"What I wish primary care doctors knew before sending patients to my pain clinic."

Derek Mitchell MD Board Certified Anesthesiology and Pain Medicine

No Disclosures

Outline

- Optimized Referral
- Polymorphisms in CYP450/Opioid metabolism
- Turmeric
- Radiofrequency Neuroablation
- Conclusion Statement

Concluding Statement

 If you have a patient you think would benefit from a consultation, then we are happy to evaluate your patient.

Optimized Referrals

- Expectations Patient vs Physician
- Prior work up
- Imaging/Studies
- Initiating Medications
- Concerns

• • •

Patient vs Physician Expectations

Physician

Assume prescription responsibility
Full evaluation and management
Provide management recommendations

Patient

- Initiate opioid therapy
- Assume responsibility of opioid therapy
- Surgical consultation
- Dazed and confused

Patient vs Physician Expectations

- Patient
 - Initiate opioid therapy
 - Assume responsibility of opioid therapy
 - Surgical consultation
 - Dazed and confused

Prior Workup

- Previous pain clinic evaluation
- Imaging

Initiating Medications



Concerns





CYP2D6 &Polymorphisms

- CYP2D6- part of the CYP450 family
- Carries out oxidative metabolism
- Responsible for activation and deactivation of opioid prodrugs/substrates
- Hypervariable/hypermutable
- Activity of CYP2D6 a primary determinate of therapeutic response to opioids

Nomenclature of CYP2D6 Function

- Poor Metabolizers-little or no CYP2D6 function
- Intermediate Metabolizers-between poor and extensive
- Extensive Metabolizers-normal CYP2D6 function
- Ultra-rapid metabolizers-high CYP2D6 function
- Functional (extensive)-60% of the population
- Subnormal (intermediate)-30% of the population
- Dysfunctional (poor and ultra-rapid)-10% of pop. (estimated prevalences based on Hardy-Weinberg law)







Codeine Toxicity

Cough syrup w/codeine



• Breast Milk



Alternatives



Turmeric/Curcumin

- Curcumin is the main curcuminoid of turmeric, a rhizome member of the ginger family
- Promoted as an anti-inflammatory molecule in the tx of osteoarthritis





Curcumin Mechanism of Action

- Inhibits activation of IKB (inhibitor of nuclear factor kappa-light-chain-enhancer of activated B cells)
- Inhibits translocation of NF-kappaB into B cell nucleus
- Suppresses phosphorylation of p38 and C-Jun Nterminal kinases
- Inhibits BCL expression and caspase-3 expression

Mechanism of Action

- Prevent apoptosis of chondrocytes
- Suppresses the expression of cyclooxygenase and prostaglandin E-2 and inflammatory cytokines.

Clinical Studies

- Badria et al. 30 outpatients. Double blind randomized control. 3 months of C. longa extracts.
- Tx arm-significant improvement in pain-free walking time, degree of pain pre and post active/passive range of motion texting and degree of knee effusion compared to placebo.
- Kizhakkadeth et al. 700mg C. longa extract vs 200mg celebrex for 12 weeks.
- Decreased joint line pain in C. longa. No difference in crepitus and walking pain.

Clinical Studies

- 2014 Kuptnir et al. Efficacy of curcuma extracts compared with ibuprofen in pts with knee OA. Largest curcumin study to date.
- 185 pts 1500mg curcumin extract and 160 pts 1200mg ibuprofen 4 weeks
- Similar improvements of WOMAC score after tx period
- No difference in adverse events between two groups: dyspepsia, abdominal pain, nausea and edema

Radiofrequency Ablation AKA Rhizotomy **AKA** Neurolysis **AKA RFA AKA** "The Burn"

Principle of RFA

Patient: "So how does it work?"

Doctor: "In a percutaneous fashion a high frequency current produced by a radiofrequency generator is transmitted along an electrode to produce localized thermocoagulation of a target nerve to disrupt nociceptive transmission and reduce pain."

