal
- Last time headaches resolved after 3rd round of antibiotics
ICHDI-3β Cluster Headache diagnostic criteria

A. Headaches ≥ 5 attacks
B. Severe or very severe unilateral orbital, supraorbital and/or temporal pain 15-180 mins
C. Either or both of the following:
   1. at least one of the following symptoms or signs, ipsilateral to the headache:
      - **Parasympathetic activation:**
        a) conjunctival injection and/or lacrimation
        b) nasal congestion and/or rhinorrhea
        c) eyelid edema
        d) forehead and facial sweating
        e) forehead and facial flushing
        f) sensation of fullness in the ear
      - **Sympathetic paresis:**
        g) miosis and/or ptosis
   2. a sense of restlessness or agitation
D. Attack Frequency from one QOD to 8/day

*Cephalalgia* 2013;33(9) 629–808.
Episodic cluster headache vs. Chronic Cluster

ECH Diagnostic criteria
A. Attacks fulfill criteria for Cluster headache
B. At least two cluster periods lasting 7-365 days and separated by pain-free remission periods of ≥1 month

Pearls:
• Cluster periods usually last between 2 weeks and 3 months
• Typical remission period lasts 6-12 months

Chronic Cluster Headache (CCH)
No pain free remission periods of a month or greater per year

Cephalalgia 2013;33(9) 629–808.
Pathophysiology of Cluster headache

Triggers: alcohol, smells
Photoperiod stress
Sleep-wake cycle alteration

VIP
CGRP
Post/Inferior Hypothalamus
SSN
Trigeminal ganglion
Sphenopalatine ganglion [SPG]
Superior cervical ganglion


Cluster Headache attacks: Clinical Features

- Sex ratio (M:F): 2-6:1
- Age of onset late 20’s
- Attacks recur from once every other day to 8 times daily
- Cluster attacks usually occur 1-2 times per day.
- Temporal profile: attacks occur the same time each day and night
- Attack duration 15 and 180 minutes (mean for cluster 45 minutes)
- Excruciatingly severe “hot poker”; autonomic features (red eye, tearing); Restlessness or pacing activity
- ETOH trigger
SPG Innervations: Sympathetic postganglionic pathways pass through the SPG without synapsing; Parasympathetics synapse, then move to targets.

Cluster Treatment

- Transitional (to buy time): GON blocks, high dose steroids
- Acute prn: FDA approved: Sumatriptan subQ, DHE injections, noninvasive vagal nerve stimulation [nVNS] (for eCH),
  Not FDA approved: O2 7-15 liters/min, suma or zolmitriptan nasal
- Preventive: Verapamil + lithium or valproate
- Neuromodulation for acute or prevention: FDA approved: nVNS,
- Before the FDA: implanted SPG stimulator
- Not FDA approved: Occipital Nerve stimulation (EU approval rescinded), Deep Brain Stimulation
Oxygen inhibits lacrimal gland activation and Superior Salivatory Nucleus (SSN)-activated trigeminal neurons (SSN to SPG)

Akerman et al. *Headache* 2009;49:1131
Case 2

• 24 yo woman with 1 year of daily headaches
• Headaches began for the first time while at work, June 26\textsuperscript{th}
• Have been daily ever since
• Pain is always in her left eye and temple
• Sharp, stabbing, knifelike
• Attacks recur 15 times daily; last 15 mins
• Associated with nausea, photophobia
Case 2, continued

• Left eye tears during attacks
• She prefers to lie down in a dark quiet room
• Can’t identify triggers—perhaps alcohol but not consistently
• MRI with and without contrast normal
• No relief with rizatriptan or sumatriptan
• Verapamil, topiramate, onabotulinumtoxinA no l
ARS: What is Diagnosis?

