Pain in the ED: Case based discussion

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Objectives

- Describe the mechanistic approach to pain management
- Review medications available for analgesia in the ED
- Present cases for discussion to highlight key principles in pain management
- Discuss non-traditional analgesic approaches and their role in the ED: intra-articular medications, regional blocks etc

Mechanistic vs. Symptomatic

- Aim to target involved neurobiological pathways
- Goal is to
  - Minimize adverse events
  - Provide complete relief as cause of pain nullified

Mechanistic approach

- Weaknesses
  - Rare that pain originates from a single neurotransmitter or pathway
  - We often do not understand all the pathways
  - Requires knowledge of multiple medications (risks, benefits, interactions etc)

Successes

- Migraine headache
- Neuropathic pain
- Renal and biliary colic
- CRPS and use of ketamine
- Bupivicaine for molar surgery

Cases/Topics for review

1. Arthritis/NSAID discussion
2. Acute back pain
3. Chronic low back pain/opioid habituated patients
4. Sore throat/steroids
5. Dislocated shoulder/IA analgesia
6. Abdo pain/Review of opioid use
7. Migraine management
8. Neuropathic pain

- A 46 year old male presents with acute atraumatic L knee pain. Has suffered gout in the past.
- He is in severe pain.

Will an NSAID suffice? When is an NSAID enough?

- NSAIDS are rarely effective as an analgesic for severe undifferentiated pain
- May be *very* effective in specific instances where pain induced by AA pathway mechanisms
  - It does not act as an analgesic per se but rather stops the neurobiology leading to a painful state

NSAIDs

1. 20% of all new CHF associated with NSAIDs
2. Increase in AHD mortality
3. GI hemorrhage
4. Leaky Gut syndrome*
5. Hypertension
6. Renal failure

Parenteral NSAIDs

- Renal Colic?
  - IV NSAID effective in 70% of patients
  - Time to onset 15-30 minutes
  - Combined with opioid (fentanyl 1.5 mcg/kg) provides good relief in most patients
  - Acts by impeding ureteral spasm and rise in intra-mural pressure

- Ketorolac 30 mg IV vs. ibuprofen 800 mg PO
  - Same opioid requirements in first 2 hours
  - Same rate of cessation of need for opioids by 2 hours
  - Parenteral route advantageous in vomiting patients
    - Vomiting usually autonomic response to the pain.
    - Relieving the pain with an opioid often stops the emesis and allows an oral NSAID

Alternatives to NSAID

- Histamine 1 receptor antagonist in symptomatic treatment of renal colic accompanied by nausea: two birds with one stone? *Urology* 2009:73;32-36

- Acción analgésica de los antihistamínicos (ensayo clínico sobre 56 pacientes afectos de dolores cólicos reno-ureterales en un servicio de urgencias). FR Breijo, *Rev. Soc. Esp. Dolor* 2007;3:220-222

A systematic review of medical therapy to facilitate passage of ureteral calculi.

- *Ann Emerg Med*. 2007;50:552-563
  - Alpha-antagonist or calcium channel clocker
  - Significantly improved spontaneous stone expulsion in patients with distal ureteral stones
    - Alpha-antagonist RR 1.59 NNT 3.3
    - Calcium channel blocker RR 1.50 NNT 3.9
  - *Adverse effects*: 4% of patients receiving alpha-antagonist, 15.2% of patients receiving calcium channel blockers

Alpha-antagonists: not so fast…

- **Efficacy of tamsulosin with extracorporeal shock wave lithotripsy for passage of renal and ureteral calculi.** *Ann Pharmacother*. 2008;42:692-7.
  - *Evidence regarding ureteral stone clearance is inconclusive, although adjunctive tamsulosin has been reported to reduce painful episodes*.

Not so fast…

- **Tamsulosin for ureteral stones in the emergency department: a randomized, controlled trial.** *Ann Emerg Med*. 2009;54:432-439.
  - *In this cohort of adult ED patients with distal ureteral calculi, treatment with tamsulosin did not substantially improve any of the studied outcome measures compared with treatment with ibuprofen and oxycodone alone*

Back to NSAIDs

- Biliary Colic
  - Acts thru same mechanism
  - Ketorolac effective for spasm in CBD

Migraine headache

- Oral NSAIDs are excellent meds for preventing a migraine
  - E.g. perimenstrual migraines
  - Also excellent as abortive agents for mild to moderate migraine headaches
- IV ketorolac provides relief to only 50% of patients with severe migraine pain
  - Not a good choice
  - Too many other mechanisms involved

What about oral NSAIDs in the ED?

