Challenging Pain Cases: Round Table Discussion

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Objectives

• Distinguish between different pain syndromes
• Discuss rationale for particular analgesic selection
• Apply knowledge of pain syndromes and analgesic selection to practice cases
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• Discuss rationale for particular analgesic selection
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Pain Syndromes

- Pain quality
- Pain related to underlying disease
- Pain related to treatment
- Acute versus Chronic Pain
- Barriers to treatment
Pain Quality

**Nociceptive**
- Somatic
  - Bone metastases
  - Mucositis
  - Soft tissue injury
- Visceral
  - Bowel obstruction
  - Biliary colic

**Neuropathic**
- Diabetic neuropathy
- Post-herpetic neuralgia
- Chemotherapy-related neuropathy
- Phantom limb pain
- Post stroke pain
Common Pain Syndromes

Pain related to underlying disease

- Tumor-related pain due to compression
- Ischemia caused by ATH
- Abdominal pain with referral to thorax and shoulder, ascites due to liver failure
- Back pain and pruritus due to ESRD
- Chest pain or dysnea due to pulmonary or cardiac disease
- CNS processes leading to headache
- Trigeminal neuralgia in multiple sclerosis
- Vaso-occlusion leading to bone, muscle and visceral pain in sickle cell disease
- Spasticity due to neuromuscular disorder
Common Pain Syndromes

_Pain related to Treatment_

- Peripheral neuropathy due to chemotherapy, HAART
- Surgically induced phantom limb pain
- Immunocompromise leading to postherpetic neuralgia
- Aseptic necrosis due to prolonged corticosteroid use
- Opioid-induced hyperalgesia
Pain Chronicity: Acute vs. Chronic

Acute
• Time-limited
• Cause often known
• Diminishes as healing takes place
• May have observable signs
• Usually nociceptive

Chronic
• Purposeless, cyclical, irreversible
• Persists greater than 3-6 months
• Vegetative, depressive signs
• Autonomic adaptation
• Usually nociceptive +/- neuropathic
Objectives

• Distinguish between different pain syndromes
• Discuss rationale for particular analgesic selection
• Apply knowledge of pain syndromes and analgesic selection to practice cases
Analgesic Selection

- WHO ladder
- Pharmacologic approaches
- Drug-Drug interactions
- Special populations
- Barriers to treatment
Analgesic Approaches

- Opioids
- Adjuvants
- Neural-augmentation
- Ablative Surgery
- Suffering
- Pain Perception
- Nociception

- Psychotropics
- Anti-depressants/
- Cognitive therapies
- Relaxation
- Spiritual
- NSAIDS
- Radiation
- Chemotherapy
- Local blocks
- Surgery
- Physical modalities

Pain Management: Stepwise Approach

WHO’s Pain Relief Ladder

- **Step 1**: Non-opioid agent, including NSAIDs and acetaminophen, ± adjuvant analgesia, including corticosteroids and antidepressants

- **Step 2**: Opioid for mild to moderate pain, ± non-opioid agent, ± adjuvant analgesia

- **Step 3**: Opioid for moderate to severe pain, ± non-opioid agent, ± adjuvant analgesia

Revised Approach

The Revised Analgesic Ladder for Acute Pain, Chronic Non-cancer Pain, and Cancer Pain

**Step 1**
Use non-opioids (NSAIDs)

**Step 2**
Use mild opioid analgesics

**Step 3**
Use a strong opioid
- Use nerve block epidurals, spinal stimulators, neurolytic block therapy, Patient-Controlled Analgesia (PCA) pumps

**Step 4**
Step Down Therapy for,
- Intense acute pain
- Uncontrolled chronic pain

**Step Up Therapy for,**
- Chronic pain
- Cancer pain

Pharmacologic approaches

- Non-opioid Analgesics
- Opioid Analgesics
- Opioid conversions
- Fentanyl and Methadone
Drug Selection Process

• Evaluate:
  – Etiology of pain
  – Co-morbidities (renal/liver dysfunction, HTN/CV, anxiety, depression, addiction)
  – Prognosis
  – Severity

• Ideal analgesic drug:
  – Has long-acting and short-acting formulations
  – Has predictable onset, peak, duration of action
  – Minimal toxicities/side effects
  – Potent
## Non-Opioid Analgesics

<table>
<thead>
<tr>
<th>Type of Pain</th>
<th>Mechanism</th>
<th>Adjuvants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Neuropathic agents*</td>
</tr>
<tr>
<td>Nociceptive</td>
<td>Pain sensors</td>
<td>X</td>
</tr>
<tr>
<td>Neuropathic</td>
<td>Nerve damage</td>
<td>X</td>
</tr>
<tr>
<td>Inflammation</td>
<td>COX, etc</td>
<td>X</td>
</tr>
</tbody>
</table>

*Neuropathic agents fall in 2 classes: 1. Antidepressants: primarily tricyclics and serotonin–norepinephrine reuptake inhibitors (SNRIs) venlafaxine (Effexor) and duloxetine (Cymbalta); 2. Antiepileptics, e.g. gabapentin, carbamazepine*
## Non-Opioid Analgesics