1. Chronic cluster
2. New Daily Persistent Headache (NDPH)
3. Hemicrania continua (HC)
4. Chronic Paroxysmal Hemicrania (CPH)
Paroxysmal Hemicrania

A. At least 20 attacks fulfilling criteria B-E
B. Severe unilateral orbital, supraorbital and/or temporal pain, 2–30 min
C. At least one of the following, ipsilateral to the pain:
   1. conjunctival injection and/or lacrimation
   2. nasal congestion and/or rhinorrhea
   3. eyelid edema
   4. forehead and facial sweating
   5. forehead and facial flushing
   6. sensation of fullness in the ear
   7. miosis and/or ptosis
D. Attack frequency >5/day for >50% of the time
E. Attacks prevented absolutely by therapeutic doses of indomethacin
F. No other ICHD-3 diagnosis; not secondary

Episodic PH (EPH): At least two attack periods lasting 7-365 days and separated by pain-free remission periods of ≥1 month. F=M

Chronic PH (CPH): more common, no pain free month/year, F:M 2:1

PH Clinical Features

- Strictly unilateral ocular, temporal without side-shift (just like cluster)
- Excruciatingly severe; “clawlike”, aching, throbbing, boring (like cluster)
- PH attack duration 2-30 minutes, overlaps with cluster (15-30)
  - PH attack duration mean 13 minutes, up to 2 hrs
- Cluster attack duration average 45 minutes
- Interictal discomfort in 1/3 (same as cluster)
- PH attacks more frequent & shorter duration: 4-38 attacks/d (mean 14/d), >50% of time >5 attacks per day [Cluster usually 1-2 attacks per day]
- 50% pace during attack; 7% report ETOH trigger
- Lack of alarm clock periodicity
- Male to female
  - EPH 1:1
  - CPH 1:2
Paroxysmal Hemicrania PET Imaging: Contralateral Hypothalamus and Contralateral Ventrolateral Midbrain

Right-sided Pain

No Pain

Paroxysmal Hemicrania: Work-up and Treatment

- MRI scan in all patients
- Indomethacin 25 mg tid (Not FDA Approved)
  - No response or partial response after 5 days - increase to 50 mg tid for 10 days
  - If high index of suspicion increase to 75 tid for 10 days
  - Initial dose of 150 mg/day up to 225 mg/day (ICHD-IIIβ)
- Complete resolution is prompt, within 1-2 days of effective dose
- GI protection
- Continue slightly longer than usual cycle (EPH)
- Try stopping every 6 months in CPH
Follow up challenging additions

- She has had a peptic ulcer with a documented (+) stool for blood
- This was attributed to excessive daily ibuprofen intake
- Her creatinine was borderline high at the time of the GI bleed
Case 3

- 74 year old man
- Referred for evaluation of atypical trigeminal neuralgia
- Began 6 years ago
- Stabbing pain in left forehead
- Attacks are brief, lasting 2-10 mins
- Recur 3 times some days, but “I bet I can have 50”
- Washing his face and touching forehead consistently produces pain
Case 3 continued

• Denies ptosis, tearing, nasal symptoms
• MRA shows left superior cerebellar artery overlying V₁
• He has 4 attacks while in your office
• Sits in chair but looks uncomfortable
• Left eye gets red during attack
• Carbamazepine, amitriptyline, pregabalin unhelpful
Follow up challenging additions

• We order MRI which shows a pituitary adenoma
Short lasting Unilateral Headache Attacks (SUNHA)

At least 20 attacks fulfilling criteria B–D

B. Moderate or severe unilateral head pain, with orbital, supraorbital, temporal and/or other trigeminal distribution, lasting for 1–600 seconds and occurring as single stabs, series of stabs or in a saw-tooth pattern

C. At least one of the following cranial autonomic symptoms or signs, ipsilateral to the pain:

1. conjunctival injection and/or lacrimation
2. nasal congestion and/or rhinorrhea
3. eyelid edema
4. forehead and facial sweating
5. forehead and facial flushing
6. sensation of fullness in the ear
7. miosis and/or ptosis

D. Attacks have a frequency of ≥1/d ≥ 50% of the time

- SUNCT: with conjunctival injection and tearing; SUNA: autonomic features
- SUNHA can respond to GBP, PTG, OXCB, CBZ
Trigeminal Neuralgia vs SUNHA

- Autonomic features and V₁ for SUNHA
- However, 31% of patients with Classical TN have autonomic features
- Lacrimation occurs in up to 25% of TN, but is associated with severe pain and is less consistent than in SUNCT
- Both have triggers
- TN should be strictly localized to a trigeminal nerve distribution; SUNHA is out of the trigeminal distribution in 20-15%
- SUNHA responds to lamotrigine; both can respond to gabapentin and carbamazepine and oxcarbazepine
- SUNHA is rare, MRI wwo is mandatory, pituitary adenoma is the most common secondary cause (sometimes extirpation results in cure)