- Always ask: as an analgesic or as an anti-inflammatory agent?
- Menstrual pain
  - Conflicting prostaglandins, excitatory and inhibitory
  - Too high a dose blocks inhibitory PG, so if 400 mg ibuprofen does not work, *give ½ the dose next time it is due*

NSAID for inflammation

- No ceiling to dose for inflammation
  - Limited by adverse effects
  - Celecoxib same adverse event profile as ibuprofen (CLASS study, JAMA, 2000)
- Ceiling for analgesic effect
  - Mild to moderate pain
  - No advantage for sciatica or other nerve impingement pain

Back to our patient with gout

- NSAID will help with inflammation, but will take 2-3 days
  - Only fast acting agent would be colchicine
- Patient will require opioid analgesia for his severe pain for about 24-48 hours
  - Prednisone no faster than NSAID but less AEs
  - **All** patients with acute arthridities can benefit from splinting and opioids while waiting for inflammation to decrease

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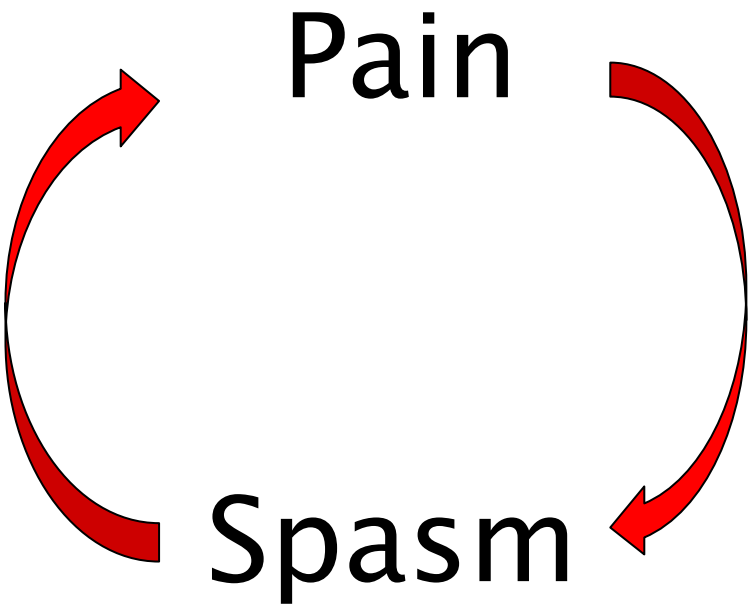
Case #2 – Back Pain

- A 37 year-old woman comes in by ambulance with acute onset low back pain when she bent over. Unable to stand or turn on stretcher. Minimal pain when lying on back with knees bent.

- First ever episode of back pain. No radiation. No neuro deficit

How would you manage her pain?



Hypoxic tissue
Decreased pH
++ afferent nerve stimulation

Rest vs. Incident Pain

- With rest pain, require constant relief, best served (if severe) by opioids

- Incident pain (pain with activity) difficult to control
  - Adverse effects if pain controlled completely during activity
  - Less urgency to control pain

What are patients with back pain afraid of?

- Inability to mobilize at home
  - Inability to be able to void

- So, get them to see the meds you will prescribe for home will work for them
  - If no urgency, titrate with oral format

Options

- If you choose to use a muscle ‘relaxant’, choose one that has a proven pathway and is effective
  - Benztropine
  - Baclofen
- Remember: by eliminating pain, spasm resolves – good pain relief is an excellent muscle relaxant!

Recipe

- Hydromorphone 4 mg PO (2 mg IM)
- Benztropine 2 mg PO (IM)

- Reassess in 1 hour, can repeat the hydromorphone
- D/C with q4h prn hydromorphone and bid benztropine (for 3 days)
  - Consider scheduled (not prn) opioid dosing for 1st 48 hours

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Case #3 – Chronic Back Pain

- A 51 year old male has a history of 15 years of chronic back pain. He requires 400 mg/day MS Contin to control his pain.
  - He fell down 5 stairs today and says his pain is 10/10,
  - What is your approach to his pain management?

