Ambulatory Pain Management

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<th>Consultant and Speaker’s Bureau</th>
<th>Endo Pharmaceuticals, Alpharma Inc., and Pfizer Inc.</th>
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<td>Grant Research</td>
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Disclosure
Richard Jermyn, DO
Objectives

- Learn how to interview a pain patient
- Review pharmacology of pain medications
- Common treatments for the pain patient
- Understand the pathophysiology of pain
CASE STUDY

- Patient is a 53 year old female with a 10 year history of Diabetes Mellitus. Patient has severe pain in feet and legs VAS 9 (1-10) for 1 year. Patient admits to not using her insulin and blood sugars are usually above 200. You have no medical records.
- Diagnosed with osteoarthritis of both knees
- History of Lumbar spinal stenosis
Case Study

- Works as a waitress but struggles
- Limited income
Case Study

- Patient taking Neurontin 600mg (Gabapentin) TID
- Percocet 7.5/325 (Oxycodone HCl-Acetaminophen) 5-6/day
- Never has had physical therapy but feels gets exercise at work
- Corticosteroid injections provided no relief
- Does this patient have pain?
- Is Neurontin (Gabapentin) appropriate?
- Is Percocet (Oxycodone HCl-Acetaminophen) appropriate?
- How to get started?
Acute vs Chronic Pain States

**Acute**
- Associated with tissue damage
- Increased autonomic nervous activity
- Resolves with healing of injury
- Serves protective function

**Chronic**
- Extends beyond expected period of healing
- No protective function
- Degrades health and functioning
- Contributes to depressed mood

Nociceptive vs Neuropathic Pain States

**Nociceptive**

- Arises from stimulus outside of nervous system
- Proportionate to receptor stimulation
- When acute, serves protective function

**Neuropathic**

- Arises from primary lesion or dysfunction in nervous system
- No nociceptive stimulation required
- Disproportionate to receptor stimulation
- Other evidence of nerve damage

Examples of Nociceptive and Neuropathic Pain

**Nociceptive**
- Arthritis
- Mechanical low back pain
- Sports/exercise injuries
- Postoperative pain

**Neuropathic**
- Painful DPN
- PHN
- Neuropathic low back pain
- Trigeminal neuralgia
- Central poststroke pain
- Complex regional pain syndrome
- Distal HIV polyneuropathy

**Mixed**
- Low back pain
- Fibromyalgia
- Neck pain
- Cancer pain

Caused by lesion or dysfunction in the nervous system
Caused by combination of primary injury and secondary effects
Caused by tissue damage
Pain Assessment

- Quality: sharp shooting, numbness, burning
- Intensity: VAS (0-10)
- Duration: constant, intermittent, worse at night
- Associated symptoms: bowel/bladder incont.
- Medical/Surgical History:
  - Opportunistic infections history: herpes, CMV, Lyme, toxoplasmosis, HIV
- Treatments that have failed
Pain Assessment

- Social History:
  - Live alone or partnered
  - Single or multiple story homes
  - Assistive devices
  - Falls
  - Drive
  - Hobbies

- Goals for treatment: work, childcare, school, sports
Physical Exam

- Upper motor neuron vs. lower motor neuron
Physical Exam

- Upper motor neuron:
  - hyper-reflexia
  - spasticity
  - hoffmans/babinski
  - frontal release signs
  - ataxia, tremor, dysmetria
Physical Exam

- Lower Motor Neuron
  - decreased reflexes
  - weakness
Upper Motor Neuron

- Metabolic: common drug effects
- Lymphoma: CNS tumors
- Primary or metastatic cancer
- CVA: thalamic syndrome, hand-shoulder syndrome
- Myelopathy: stenosis
- Infectious disease: meningitis, lymes disease
- Neurological: MS
- Dementia
Lower Motor Neuron

- Peripheral Sensory Neuropathy
- Mononeuropathy: femoral
- Radiculopathies
- myopathy: CPK
  - Drug effects
- Arthropathies: OA
- Autoimmune: RA
- Infectious Disease: Herpes zoster
Normal Pain Pathways

Key:
RVM = rostroventral medulla
PAG = periaqueductal grey
C = cingulate cortex
F = frontal cortex
SS = somatosensory cortex
A = amygdala
H = hypothalamus

- Ascending pathway
- Descending pathway

Normal and Abnormal Synaptic Neurotransmission
Supraspinal Influences on Nociceptive Processing

**Facilitation**
- Substance P
- Glutamate and EAA
- Serotonin (5-HT_{2a} and 5-HT_{3a} receptors)

**Inhibition**
- Descending antinociceptive pathways
  - Noradrenaline–serotonin (5-HT_{1a} and 5-HT_{1b} receptors)
  - Opioids
  - GABA

EAA = excitatory amino acids. 5-HT = serotonin.
Cortical

Spinal

Peripheral Nerve

Antidepressant
Anticonvulsants
Psychostimulents
Opiates
Tens
Anticonvulsants
NSAIDS
Epidural
Nerve Blocks
Modalities
Muscle Relax

µ
Pain Management

- WHO Analgesic ladder

- MILD
- MODERATE
- SEVERE
Metabolized by C450 2D6 isoenzymes

- Antiarrythmics
- Beta-blockers
- Opiates
- Antipsychotics
- SSRI’s
- TCA’s
- Anti-retrovirals
Mechanism of Action of NSAID

- **Arachidonic Acid**

  - COX-1
    - Prostaglandin
      - Protection of Gastic mucosa
    - hemostasis

  - Cox-2
    - prostaglandin
      - Mediate pain, Inflammation and fever
Specificity of Agents

- **Category inhibition**
  - Cox-2
  - Cox-1

- **Medications**
  - Celecoxib
  - Aspirin
  - Diclofenac (oral, gel, patch)
  - Etodolac
  - Ibuprofen
  - Indomethacin
    - (Indomethacin-Various)
  - Meloxicam
  - Naprosyn (Naproxen)
Opioids

- Agonist and Agonist-antagonists
  - bind to opioid receptors
- sustained released and short acting agents
- Oral route is most preferred
- mainstay for moderate to severe pain
- never dose as PRN
Opioids

- Start with the lowest possible dose possible
- titrate the drug
- place the patient on a schedule and never PRN
- use combinations of opioids and non-opioids
- be aware of tolerance
**Opioids**

- **Weaker Opioids analgesics:**
  - oxycodone, hydrocodone, codeine
  - available in combinations with ASA/aceto.