SUNCT: ipsilateral hypothalamic gray

Case 4

• 31 year old woman referred by colleague for possible admission
• 4 year history of chronic daily headache
• Right sided pain from eye to neck every day
• Headache is always right sided
• Twice a week headache switches to left side
• Friends tell her that her right eye “looks funny”
• Pain is constant, waxes and wanes
Case 4 continued

- Treats with ibuprofen 5-7 tablets daily
- When severe, treats with naratriptan, rizatriptan, or sumatriptan, and they sometimes help reduce the peak pains a bit
- Prednisone 40 mg perhaps modestly helpful with quick return of pain when stopped
- Some response to DHE, but pain recurs when stopped
Hemicrania continua

A. Unilateral headache fulfilling criteria B-D

B. Present >3 months, with exacerbations of moderate or greater intensity

C. Either or both of the following:
   1. ≥one of the following, ipsilateral to the headache:
      a) conjunctival injection and/or lacrimation
      b) nasal congestion and/or rhinorrhea
      c) eyelid edema
      d) forehead and facial sweating
      e) forehead and facial flushing
      f) sensation of fullness in the ear
      g) miosis and/or ptosis
   2. sense of restlessness or agitation, or aggravation of the pain by movement

D. Responds absolutely to therapeutic doses of indomethacin

E. Not another ICHD-3 diagnosis; not secondary

*Cephalalgia* 2013;33(9):629–808.
Hemicrania Continua

- Baseline continuous hemicranial headache
- Superimposed exacerbations of severe pain
- Frequent exacerbations minutes-days; ipsilateral autonomic signs; agitation or verbally abusive during exacerbations
- Stabs and jabs, foreign-body or itchy eye sensation
- Indomethacin-responsive- can be the only way to diagnose, 1/3 need 300 mg
- Many patients with HC come in complaining about the exacerbations, not the daily headache. Ask about headache-free time!
- Additional features of HC:
  - Foreign body or itchy sensation ipsilateral eye
  - Ice pick pains occur in 40% of migraineurs, but are a useful addition to the HC-associated features
  - Ipsilateral photophonophobia

Hemicrania Continua: Contralateral Hypothalamus and Ipsilateral Midbrain


Right-sided Pain
# Brain Activation in Primary Headache Disorders

<table>
<thead>
<tr>
<th></th>
<th>Dorsal Pons</th>
<th>Posterior Hypothalamus</th>
<th>Ventrolateral Midbrain</th>
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<tbody>
<tr>
<td>Migraine</td>
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<td></td>
<td>Ipsilateral</td>
</tr>
<tr>
<td>Cluster</td>
<td></td>
<td>Ipsilateral</td>
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<tr>
<td>SUNCT</td>
<td></td>
<td>Ipsilateral</td>
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<td>EPH/CPH</td>
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<tr>
<td>HC</td>
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### TAC Summary

<table>
<thead>
<tr>
<th>Features</th>
<th>Cluster</th>
<th>PH</th>
<th>SUNHA</th>
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</thead>
<tbody>
<tr>
<td>Attack frequency</td>
<td>QOD-8/d (1-3/d)</td>
<td>&gt;5/d for &gt;50% of time (14/d)</td>
<td>≥1/d ≥ 50% of the time (many times/d)</td>
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<tr>
<td>Attack length</td>
<td>15-180 min (45-60 min)</td>
<td>2-30 min (14 min)</td>
<td>1–600 seconds (generally seconds)</td>
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<tr>
<td>ETOH trigger</td>
<td>Yes</td>
<td>Yes</td>
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<td>Cutaneous triggers</td>
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<td>No</td>
<td>Yes</td>
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<td>Gender, M:F</td>
<td>3-6:1</td>
<td>EPH 1:1 CPH 1:2</td>
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<td>Indomethacin</td>
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<td>Oxygen responsive</td>
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<tr>
<td>Circadian</td>
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</table>
The Clinical Spectrum of the Trigeminal Autonomic Cephalalgias

- Highest Attack Frequency
- Short-Lasting Neuralgiform Headache Attacks (SUNCT/SUNA)
- Paroxysmal Hemicrania
- Cluster
- Hemicrania Continua (HC)

- Lowest Attack Frequency
- Longest Duration of Acute Attacks
- Shortest Duration of Acute Attacks
Thank you!