Be careful

- Opioid-habituated patients lose their tolerance within 14 days of stopping their opioids
  - Even though they think they might need their previous ‘usual’ dose, by 14 days, they require standard opioid dosing

Getting over a morphine ceiling

- Many staff immediately resistant to providing opioids in patient taking long term opioids
- Almost no staff are used to working with supranormal doses
  - Even less are willing to provide those doses

Opioids are titratable analgesics

Once you decide you will use one, the endpoint is patient comfort, not dose given

For acute pain in opioid naïve patients

- Get everyone to buy into standardized dosing regimens
  - Do not individualize (i.e. individual doctors) protocols or approaches

- **Safety and Efficacy of Rapid Titration Using 1mg Doses of Intravenous Hydromorphone in Emergency Department Patients With Acute Severe Pain: The "1+1" Protocol.** *Ann Emerg Med*. 2009;54:221-57.
  - 1 mg IV, repeat if desired after 15 minutes
  - 77% good relief by 15 minutes
  - 96% good relief by 60 minutes
  - 5% had O2 saturation drop

- **Intravenous morphine titration to treat severe pain in the ED.** *Am J Emerg Med*. 2008;26:676-82.
  - 2 (body weight < or = 60 kg) or 3 mg (body weight > 60 kg) with 5-minute interval between each dose
  - > 30 mm reduction on VAS considered 'pain relief'
    - 82% achieved relief
    - Average dose: 0.16 mg/kg, on average 3 doses

For patients who are NOT opioid naïve

- Standard approaches will under treat all of them
- Routine prn dosing should be *25%* of their total daily dose of opioid

Getting rapid control in the opioid tolerant patient

- Intravenous fentanyl for cancer pain: a "fast titration" protocol for the emergency room. *J Pain Symp Man* 2003;26:876-881
  - IV fentanyl to control breakthrough cancer pain
  - Calculate total daily morphine dose
  - Divide by 20
  - Give equivalent dose of fentanyl (1 mg = 10 mcg)
  - Repeat q 5 minutes
- Good pain relief within 10 - 11 minutes

Why fentanyl?

- Neurobiology: high mu receptor specificity allows pain control even when most receptors occupied with patient's own medication

- Psychology: no one really minds giving 200 mcg of fentanyl
  - But:
    - 200 mg meperidine?
    - 20 mg morphine?

What about Rx renewal requests?

- Greater than 90% of patients with ‘drug seeking behavior’ are like this due to under treatment of pain

- We have great difficulty distinguishing these patients from those who are attempting to divert opiates
  - Creates high resistance to use of opiates

One solution…

- Many ED's in North America are unwilling to address the problem of patients seeking opioid Rx renewals
  - Have signs stating "No Narcotic Prescriptions Renewed" in triage
  - Many EP's feel chronic pain is not part of our practice

Good medical practice

- Renewal of *any* Rx in the ED runs the risk of adverse outcomes

- With opiates, the stakes are higher
  - *Illegal misuse vs.*:
    - Turning away of potentially very sick patients
    - Patients in acute withdrawal
    - Addicted patients have a medical condition requiring our care – it is called addiction!
      - We try to help alcoholics when they come in…

Prescribing opioids for the chronic noncancer pain patient

- For an ED or Urgent Care Center

- http://nationalpaincentre.mcmaster.ca/opioid/
- CMAJ 2010;182:923-930
  - Canadian Practice Guideline
- http://health.utah.gov/prescription/pdf/guidelines/final.04.09opioidGuidlines.pdf
  - Utah clinical guidelines on prescribing opioids for treatment of pain

Recommendations for any ED or Urgent Care policy

- Contact must be made with the prescribing physician or dispensing pharmacist.
- *Number of doses prescribed is limited to last until the next business day*.
- Dose is amount that the physician feels is appropriate, given the patient's underlying pain condition, even if that dose is considerably less than what the patient reports receiving.