Patient: "Huh?"

Doctor:...

"We gonna BURN the nerves!!"



Applications

Pain Medicine

- Cervical, Thoracic, Lumbar Facet-mediated pain-medial branch of posterior ramus
- Sacroiliac Joint Pain-sacral lateral branches
- Chronic knee Pain-Genicular nerves
- Post Herniorrhaphy Pain-Ilioinguinal nerves
- Trigeminal Neuralgia-Gasserian ganglion
- Dorsal Root Ganglion for Regional Pain Syndromes
- Sympathetic Chain

Anatomy

Facet Joint, Zygophyseal joint, Z-joint (lumbar)



Facet Joints in Motion



Facet Joint Innervation



L3 Transverse Process

Medial branch of the spinal nerve root innervating the superior portion of the L4/L5 facet joint

L4/L5 facet joint

Medial branch of the spinal nerve root innervating the inferior portion of the L4/L5 facet joint

Fig 1

Fig 2





Facet Pain Syndrome

- Very common cause of axial spine pain (frequently under and/or misdiagnosed)
- Can involve any facet joint from C2-3 to L5-S1
 - Most commonly affected levels are C4/5, C5/6 in the cervical spine and L3/4, L4/5, L5/S1 in the lumbar spine.
- May be acute secondary to injury (MVA, whiplash, sports, lifting)
- Chronic onset more common secondary to age/activity related facet joint degeneration.
 - Strong correlation with degenerative disc disease
 - When our intervertebral disc lose height as part of the normal aging process, up to 70% of the compressive force usually applied to the disc may be transferred to the facet joints

Facet Pain Syndrome

- Location of reported pain usually correlates with level of degenerated joints
- Pain often described as deep and achy
- Patients often exhibit a pattern of referred pain that correlate with affected levels
- Patient may have local tenderness to palpation of vertebral transverse process or affected facet joint.
- Inflamed, acutely injured or chronic flair can result in overlying muscle spasms.
- Facet-loading maneuvers (stress on the joints) may reproduce a component of the pain

Cervical Facet Referral Pattern



Thoracic



Lumbar Facet Referral Pattern





Patient Selection

- Greater than 3 months of pain
- Failed reasonable conservative therapies (NSAIDs, APAP, antispasmodics, topicals, PT/chiro/massage)
- Average 4/10 on NRS
- Functional Impairment
- No active radicular component to pain (acute vs refractory)
- History and Exam
- R/o other common causes of low back/neck pain
 - SI dysfunction, piriformis, Iliolumbar ligament, myofascial strain, hip pathology, discogenic pain, spondylolisthesis etc
 - Shoulder pathology, occipital neuralgia, MFP, ligament strain, etc.
- Imaging-radiograph, MRI, bone scan

"Good" Candidate?

- Meet insurance requirements to proceed
- High vs low suspicion/confidence
- Diagnostic blocks
 - Medial Branch Block, "Test Injections"
 - Two test injections performed prior to RFA, determine the prospective success of RFA (required by all insurances)
 - Studies showed that single diagnostic medial branch block result in a false positive 38% of the time. A second "confirmatory" block performed to increase chance of successful RFA.

Medial Branch Block

- Fluoroscopic guidance
- 10 min procedure
- Contrast confirmed needle localization
- 0.5 ml local anesthetic deposited on targeted nerves (small volume reduces FP)
- Patient held in recovery for 20 mins
- Pt document 50-**80**% relief of target pain at discharge
- Duration of relief 1-4 hrs
- Performed at least 2 week apart (exceptionanticoagulation)

- Fluoroscopic Guidance
- +/- Oral or IV sedation



- RF Cannula 20G, 10 cm length, 10mm active tip
- Pulse Ox, HR, BP monitoring
- Sterile Technique

- Specialty Equipment
- RF generator

Grounding pad



• Thermistor probes





- Local anesthetic administered to cutaneous tissues along anticipated needle track
- RF cannulas placed under intermittent fluoroscopy with proper active tip localization to target nerves.
- Confirmed in oblique, AP and lateral views

• Lumbar



Cervical





- After appropriate needle confirmation (motor/sensory testing), 2-3 cc of 2% lidocaine injected through the cannula in a clockwise fashion.
- After adequate "soak" time, time to burn.

