Chronic Pain Management

Daniel W. Odell, M.D.
Assistant Professor
Department of Anesthesiology, University of Utah
Supportive Oncology and Survivorship, Huntsman Cancer Hospital
Chronic Pain

• Affects approximately 20% of the population
• Severely impacts quality of life, social life, workforce activities, overall health
• Most common pain locations:
  • Low back
  • Headache
  • Neck pain
  • Joint pain
  • Generalized pain/fibromyalgia
Diagnostic Evaluation of Chronic Pain
Pain Assessment

• History – OPQRST
  • Onset
  • Provocation/Palliation
  • Quality
  • Region/radiation
  • Severity
  • Time course

• History+
  • Medication trials and response
    • Adequate dose?
    • Adequate length of medication trial?
  • Related conditions
    • Sleep
    • Function
    • Mood
  • Social History
    • Substance abuse
    • Social situation
Diagnostic Evaluation

• Full physical exam
  • Be gentle!
  • Pain behaviors and effort
  • Neurologic and musculoskeletal exam
  • Evaluation of generalized tenderness
    • Generalized pain syndrome
    • Opioid-induced hyperralgesia
  • Palpation of trigger points
Diagnostic Evaluation

• Characterize types of pain
  • Myofascial
  • Generalized
  • Neuropathic
  • Nociceptive – visceral
  • Nociceptive - somatic
  • Most patients will have mixed pain types

• Try to put it all together
  • *Why* do they have pain?
Myofascial Pain
Myofascial Pain

• Extremely under-recognized!
• Not the same as Fibromyalgia – really quite the opposite!
• Pain resulting from disorganized muscle fibers
  • Trigger points – pain radiates with palpation
  • Can mimic radicular pain and be very painful – more than “muscle pain”
• Post-surgical
• Deconditioning
• Altered gait or positioning
Myofascial Pain

- Gluteus minimus and medius trigger point referral pattern
  - Looks like L5 radiculitis

Characteristic referral patterns of trigger points

Simon and Travells “Myofascial Pain and Dysfunction: the Trigger Point Manual”
Myofascial Pain

- Sternocleidomastoid and Trapezius trigger points
  - Looks like tension headache
  - Can mimic or provoke migraine headache
Myofascial Pain

- Very treatable!
- Physical therapy – more rehab-based than orthopedic-based
  - Experience with myofascial release
  - Experience with dry needling
- Trigger point injections
  - In combination with PT
- Massage
- Acupuncture
- Theracane/Body Back Buddy
- “The Trigger Point Therapy Workbook”
Theracane / Body Back Buddy

• $35 on Amazon.com or occasionally at Relax the Back store
• Hold trigger point with *light-medium* pressure for 10-15 sec
Neuropathic Pain

• “Pain arising as direct consequence of a lesion or disease affecting the somatosensory system”
• Affects 3-8% of population
• Characteristics
  • Burning
  • Shooting
  • Electric
  • Limited benefit from opioids
  • May or may not be confined to known nerve/nerve root distribution
Neuropathic Pain

- Peripheral neuropathy
- Phantom limb pain
- Post-herpetic neuralgia
- Multiple sclerosis pain
- Post-surgical neuropathic pain
- Post-injury neuropathic pain
- Chronic radiculopathy
- Complex regional pain syndrome
Phantom Limb Pain

Pain perceived in an absent body part
• Variable incidence, 60-80% in 1st year, may diminish over time
• ↑incidence: traumatic amputation, upper extremity amputation

Onset
▪ Immediate or years later

Duration
▪ Random, recurring intervals
▪ Can resolve spontaneously or persist for years

Severity
▪ For 3–10% of amputees, phantom pain is chronic & severe
Prevention of Phantom Limb Pain

• Referral to specialist weeks to months BEFORE amputation if possible

• Interdisciplinary Treatment focused on:
  • Pain: Somatic, Neuropathic, Myofascial
  • Psychological support
  • Physical therapy
  • Family support