Recommendations for any ED or Urgent Care policy

- The facility prescribes once only for patients who have run out.
  - Readily available patient chart to verify this
- A record of the visit is sent to the primary-care physician.
  - The primary care provider should be the sole prescriber of ongoing opioid prescriptions

2 key points for such a policy

- **Development:**
  - Participation by all physicians providing care in the acute/urgent healthcare setting can be useful in addressing the issues and promoting adherence.
    - Consistency in approach by all doctors is essential
- **Policy Availability:**
  - The policy could be posted in the waiting area of the facility, and/or available as a handout… in advance of seeing the physician.

Chronic pain in the ED

- Up to 20% of our patients.
- Know when you need to intervene
  - Know what options are in community
  - Distinguish between acute pain flare up/new pain onset/drug seeking behaviour
  - Short acting opioids rarely of benefit and may increase tolerance and induce institutional dependence

Be willing to address the major underlying problem

- If you suspect substance abuse, say so.
  - Offer help, know what programs are available
  - We do this for alcoholics so do so for all medication misuse

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Case #4

- A 22 year-old male comes in with 2 days of severe odynophagia. His voice is muffled a bit. He has a fever of 38.5 C.

Pharyngitis

Treat the patient's symptoms

ARE SORE THROAT PATIENTS WHO HOPE FOR ANTIBIOTICS ACTUALLY ASKING FOR PAIN RELIEF?

- van Driel, M.L., et al, *Ann Fam Med* 2006;4:494

- Most important reason for visiting the physician were a *desire to know the cause of the sore throat* (85.5%)
  - Its likely course (82.7%),
  - *Need for pain relief* (84.5%).
  - Only 37.6% cited a desire for an antibiotic as being important (ranking 11th of the 13 items)

Antibiotics: pain relief?

- PENICILLIN FOR ACUTE SORE THROAT IN CHILDREN: RANDOMISED DOUBLE BLIND TRIAL *BMJ* 2003;327:1–3
  - PENICILLIN VS PLACEBO
  - **No statistical differences** between the groups in the mean duration of absence from school, *mean analgesic consumption* or the number of episodes of upper respiratory infection or sore throat during six months of follow-up.

Dexamethasone?

- *Ann Emerg Med 2003;*41:601,
  - There were no overall differences between treatment groups in any outcomes

- *Arch Pediatr Adolesc Med.* 2005;159:278–282.
  - Patients who received dexamethasone reported earlier onset of pain relief (9.2 vs 18.2 hours; $P<.001$), fewer hours to complete resolution of sore throat (30.3 vs 43.8 hours; $P = .04$

Meta-analysis 2010..not so much!

- Acad Emerg Med. 2010;17:476-83.
  - Corticosteroid administration for acute pharyngitis was associated with a relatively small effect in time to clinically meaningful pain relief (4.5-hour reduction) and in pain relief at 24 hours (0.9-point reduction)
  - Use of steroids ***not*** recommended

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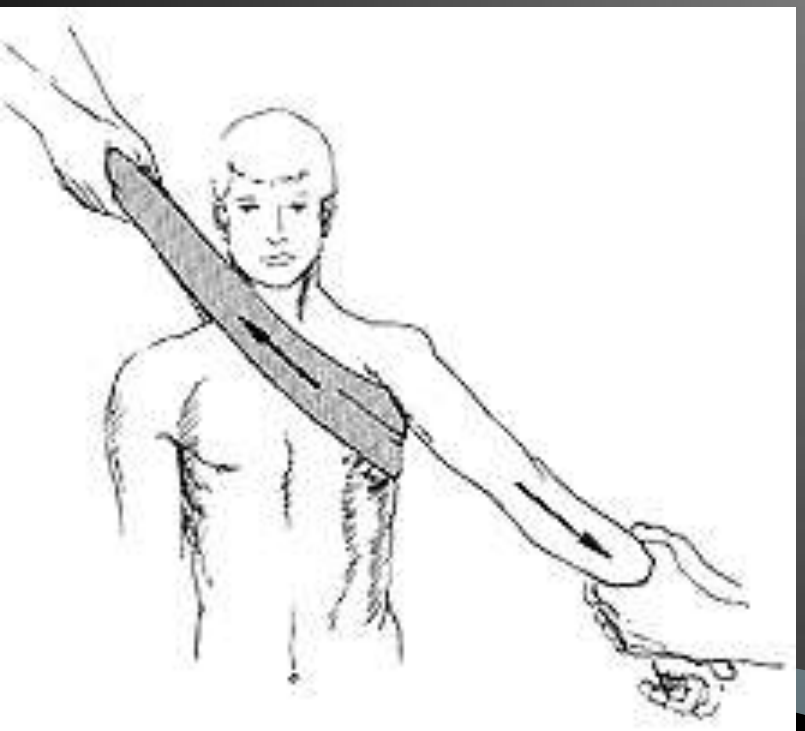
Case #5

- An 18 year old linebacker arrives with a dislocated shoulder, in a lot of pain.

