Disclosures

- I have no financial disclosures

Objectives

- Review principles of pain management
- Review commonly used non-opioid analgesics
- Review adjuvant analgesics
  - Inflammatory pain
  - Neuropathic pain
  - Bone pain
  - Bowel obstruction
General approach to pain management

- Detailed pain history
- Physical exam
- Associated factors
- Information obtained will dictate choice of medication

Adjuvant Analgesics

- Medications that have a primary indication other than pain
- Can be used alone or in combination with analgesics
- Often used with opioids to enhance pain relief, treat pain that is refractory to opioids, or as an "opioid-sparing" agent
- Commonly used for pain syndromes

Inflammatory Pain Analgesics

- NSAIDs
  - Inhibit COX-1 and COX-2
  - Inhibit prostaglandin synthesis to reduce inflammation and pain
  - Can be administered orally, rectally, topically, intravenously, and intramuscularly
- Aspirin
  - Irreversibly inhibits COX-1 and COX-2
- COX-1 inhibition can affect gastrointestinal tract, kidneys, central nervous system, platelet function
Inflammatory Pain Analgesics

- NSAIDs are considered first line treatment for non-cancer pain
  - Inflammatory joint disease
  - Myalgias
  - Back pain
  - Headaches
  - Surgical pain

Inflammatory Pain Analgesics

- NSAIDs are helpful in cancer related pain
  - Bone pain – due to distention of the periosteum by metastases
  - Soft tissue pain – due to compression or distention of tissues
  - Visceral pain – due to irritation of the pleura or peritoneum

Adjuvant Analgesics - Corticosteroids

- Dexamethasone commonly used
- Works by inhibiting arachidonic acid cascade to reduce inflammation
- Improves appetite, nausea, malaise, and quality of life
- Used for neuropathic pain, cancer pain, bone pain, pain due to compression fractures, headaches, tumors, and malignant bowel obstruction
- Side effects include neuropsychological toxicity, hyperglycemia, fluid retention, gastrointestinal ulcers, fragile skin, weight gain, oral thrush, osteoporosis, and hypertension
Adjuvant Analgesics - Paracetamol

■ Also known as acetaminophen
  - Mechanism of action is poorly understood
  - Can be administered orally, rectally, and intravenously
  - Often used alone for fevers, or with opioids
  - Toxicity can occur with doses greater than 4g/day

Adjuvant Analgesics for Neuropathic Pain

■ Antidepressants
  - Tricyclics (amitriptyline, nortriptyline, desipramine, etc.)
    ■ Used for fibromyalgia, spinal cord injury pain, cancer-related pain, depression, post-herpetic neuralgia
    ■ Side effects include cardiotoxicity, orthostatic hypotension, somnolence, and anticholinergic effects
  - Noradrenaline and serotonin reuptake inhibitors (venlafaxine, duloxetine, etc.)
    ■ Used for atypical facial pain, fibromyalgia, and chronic post-mastectomy pain
    ■ Side effects include nausea, headache, sedation, insomnia, weight gain, and sexual dysfunction
  - Usually can use lower doses compared to doses for depression treatment

■ Anticonvulsant drugs
  - Carbamazepine is used for trigeminal neuralgia, postherpetic neuralgia, and diabetic neuropathy
    ■ Side effects include dizziness, nausea, leukopenia, thrombocytopenia, aplastic anemia, liver failure, SIADH, and heart failure
  - Gabapentin and pregabalin are used for diabetic neuropathy, spinal cord injury, lumbar spinal stenosis, lumbar spinal stenosis, fibromyalgia, HIV neuropathy, multiple sclerosis related pains
    ■ Considered first line agents for treatment of non-malignant neuropathic pain
    ■ Side effects include sedation, fatigue, edema, and weight gain
  - Lamotrigine relieves pain from trigeminal neuralgia, HIV neuropathy, and central post-stroke pain
    ■ Side effects include an exfoliative rash
Adjuvant Analgesics for Neuropathic Pain

- **Lidocaine**
  - Works by blocking sodium channels
  - IV route not shown to be effective in clinical trials
  - Clinical experience may justify IV use for refractory neuropathic pain
  - Contraindicated for patient with cardiac conduction disorders and seizure disorders
  - Topical route well tolerated

- **Capsaicin**
  - Works by inhibiting the release of substance P
  - Used topically for mononeuropathies and polyneuropathies

Adjuvant Analgesics for Neuropathic Pain

- **Ketamine**
  - Analgesic doses much lower than anesthetic doses
  - Can be given intravenous, oral, rectal, subcutaneous, and topical routes
  - More studies needed to support use as analgesic and dosing/titration
  - Toxicities
    - Neuropsychiatric: dysphoria, hallucinations, nightmares
    - Cardiovascular: tachycardia, hypertension

Adjuvant Analgesics for Neuropathic Pain

- **Alpha-2 adrenergic agonists (clonidine, tizanidine)**
  - Can be beneficial for pain syndromes that are less responsive to opioids, including chronic headache, non-malignant neuropathic pain, and some neuropathic cancer-related pain
  - Can be given orally or transdermally
  - Mechanism of analgesia is unknown
  - Side effects include somnolence, hypotension, and dry mouth
Adjuvant Analgesics for Bone Pain

- Calcitonin and bisphosphonates relieve pain from bone metastases and vertebral compression fractures
  - Work by inhibiting osteoclast activity
  - Can be given subcutaneously or intranasally
  - Most effective for breast cancer and multiple myeloma
  - Side effects include renal toxicity, gastrointestinal toxicity, and osteonecrosis of the jaw
  - Use cautiously in patients with renal and hepatic impairment

Adjuvant Analgesics for Bone Pain

- Radiopharmaceuticals
  - Absorbed at areas of high bone turnover
  - Strontium-89, Samarium-153
    - Given as monotherapy or with radiation therapy
  - Main side effect – myelosuppression

Adjuvant Analgesics for Bowel Obstruction

- Octreotide inhibits the secretion of gastric, pancreatic and intestinal secretions