• Mirror Therapy?
  • Links visual and motor pathways to image recreate body
  • Reverse maladaptive memory traces
# Treatment of Phantom Limb Pain

<table>
<thead>
<tr>
<th>Medical</th>
<th>Physical</th>
<th>Psychological</th>
<th>Invasive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gabapentinoids</td>
<td>Physical therapy</td>
<td>Explanation</td>
<td>Stump revision</td>
</tr>
<tr>
<td>TCAs</td>
<td>Mirror therapy</td>
<td>Guided Imagery</td>
<td>Neuroma resection</td>
</tr>
<tr>
<td>SNRIs</td>
<td>Prosthesis adjustment</td>
<td>Relaxation</td>
<td>Spinal cord stimulation</td>
</tr>
<tr>
<td>Anticonvulsants</td>
<td>Stump desensitizing</td>
<td>Behavioral therapy</td>
<td>Thalamic/cortex stimulation</td>
</tr>
<tr>
<td>Beta-blockers</td>
<td>Acupuncture</td>
<td>Hypnosis</td>
<td></td>
</tr>
<tr>
<td>Ketamine</td>
<td>Stump massage</td>
<td>Biofeedback</td>
<td></td>
</tr>
<tr>
<td>Lidocaine IV</td>
<td>TENS</td>
<td>Psychotherapy</td>
<td></td>
</tr>
</tbody>
</table>
Post-Herpetic Neuralgia

- Pain that persists after shingles infection
  - Unilateral, dermatomal
- Increase incidence with age
  - 80% in patients 80yo
- Severe burning, shooting pain +/- skin hypersensitivity
- More common in immunosuppressed patients
- Early treatment associated with improved outcomes
Post-Herpetic Neuralgia

• Prevention
  • Antivirals in first 48 hours of shingles outbreak
  • Zoster vaccine if > 60yo or prior outbreak

• Treatment
  • Neuropathic Agents

• Interventional Therapies
  • Stellate Ganglion block
    • Face/upper extremity
  • Epidural steroid injection
    • Thorax/abdomen
Complex Regional Pain Syndrome

• Spectrum of disease but very specific
  • Not “Pain NOS,” Not Reflex Sympathy Dystrophy (RSD)
• Continuous pain, disproportionate to any inciting event
• History of one symptom in 3 categories and presence at the time of evaluation of symptoms in 2 categories:
  • Sensory – hyperesthesia, allodynia
  • Vasomotor – temperature asymmetry, skin color changes
  • Sudomotor/Edema – swelling, sweating
  • Motor/Trophic – decreased range of motion, motor dysfunction, trophic changes
• No other diagnosis that better explains the signs/symptoms
Complex Regional Pain Syndrome

• Uncommon to be present in more than 1 body part
  • There is no such thing as “Full-body CRPS” though CRPS has systemic effects
• Variable progression over time – overall favorable
  • Return of function and relief of pain associated with early and aggressive care
• Treatment
  • Physical therapy with desensitization followed by increasing flexibility, range of motion and strength
  • Pharmacotherapy with anti-neuropathic agents
  • Sympathetic nerve blocks to facilitate physical therapy
  • More invasive therapies if needed (spinal cord stimulator)
Complex Regional Pain Syndrome
Complex Regional Pain Syndrome

- Physical therapy
  - Experienced provider
  - Desensitization therapy
  - Mirror therapy
  - Increasing range of motion slowly
- Sympathetic nerve blocks
  - Used to facilitate PT and break cycle of pain
- Neuropathic medications
Generalized Pain
Generalized Pain Syndromes

- Widespread pain throughout the body
  - Not multiple locations but continuous in joints, soft tissue, etc
- Variable quality, usually no inciting event
- Diffuse tenderness to palpation throughout body on exam
  - Absence of significant trigger points
- Associated with depression, poor sleep
- Thought due to central sensitization
Fibromyalgia