- How can we manage his pain:
  - Before X-ray
  - During reduction
  - After discharge

Shoulder reductions



Intervening in acute pain

- Wind-up requires about 4 hours
  - Stimulation of spinothalamic track with release of NMDA, MPA
  - Prevention of wind-up best done with long acting anesthetics
    - Or by giving opiates prior to the painful event occurring
    - Decreased pain and analgesic requirement after d/c

Intraarticular lidocaine versus intravenous procedural sedation with narcotics and benzodiazepines for reduction of the dislocated shoulder: a systematic review.

- *Acad Emerg Med*. 2008;15:703–8

  - Six Level 1 RCTs were identified. No studies showed a statistically significant difference in success rate between IAL versus IV sedation.
  - The complication rate was significantly higher in the IV sedation groups ($p < 0.001$),
  - The total time spent in the ED was longer for the IV sedation group.

Which anesthetic?

- Lidocaine in study effective, but no f/u after discharge
- All molar surgery models demonstrate the inability of lidocaine to prevent wind-up and decrease post discharge pain
- Bupivicaine lasts 6 hours and has been shown to decrease post procedure pain and minimize analgesic requirements

Pearl

- Shown that removal of blood from shoulder prior to reduction minimizes risk of adhesive capsulitis
- This encourages us to inject bupivicaine as already in joint anyway!

What else can we do with joints?

- Mr. Smith has been playing basketball. On landing after a jump shot, he steps onto the foot of his defender.
  - He suffers a valgus injury to his L knee and has difficulty weight bearing.
  - What is the best way to control his pain?

No pain, no gain: clinical excellence and scientific rigour--lessons learned from IA morphine

- *Pain*. 2002;98:269–75

- The analysis of sensitive studies indicates that 5mg of IA morphine injected into the knee joint provides postoperative pain relief for up to 24h

IA morphine

- A routine pain management technique for post-op knee interventions.

- My experience is that it provides excellent analgesia with NO adverse effects, and lasts AT LEAST 48 hours
  - Risk is they will weight bear as they have no pain!

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Case #6

- Mrs. Jones is a 48 year old female with severe abdominal pain x 48 hours. She has had pancreatitis twice before, and says this is just like the other episodes

- Which opiate?

Opiates: are they all the same?

- Why is meperidine so reviled?
  - No real reason but:
    - Short half life
    - Past history of poor dosing by MDs
    - Long Hx of being sought by drug seekers
    - Very rare risk of seizures in patients with renal failure

- Hydromorphone
  - Better especially if renal failure
  - Better tolerated orally
  - Psychologically nurses and docs willing to give more – 1 mg IV does not bother anyone, yet few are ready to give 10 mg morphine IV

- Buprenorphine
  - Risk of withdrawal if opiate consumer
  - Great for pain relief and less sedation (many sickle cell sites use it)

- Codeine:
  - Incredibly maligned
  - Ineffective in about 8% Caucasians, 10-15%Oriental populations
  - Ceiling effect orally (short acting form) due to adverse events
  - Well used in chronic malignant pain in long acting format.
  - Adverse event rate high in elderly

- Oxycodone
  - Also much maligned
  - OxyContin many press releases about abuse – no different than other opiates
  - Euphoric effect, so often mis-used.
  - Equivalent to morphine orally; titrate without combination format (Percocet etc)

- Hydrocodone
  - Cough syrup with no effect on cough, analgesic with probably less effect on pain than codeine
  - Everyone seems willing to prescribe it…

- Tramadol
  - High risk in overdose – status seizures
  - Questionably better than acetaminophen
  - Minimal dependency or addiction potential – which tells you everything you need to know for a pseudo-opiate

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Case # 7

- A 38 year old woman presents with a severe L sided migraine headache. She has suffered from them for 10 years.