• Conventional RF-80 degrees C for 90 seconds.

Conventional RFA



Post-procedure

- Ice packs/OTC analgesics generally sufficient
- Return to work same day
- Inform patients several days of possible soreness
- 2 weeks restricted activity-no "new" vigorous activity
- Inform patients generally 2-3 week delay before onset of perceived benefit.
- Duration of benefit 6 months to 2 years (and some)
- Can be repeated (indefinitely-ish)

Outcomes

- Multiple studies reviewed
- Success for Lumbar RFA ranges from 60-90%

 80-80-80
- 21% had complete pain relief and 65% reported mild to mod pain relief

 Patient Selection?
- Other studies showed that 60 percent of patients enjoy at least 80% relief at 12 months and 80 percent enjoy at least 60 percent relief.

Clinical Article

The Efficacy of Repeated Radiofrequency Medial Branch Neurotomy for Lumbar Facet Syndrome

Jung Hee Son, M.D., Sang Dae Kim, M.D., Se Hoon Kim, M.D., Dong Jun Lim, M.D., Jung Yul Park, M.D., Ph.D. Department of Neurosurgery, Korea University Ansan Hospital, Korea University School of Medicine, Ansan, Korea

The times of RF medial branch neurotomy	1	2	3	Overall
Patients No.	60	55	5	60
Success (%)	51 (85)	50 (91)	4 (80)	88%
Failure (%)	9 (25)	5 (9)	1 (20)	13%
Duration of pain relief (months)	10.9	10.2	9.8	10.5

Table 2. Success rates and pain relief duration of repeated RF medial branch neurotomy

Complications

- Post procedure pain-beyond expected (patient dependent)
- Neuritis/dysesthesia-"Sunburn" 1:200
- Anesthesia/hypoestheia
- Hematoma-extremely rare
- Bruising-common, minor
- Radiculitis/Radiculopathy-rare

 Intraoperative radicular pain

Thank You

- QUESTIONS??
- Email; gustanini23@yahoo.com

Multifidis Muscles



- The significance of multifidus atrophy after successful radiofrequency ablation for low back pain. Dryfess et al. 2009. PMR
- 20 pts. Uniltareral lumbar RFA
- 16 wks later. 3 independent radiologist determine multifidus atrophy and level of RFA.

Turmeric bioavailability

- Poor oral availability
- Animal study-single oral dose 500mg/kg at 41 mins resulted in 0.06 microgram/ml peak plasma level ~1% oral bioavailability
- Improve bioavailability of curcumin-formulations with liposomes, solid lipid nanoparticles, micelles etc.
- Phophatidylcholine (Meriva) formulation. Same rat study resulted in peak plasma levels 5x uncompounded curcumin.
- Piperine-inhibitor of UDP-glucuronyltransferanse. 2000% increase of curcumin bioavailability

- As a high frequency low energy current is applied an electric field is established around the electrode tip.
- This electric field oscillates with alternating RF current causing movement of ions in the tissue
- This causes friction in tissue surrounding the catheter tip which produces heat (not the catheter itself)
- Monitoring the catheter tip temp therefore adequately measures tissue temp.

Special Considerations

- ICD/Pacemakers-risk of mis-sensing which could lead to device discharge
 - EP consult-underlying rhythm, indication of placement, response to magnet, deactive defib function, switched to fixed rate
 - Device rep-interrogate and reprogram if necessary
 - Magnet-place magnet over device. Must know how device responds to a magnet
- Spinal cord stimulators-switch settings to bipolar
- Anticoagulation
- Surgical (Spinal, joint) Hardware

Spinal Hardware