• Specific diagnosis within “Generalized Pain States”
• Specific diagnostic criteria
  • Incorporates sleep, cognitive symptoms, other somatic symptoms into diagnosis
• NOT THE SAME AS MYOFASCIAL PAIN
• Affects 2-4% of the population, female predominance
• Often begins in middle adulthood
## Fibromyalgia

<table>
<thead>
<tr>
<th>Table 1: ACR clinical diagnostic criteria for fibromyalgia.(^\dagger)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Widespread pain index (WPI)(\dagger) ≥ 7 and symptom severity (SS)(\dagger) score ≥ 5 or WPI from 3 to 6 and SS score ≥ 9</td>
</tr>
<tr>
<td>2. Symptoms present for ≥ 3 months</td>
</tr>
<tr>
<td>3. No other explanation for pain</td>
</tr>
</tbody>
</table>

\(\dagger\) The WPI is a questionnaire that assesses pain extent and distribution across 19 body areas.

\(\dagger\) The SS scale is a 4-item scale that assesses fatigue, cognitive difficulties, “waking unrefreshed,” and somatic symptoms.
Generalized Pain States

• Treatment
  • Physical activity!
    • Start at 5 min/day, work up to 30 min/day aerobic activity
    • Very gradual
  • Sleep hygiene
  • Treatment of concurrent mood disorders
    • Gabapentin/Pregabalin, Duloxetine, ?TCA, NSAIDs, tylenol
  • Opioids not indicated!
    • Not effective and may contribute to hyperalgesia
Nociceptive Visceral Pain
Nociceptive Visceral Pain

- Pain resulting from thoracic, abdominal or pelvic viscera
  - Distension, ischemia, inflammation
- Poorly localized
- Dull, aching, pressure, squeezing
- Not particularly movement-related
Visceral Pain

- Referred to superficial structures
  - Diaphragm → Shoulder
  - Angina → Left neck/arm
- Chronic abdominal and pelvic pain
- Cancer pain

Examples of Referred Pain

<table>
<thead>
<tr>
<th>Origin of Pain</th>
<th>Site of Referred Pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendicitis</td>
<td>Umbilical region</td>
</tr>
<tr>
<td>Angina pectoris</td>
<td>Arm, jaw</td>
</tr>
<tr>
<td>Aortic aneurysm</td>
<td>Back</td>
</tr>
<tr>
<td>Pleuritis</td>
<td>Shoulder</td>
</tr>
<tr>
<td>Cholecystitis</td>
<td>Right shoulder/scapular area</td>
</tr>
<tr>
<td>Gastroesophageal reflux</td>
<td>Chest</td>
</tr>
<tr>
<td>Urinary tract infection</td>
<td>Back, abdomen</td>
</tr>
</tbody>
</table>
Nociceptive Somatic Pain
Nociceptive Somatic Pain

- Arises from damage or injury to bone, joint, muscle, skin or connective tissue
  - “Mechanical” pain
- Well-localized
- Intense ache, throbbing, sharp, stabbing, pinprick
- Bony pain
  - Metastases, fractures
  - Degenerative spine disease
- Joint pain
  - Osteoarthritis
Treatment Approach to Chronic Pain
Treatment Algorithm

• Conservative treatment
  • Physical therapy, Pool therapy
  • Behavioral therapy
  • Complementary medicine – acupuncture, massage, acupressure
  • Tylenol, NSAIDs

• Adjunct medications
  • Neuropathic agents, antidepressants, topical agents, muscle relaxants

• Injections/Procedures

• Invasive Procedures/Implanted Devices
Conservative Treatment
Conservative Treatment

• Physical Therapy
  • One size does not fit all!
  • Early institution
  • Experienced providers
  • Tailored treatment

• Pool Therapy
Conservative Treatment

• Behavioral Medicine
  • Relaxation Therapy
  • Behavior Modification
  • Education
  • Biofeedback
  • Counseling/Therapy – CBT
  • Hypnosis

• Beneficial for all!