- Ibuprofen and a dark room failed at home

Mechanistic approach to migraines

- Dorsal raphe releases serotonin
- Trigeminal neurovascular bundle stimulated by CGRP, substance P, activated through AA pathway
- Dopamine 3 receptors disinhibit mechanisms of vascular response

So…

- Serotonin agonists should work
  - Triptans, DHE, meperidine
- Dopamine antagonists should work
  - Metoclopramide, prochlorperazine,
- NSAID should work
  - Ibuprofen, ketorolac

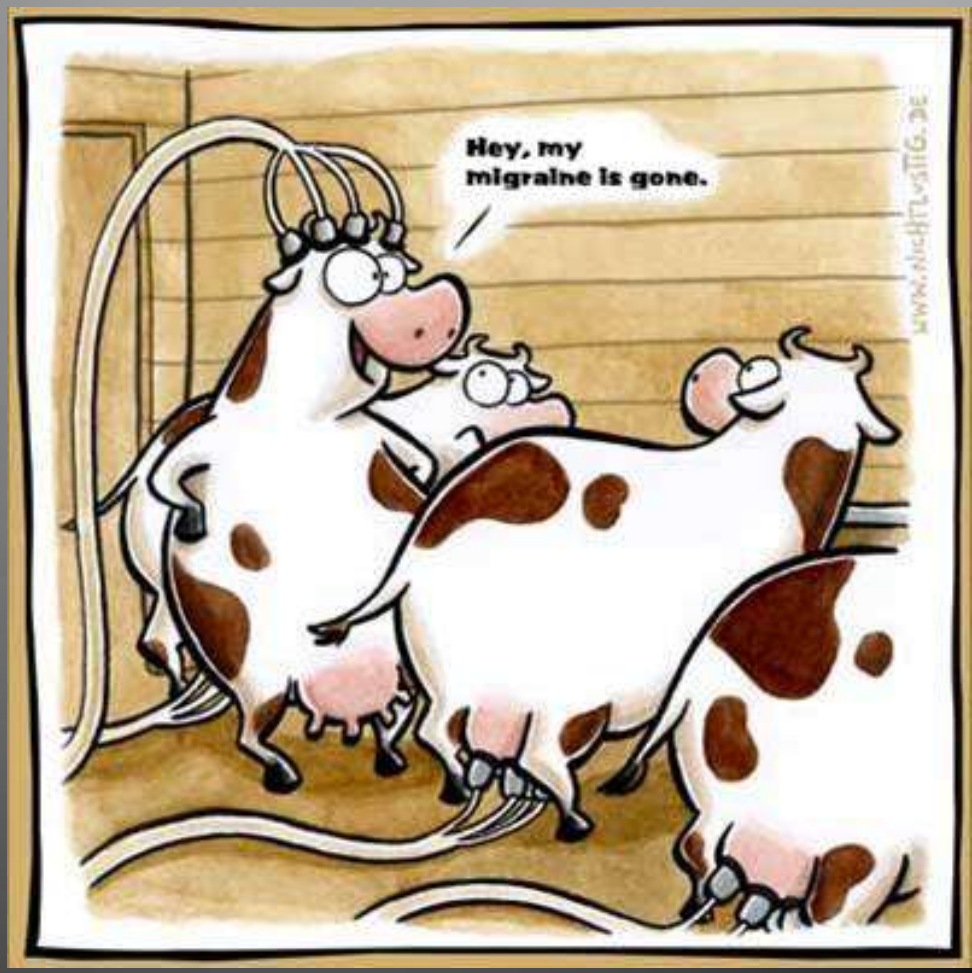
Beware!

- Never confuse a therapeutic intervention with a diagnostic one!

- Just because pain relief occurs with one of the suggested agents, this does not infer it is a migraine
  - Sphenoid sinusitis
  - SAH
  - Post LP headache
  - Benign headache

Patient endpoints

- Return to normal function same day
- No headache recurrence the next day.



- Ann Emerg Med. 2010;56:1-6.
  - IV prochlorperazine with diphenhydramine is superior to subcutaneous sumatriptan in the treatment of migraine
  - Decrease of 73 mm for the prochlorperazine/diphenhydramine group and 50 mm for those receiving sumatriptan

What prevents headache recurrence?