- **Stronger Opioid analgesics:**
  - Roxicodone (Oxycodone HCl) immediate release
  - Oxycontin (Oxycodone HCl) sustained release
  - MSContin (Morphine Sulfate), MSIR
  - Methadone
  - Duragesic (Fentanyl)
Dosing of Opioids

- Long-acting agents for 24 hr. relief

- Short-acting agents for breakthrough pain
  - no more than 2 times daily (debated)
  - Combo drugs: Percocet (Oxycodone HCl), Vicodin (Hydrocodone Bitartrate-Acetaminophen), Lortab (Hydrocodone Bitartrate-Acetaminophen)
  - Uncombinated drugs: Oxy IR (Oxycodone HCl), Actiq (Fentanyl Citrate)

- Treat side effects such as constipation
Methadone

- Long half life: 24-150hrs
- Duration of activity: 4-6hrs.
- Toxicity with overlapping half lives
- HIV meds can decrease the serum level of methadone
  - Immediate withdrawal
Methadone

- When switching to methadone to another analgesic: decrease 75-90% equi-analgesic dose
- Take maintenance Dose decrease 20% and divide to tid-qid.
- Short acting for withdrawal symptoms
Transdermal

- 98% protein bound
  - Must have protein to be absorbed
  - Must have protein to be excreted

- Absorption of the drug increased as the temperature increases.
  - 101-103 degrees
Tramadol (Ultram)

- Centrally Acting Oral Opioid Agonist
- Serotonin and Noradrenergic
- Dizziness, Nausea and Headache
Antidepressants

- Works on serotonin and noradrenergic
- Tricyclics, hetero, SNRI, SSRI
- Potentiate the opiates
- Treat depression as a side effect
Antidepressants

- Effexor: SSRI (Venlafaxine)
- Amitriptyline: tri
- Lithium
- Desipramine: tri
- Nortriptyline: tri
- Paxil: SSRI (Paroxetine)

- Prozac: SSRI (Fluoxetine)
- Serzone (Nefazodone)
- Wellbutrin (buPROPion): Aminoketone
- Zoloft: SSRI (Sertaline)
- Cymbalta: SNRI (duloxetine)
Most neurotransmitters are inhibitory
Side-effects

- Urinary retention, anticholinergic, increased or decreased blood pressure, drowsiness, nausea, headache, sweating
Antidepressants

- Pain relief is related to serum level.
- Dose at night to allow improved sleep.
- SSRI’s are believed to be not as beneficial in pain relief until recently.
- Warn patients about side effects.
Anticonvulsants

- Gabapentine (Neurontin):
  - works on GABA
  - start at low doses and titrate upward
  - check renal profiles: renal excretion
  - potentiate opioids weakly
  - strong mood stabilizer
Anticonvulsants

- Valproic Acid: extreme caution in liver disease, monitor blood levels, neural tube defects in fetus, dizziness, headache, thrombocytopenia
- Phenytoin: nystagmus, lethary, ataxia, gingival hyperplasia, hepatic disease
Anticonvulsants

Gabitril (Tiagabine): GABA reuptake inhibitor, caution with liver disease, dizziness, fatigue, rare ophthalmologic effects

- Klonopin (Clonazepam): benzodiazepine
- Lamictal (Lamotrigine): rash (serious), dizziness, ataxia, fatigue, blurred vision
- Tegretal: aplastic anemia, rash (SJS), photosensitivity, dizziness
Anticonvulsants

- Zonegran: Somnolence, dizziness, anorexia, headache, nausea
- Lyrica (Pregabalin): Schedule V, sedation, weight gain
  - May be less sedating than Neurontin (Gabapentin)
  - Indicated for post-herpetic neuralgia, diabetic neuropathy
Antispasmodics

- Flexeril (Cyclobenzaprine): central acting, unknown mechanism, anticholinergic side effects
- Baclofen: central acting, drowsiness, confusion, seizures with abrupt withdrawal
- Parafon Forte: central acting, GI upset, drowsiness
Muscle Relaxants

- Robaxane: central acting, drowsiness, dizziness, GI upset, blurred vision, headache
- Skelaxin (Metaxalone): central acting leukopenia, hemolytic anemia, dizziness
- SOMA: addictive, dizziness, nausea
- Tizanidine: alpha adrenergic agonist, anticholinergic, fatigue, urinary retention
Psycho-stimulants

- Serotonin and noradrenergic
- Potentiate opioids
- Powerful mood stabilizer
- Improves appetite when wasting
- Improves sedation
- Dose in am and noon only
Topical

- Lidoderm patch (Lidocaine)
- Capsaicin
- Ketomine topical (compound pharm)
- Flector Patch (diclofenac)
- Voltaren Gel (diclofenac)
Drug Abuse and Opioids

- Not as common in the elderly
- Place patient in a drug agreement
  - monthly visit
  - one pharmacy only
  - can not use, sell, trade drugs
  - take as specified - no renewals
- Detox when appropriate - not when sick
- Treat other symptoms: depression