• Recognize the impact of mood on pain and visa versa
  • Central sensitization
Conservative Treatment

- Complementary medicine
  - Acupuncture
  - Acupuncture
  - Massage therapy
  - Tai Chi
  - Mindfulness meditation
Acetaminophen

• Analgesic and antipyretic
• Mechanism of action poorly understood
  • Blocks prostaglandin synthetase in CNS, not peripherally
  • Lacks peripheral anti-inflammatory effects
  • Lacks platelet, GI, bone, renal effects

First-line treatment for pain in the elderly
Maximum 3000-4000mg/day
  • Be aware of other tylenol-containing products
  • 2000mg/day with hepatic disease
NSAIDs

COX Inhibitors: Prevent inflammatory cascade
NSAIDs

Two isoforms of COX enzyme

**COX-1**
- Constitutive
- “Housekeeping enzyme”
  - GI tract
  - Kidneys
  - Platelets

**COX-2**
- Inducible with inflammatory stimulus
**NSAIDs**

- Aspirin: Non-Selective, Permanent COX-Inhibitor
- Ibuprofen
- Ketorolac
- Naproxen
- Indomethacin
- Diclofenac
- Meloxicam
- Etodolac
- Celecoxib: Selective, Temporary COX-2 Inhibitors
NSAIDs Adverse Effects

GI - Gastritis, gastric/peptic ulcers
Hematologic – Increased risk of bleeding
Orthopedic – Impaired bone healing?
Renal - Acute kidney insufficiency
Cardiovascular - Increased risk of MI

Decreased incidence with COX-2 Inhibitor
NSAIDs

• ALWAYS TAKE WITH FOOD
• Consider concurrent PPI use
• Naproxen 375 - 550mg bid
• Meloxicam 7.5-15mg daily
  • 7.5mg dose is COX-2 selective
• Celebrex 100-200mg bid – easiest on GI system, safer with anticoagulants, expensive
• Ibuprofen 600-800mg tid
  • Increased risk of AKI
Risk of acute myocardial infarction with NSAIDs in real world use: bayesian meta-analysis of individual patient data

Michèle Bally,1,2 Nandini Dendukuri,3,4 Benjamin Rich,4 Lyne Nadeau,4 Arja Helin-Salmivaara,5 Edeltraut Garbe,6 James M Brophy2,4,7

CONCLUSIONS
All NSAIDs, including naproxen, were found to be associated with an increased risk of acute myocardial infarction. Risk of myocardial infarction with celecoxib was comparable to that of traditional NSAIDs and was lower than for rofecoxib. Risk was greatest during the first month of NSAID use and with higher doses.

• “Taking any dose of NSAIDs for one week, one month, or more than a month was associated with an increased risk of myocardial infarction.”

Short term use for 8-30 days at a high daily dose (celecoxib >200 mg, diclofenac >100 mg, ibuprofen >1200 mg, and naproxen >750 mg) is associated with the greatest harms, without obvious further increases in risk beyond the first 30 days.

Cite this as: BMJ 2017;357:j1909
http://dx.doi.org/10.1136/bmj.j1909
Accepted: 10 April 2017
Adjunct Medications
Adjunct Medications

• Gabapentinoids
  • **Gabapentin**
    • Calcium channel blocker
    • 300mg qhs with titration to total daily dose 1800-3600mg (start with 100mg qhs with titration to 300mg tid in elderly)
    • Neuropathic pain, generalized pain, opioid-sparing
  • **Pregabalin**
    • Calcium channel blocker
    • 50mg qhs with titration to total daily dose 300-600mg
    • Neuropathic pain, generalized pain, opioid-sparing
Adjunct Medications

• **Antidepressants**
  
  • **Tricyclic antidepressants**
    • Amitriptyline and Imipramine – tertiary amines, more side effects
    • Nortriptyline and Desipramine – secondary amines, less side effects
      • Desipramine causes least amount of sleepiness
    • Start at 25mg qhs, titrate to 100mg qhs as tolerated (less in elderly)
    • Caution with other serotonergic medications, elderly patients
  