- DOES THE ADDITION OF DEXAMETHASONE TO STANDARD THERAPY FOR ACUTE MIGRAINE HEADACHE DECREASE THE INCIDENCE OF RECURRENT HEADACHE FOR PATIENTS TREATED IN THE EMERGENCY DEPARTMENT? A META-ANALYSIS AND SYSTEMATIC REVIEW OF THE LITERATURE
  - Singh, A., et al, Acad Emerg Med 15(12):1223, December 2008
  - The pooled relative risk of recurrence with adjunctive dexamethasone was 0.87, 95% CI 0.80–0.95).
  - About nine patients would need to be treated with dexamethasone in the ED to prevent recurrence in one (NNT 9)
  - Adverse events with a single dose of dexamethasone were infrequent, mild and transitory

Medication choice matters

- Headache 24 hour recurrence rates:
  - Prochlorperazine: 8-10%
  - Metaclopramide: 30%
  - DHE: 35%
  - Sumatriptan: 50% (Cady NEJM 1991)

Pain level at discharge matters

- If headache 100% relieved, < 10% headache recurrence (Ducharme et al, *Acad Emerg Med*. 1998;5:899–905)
  - If pain > 4/10, recurrence rate 40%

Migraines do come back

- Ann Emerg Med. 2010;56:7-17.
  - In this trial, nearly 3/4 patients reported headache recurrence *within 48 hours* of ED discharge. Naproxen 500 mg and sumatriptan 100 mg taken orally relieved post-ED recurrent primary headache and migraine comparably.

Avoid adverse events

- With dopamine antagonists: lower recurrence rates, higher EPS
  - Reported as high as 45%
- Treat with benztropine 1 mg IV
  - Prevents both early an delayed onset on EPS
  - No additive sedation as seen with diphenhydramine or lorazepam

Summary plan

- Prochlorperazine 5 mg IV
  - Options: metoclopramide IV, DHE IV, sumatriptan s/c
- Benztropine 1 mg IV if dopamine antagonist used
- If still headache just prior to discharge
  - Dexamethasone 10 mg IV

  Or
  - Naproxen sodium 500 mg PO prn

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Case #8

- Mrs. Tearful comes in c/o severe R facial pain for 3 days. The pain occurs every 10-15 minutes, and is like am electric bolt going through her face. Unable to sleep.
  - N physical exam, no trigger points

Acute Neuropathic Pain

- There are 2 or 3 neuropathic pathologies where management should be initiated in the ED
  - Know doses required, titration pattern
  - Know when f/u is required
  - Know what additional w/u is required

Trigeminal neuralgia

- Essentially status seizures of ganglion behind face
  - Local blocks do not work, opiates ineffective
  - Carbamazepine treatment of choice
    - 200 mg increments per day every 2-3 days
    - F/u in a week or so
    - Will require CT at some point as about 1-2% risk of malignancy

Post herpetic neuralgia

- Allodynia present 2-4 days before rash
  - If pain with light touch – presumptive diagnosis
- Risk of neuralgia = age, once over age 50
  - Tx should be started in ED as soon as diagnosis suspected

Post herpetic neuralgia

- Tricyclic or SNRI with noradrenaline and serotonin activity is best choice
  - Amitriptylline, nortriptylline, duloxetine
  - Start at 25 mg hs, titrate up q 3-5 days
    - Maximal dose can be 150 mg
    - F/u in 5-7 days
- Antiviral for 10 days also important
  - Acyclovir ($40.50) or valcyclovir ($185.99) equally effective

Home

Last but not least!

That eternal question…

- **Fast versus slow bandaid removal: a randomised trial.** Med J Aust. 2009;191:682-3
  - Overall mean pain score for fast bandaid removal was 0.92 and for slow bandaid removal was 1.58. This represents a highly significant difference of 0.66 ($P < 0.001$).
  - CONCLUSION: In young healthy volunteers, fast bandaid removal caused less pain than slow bandaid removal.

Wrapping it up

- Many more medications in play for pain management as mechanisms of pain increasingly understood
- Other topics that could have been discussed
  - Ketamine in trauma patients
  - Ketamine for CRPS flare ups
  - Regional nerve blocks for procedures and pain relief

QUESTIONS?

THANK YOU VERY MUCH