  • **SNRIs**
    • Duloxetine (60-120mg/day)
    • Venlafaxine?
    • Evidence is underwhelming
Adjunct Medications

• Anticonvulsants
  • Topiramate
    • Sodium channel blocker
    • Poor evidence in pain other than migraine prophylaxis
  • Carbamazepine/Oxcarbazepine
    • Sodium channel blockers
    • Trigeminal neuralgia
Adjunct Medications

• **Muscle Relaxants**
  • Work best with short-term use (10 days), tolerance develops quickly
  • **Cyclobenzaprine** 5-10mg tid
    • TCA-like, caution with other serotonergic meds and in the elderly
  • **Tizanidine** 2-8mg tid
  • Valium, Soma (carisoprodol), Robaxin (methocarbamol), Skelaxin (metaxaolone)
    • CNS sedatives – not muscle relaxants. Avoid.
    • Soma is a dangerous CNS-depressant and implicated in many multidrug unintentional overdose deaths
Adjunct Medications

• **Topical Agents**
  - Voltaren gel or Flector patch
    - Diclofenac preparations – gel now generic
    - Apply to affected area
    - Great for patients on oral anticoagulation
    - Works best when painful area is close to the skin
      - Knees, finger/toes, etc
  - Compounded creams
    - Expensive and ineffective
    - Exception may be ketamine cream for allodynia
Opioid Medications
Pain and Addiction

• Chronic pain is common
  • Occurs in 33% of the population, severe in 10%

• Opioids are frequently prescribed for pain
  • 16% of patients in primary care setting in 2002

• Opioid misuse and addiction are common
  • Fishbain 2007
    • 11.5% of chronic pain patients misuse opioids
    • 3.5% of chronic pain patients have develop opioid addiction
    • 14.5% of chronic pain patients use illicit drugs
When to consider opioids

• Appropriate type of pain
  • Not myofascial pain
  • Not generalized/fibromyalgia pain

• NEVER first line
  • Conservative treatment
  • Adjunct medications
  • Physical, behavioral, complementary therapies

• Failure of multiple past trials of medication/therapies

• Will it improve function??
Initiation of Opioids

- Documentation of pain and prior interventions, therapies and medication trials
- Psychological assessment
  - Substance abuse assessment
- Risk/benefit discussion with the patient
- Medication agreement
  - Specify who can prescribe opioids
  - Who can prescribe other controlled medications
  - Management of acute pain
- Consider baseline urine drug screen
Initiation of Opioids

- **Trial of opioids**
  - Low dose (Hydrocodone 5/325 bid-tid)
  - Mild escalation reasonable (approaching 30-50mg OME?)

- **Assessment of improvement**
  - Pain
  - FUNCTION!

- **Routinely assess 4 A’s**
  - Analgesia
  - Activity
  - Adverse Effects
  - Aberrant Behavior
Casual Prescribing of Opioids

• If you start opioids you have become that patient’s opioid prescriber
  • May be reasonable for acute issues
  • Important for patient to have appropriate expectations
  • Due diligence
    • Controlled Substance Database report
    • Knowledge of other sedating medications
    • Health history
• Do not give opioids and tell a patient another provider (Pain Specialist, Surgeon, Dentist) will give them more
Pre-Existing Opioids

• Management of patients already on opioids
• Same considerations
  • Appropriate type of pain
  • Failure of multiple therapies and non-opioid medications
  • Psychological assessment
  • Substance abuse assessment
  • Risk/benefit discussion with the patient
  • Medication agreement

• If not appropriate inform the patient and develop plan for opioid taper with initiation of other treatment
• You are not beholden to prescribe opioids just because another practitioner has done so
  • However tapering over time can promote therapeutic relationship with patient
Prevention of opioid misuse/abuse

- Prescriber factors
  - Dose
    - Risks increase above 100mg OME, skyrocket over 200mg OME
  - Concurrent controlled substances
    - Risks increase with concurrent benzodiazepines or hypnotics
      - “Muscle relaxants” other than tizandine/cyclobenzaprine
      - Sleep aids: Ambien/Lunesta/Sonata, temazepam
      - Only one? Only two?
Detection of aberrant opioid-related behaviors
Aberrant Behavior

• Lost opioid prescriptions
• Out of opioids early
• Inappropriate DOPL
• Inappropriate UDS
• Failure to participate in non-opioid treatment
• Concern for opioid diversion
• Overt sedation
Aberrant Behavior

• Safety of patient and community is first consideration

• Verify the facts
  • Controlled substance database report
  • Call patient’s pharmacy or other providers
  • Request records from ED/Hospital

• Base decision on continued prescribing on safety, factual information, pain issue and inform the patient
  • Provide resources for opioid withdrawal
Detection of aberrant opioid behaviors

• Urine Drug Screening
  • Presence of expected medications and metabolites
  • Absence of illicit substances or other opioids
  • Only as good as your test!
    • False positives and negatives exist – know your patient and test
    • High-resolution test in EPIC
    • ARUP pathologists on call to troubleshoot/answer questions

• How often?
  • PRIOR to initial prescribing
  • Q3-12 months
  • Witnessed?
  • Or just make sure they don’t take anything into the bathroom?
Detection of aberrant opioid behaviors

• Prescription Drug Monitoring Programs (DOPL)
  • Every time you see a patient or refill a medication
  • Hopefully eventually nationwide
  • Can set surrogates to access this under your license in UT
    • 3 RNs or Mas

• Pill Counts
  • Require coordination of staff and patient

• Requests for early medication refills

• Reports from family/friends
  • Can listen to any information, may not disclose any
  • Fine line to walk
Management of aberrant opioid related behavior

The hard stuff
Management of aberrant behavior

- Safety of patient and community is first consideration
- Verify the facts
  - Controlled substance database report
  - Call patient’s pharmacy or other providers
  - Request records from ED/Hospital
- Base decision on continued prescribing on safety, factual information, pain issue and inform the patient
  - Provide resources for opioid withdrawal
- You must continue to care for patients for 30 days after clinic discharge – this does not imply prescribing opioids
Management of aberrant behavior

- Depends on severity
- “Common” - Early refills, inappropriate UDS/DOPL/Pill Count
  - Verify the facts, give the patient an opportunity to explain
  - Reasonable practice
    - First strike incurs a warning – document it!
    - Second strike = no continued opioid prescribing
- Concurrent illicit drug use
  - No further opioid prescribing (marijuana?)
- Confirmed overdose
  - No further opioid prescribing
- Confirmed diversion
  - Discharge patient
- You must continue to care for patients for 30 days after clinic discharge – this does not imply prescribing opioids
Injection Procedures
Chronic Spine Pain

- Mechanical
  - Scoliosis, arthritis, stenosis, degenerative
  - Facet arthropathy, sacroiliac joint arthropathy
  - Failed back/neck surgery syndrome
Epidural Injections

- Epidural injections
  - Local anesthetic + steroid injected into epidural space surrounding nerve roots
    - Clears inflammatory mediators and reduces inflammation/compression
  - Indicated for radiculare upper extremity or lower extremity pain
    - Burning, shooting pain in specific distribution to distal area of limb
    - Neurologic deficits → radiculopathy, “just” pain – radiculitis
  - Also indicated for spinal stenosis and postherpetic neuralgia
  - Different approaches depending on nature and location of pain
  - Relief lasts 2-4 months on average
Facet Arthropathy

- Pain just off midline, worse with extension/rotation
- Does not cause radicular pain but pain can radiate locally
- Can develop due to arthritis, misalignment
- Injections:
  - Thermal ablation of nerve branch that innervates the joint (older)
    - Lasts 6-9 months, can be repeated
  - Intra-articular steroid injections (younger)
    - Less effective
Sacroiliac Joint Injection

• Joint at intersection of spine and pelvis
• Significant movement and weight loading
  • Can develop pain due to arthritis or misalignment
• Pain over SI joint with radiation into buttock and posterior thigh
• “FABER” provokes pain
  • flexion, abduction and external rotation of hip
• Local anesthetic + steroid, lasts 3-4 months
Sacroiliac Joint Dysfunction
Peripheral Nerve Injections

• **Iliioninguinal Nerve Block:**
  • Indications: *Ilioinguinal neuralgia* (groin pain after inguinal surgery/tumor)
  • Steroid + local anesthetic – lasts approx 3 months
Peripheral Nerve Injections

- **Occipital Nerve Block:**
  - Indications: **Occipital neuralgia** (occipital pain/HA after surgery or tumor)
  - Steroid + local anesthetic – lasts approx 3 months
Peripheral Nerve Injections

• Genicular Nerve Block
  • Indications: Chronic knee pain, not operative candidate
  • Diagnostic nerve block with thermal ablation if successful
  • Success 50/50
Peripheral Nerve Injections

Intercostal Nerve Block

- Indications: Intercostal neuralgia, Chronic rib pain (post-thoracotomy)
- Local anesthetic + steroid
Joint Injections

• Hip, Knee, Shoulder most common
  • Painful osteoarthritis of joint
    • Dx with x-ray
  • Steroid + local anesthetic – lasts approx 3 months
  • Hyaluronate viscosupplementation for knees may last 6-12 months
  • Ultrasound, fluoroscopy, “blind”
Invasive Injections and Implanted Devices
Sympathetic Blocks

• Diagnostic
  • Is the pain sympathetically mediated?

• Therapeutic
  • Local anesthetic – break the cycle
    • Series of sympathetic blocks + PT for CRPS
  • Steroid – little evidence
  • Chemical neurolysis – denature the nerves
    • Terminal Cancer
Sympathetic Blocks

• **Stellate Ganglion**
  • Neuropathic pain of the face, neck, shoulder or upper extremity
    • CRPS, Phantom Limb, PHN

Lumbar Sympathetic Block

• Neuropathic, suspected sympathetically-mediated pain in the lower extremity
  • CRPS, Phantom limb pain, Ischemic pain/vascular insufficiency
Spinal Cord Stimulation

Neuromodulation: provide alternate input to spinal cord to “cover up” pain

- Leads implanted in epidural space connected to an implanted battery source
  - Patients undergo “Trial” first with temporary percutaneous leads for 3-7 days
- Multiple device companies, stimulation methods/parameters
Spinal Cord Stimulation

• Indications:
  • Neuropathic pain in limbs
    • Persistent radicular pain, phantom limb pain, postherpetic neuralgia, brachial plexus injury
  • Failed back/neck surgery syndrome

Rapidly Changing
  • High-frequency SCS: Effective for axial low back or neck pain?
  • Dorsal Root Ganglion SCS: Groin pain, ilioinguinal pain, intercostal pain, radiculopathy?
  • New waveforms/programming techniques: Burst, high-density, etc.
Spinal Cord Stimulation

• Downsides:
  • Invasive
  • Complications
    • Infection rate 5-10%
  • Diminished effect over time (5+ years)
    • May be less with newer waveforms
  • Does not treat myofascial or mechanical pain
  • Not all systems are MRI-compatible
Peripheral Nerve Stimulation

- Similar to spinal cord stimulation
- Indicated for specific nerves
  - Occipital neuralgia
  - Ilioinguinal neuralgia
- May have a role in chronic migraine
- Emerging field
- Insurance coverage challenging
Conclusion

• Diagnosis: history, physical exam and characterization of pain types
  • Myofascial, Generalized, Neuropathic, Nociceptive visceral, Nociceptive somatic

• Treatment Algorithm tailored to pain types
  • Conservative treatment
  • Adjunct medications
  • Injections/Procedures
  • Invasive Procedures/Implanted Devices
Thanks for your attention!
Acknowledgements

- Jill Sindt, M.D.
- Perry Fine, M.D.
- Pain Management Center, University of Utah
- Supportive Oncology and Survivorship, Huntsman Cancer Hospital
References

Thank You!