<table>
<thead>
<tr>
<th>Medication</th>
<th>Single Dose</th>
<th>Maximum Daily Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetaminophen</td>
<td>325-1000mg</td>
<td>3000mg</td>
</tr>
<tr>
<td>Celecoxib</td>
<td>100-200mg</td>
<td>400mg</td>
</tr>
<tr>
<td>Ibuprofen</td>
<td>200-800mg</td>
<td>2400mg</td>
</tr>
<tr>
<td>Indomethacin</td>
<td>25-75mg</td>
<td>200mg</td>
</tr>
<tr>
<td>Naproxen</td>
<td>220-500mg</td>
<td>1250mg</td>
</tr>
<tr>
<td>Diclofenac</td>
<td>20 or 30 mg daily</td>
<td>60mg daily</td>
</tr>
<tr>
<td>Venlafaxine</td>
<td>37.5mg or 75mg daily</td>
<td>225mg daily</td>
</tr>
<tr>
<td>Amitriptyline</td>
<td>10mg or 25mg daily</td>
<td>150mg daily</td>
</tr>
<tr>
<td>Desipramine</td>
<td>25mg daily</td>
<td>150mg daily</td>
</tr>
<tr>
<td>Nortriptyline</td>
<td>10mg or 25mg daily</td>
<td>150mg daily</td>
</tr>
<tr>
<td>Gabapentin</td>
<td>100mg to 300mg daily</td>
<td>3600mg daily</td>
</tr>
<tr>
<td>Dexamethasone</td>
<td>2mg to 8mg daily</td>
<td>32mg daily</td>
</tr>
</tbody>
</table>
Opioid Analgesics

- **1st line agents for:** moderate to severe acute pain, cancer pain, chronic pain (if unresponsive to non-opioids)

<table>
<thead>
<tr>
<th>Natural from opium</th>
<th>Semisynthetic derivative of opium</th>
<th>Synthetic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Codeine</td>
<td>Oxycodone</td>
<td>Meperidine</td>
</tr>
<tr>
<td>Morphine</td>
<td>Hydromorphone</td>
<td>Fentanyl</td>
</tr>
<tr>
<td></td>
<td>Oxymorphone</td>
<td>Propoxyphene</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Methadone</td>
</tr>
</tbody>
</table>
Opioid Analgesics

Short-acting:
- Breakthrough pain: sudden flare of pain that breaks through persistent pain
- 1st step in management of acute pain episode
- If requiring frequent breakthrough dosing, should consider initiation of a long-acting medication

Long-acting:
- More predictable serum levels
- More predictable pain relief
- Improves adherence
- Less reinforcement of drug-taking behavior
- Examples: extended-release morphine, extended-release oxycodone, transdermal fentanyl
Opioids: Breakthrough vs. Around the clock Dosing

**PRN Dosing**

**ATC Dosing**

[Graphs showing comparison between PRN and ATC dosing with labelled time periods and drug concentration instructions.]
Opioids: Opioid Rotation

• Switching from one opioid to another due to:
  – Lack of therapeutic response
  – Intolerable side effects
  – Change in patient’s clinical status
  – Lack of availability of a particular opioid
  – Patient/family/other providers’ beliefs about a particular opioid
Opioids: Adverse Effects

- Gastrointestinal: nausea, vomiting, constipation
- Autonomic: xerostomia, urinary retention, postural hypotension
- Cutaneous: pruritus, sweating
- CNS: sedation, confusion, dizziness, hallucinations, delirium, myoclonus, hyperalgesia, seizures, respiratory depression
- Opioid allergy (rare): rash, hives, shortness of breath
# Opioid Analgesic Conversion Table

<table>
<thead>
<tr>
<th>Drug</th>
<th>Parenteral (mg)</th>
<th>Oral (m)</th>
<th>Formulation Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morphine</td>
<td>10</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Oxycodone</td>
<td>Not available in US</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Hydromorphone</td>
<td>1.5</td>
<td>7.5</td>
<td></td>
</tr>
<tr>
<td>Hydrocodone</td>
<td>NA</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Codeine</td>
<td>100</td>
<td>200</td>
<td>(Tylenol #3 = 30 mg codeine)</td>
</tr>
<tr>
<td>Fentanyl</td>
<td>0.1 (100 mcg)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transdermal fentanyl</td>
<td></td>
<td></td>
<td>25 mcg/fentanyl patch = 1 mg/hr IV morphine = 50 mg per day of PO morphine</td>
</tr>
<tr>
<td>Methadone</td>
<td>Not linear kinetics</td>
<td>Not linear kinetics</td>
<td>2 mg PO methadone = 1 mg IV methadone</td>
</tr>
<tr>
<td>Tramadol</td>
<td>Not available in US</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>Oxymorphone</td>
<td>1</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>
Opioid Conversions: Equations

current medication dose and route \( \times \) new drug equivalent = new drug dose
old drug equivalent

For example:

60 mg oral morphine \( \times \) 7.5 mg oral hydromorphone = 15 mg oral hydromorphone
30 mg oral morphine

or:

6 mg IV hydromorphone \( \times \) 30 mg oral morphine = 120 mg oral morphine
1.5 mg IV hydromorphone
Opioid Conversions: Incomplete Cross-Tolerance

• Tolerance: continued exposure to a drug reduces its effectiveness
• When converting from one opioid to another, tolerance is lost
• Account for incomplete-cross tolerance (increased opioid sensitivity)
  – Reduce newly calculated opioid dose by 50% (range 25-75%)
Fentanyl

- May be administered IV, SL, transdermal

- Transdermal dosing should only be used in opioid tolerant patients who have stable, chronic pain

- Doses depend on amount of oral morphine equivalents required in preceding days

- Special considerations:
  - 12 to 24 hours after application to achieve analgesia
  - Some patients have dose failure after 48 hours
  - Patch can not be cut
  - Always prescribe a rescue opioid
  - Always check patch site, do not apply heat directly over patch site
Fentanyl Conversion

Fentanyl Patch (mcg) = \( \frac{\text{24 hr PO morphine use (mg)}}{2} \)

or:

<table>
<thead>
<tr>
<th>ORAL 24 HOUR MORPHINE (MG/DAY)</th>
<th>FENTANYL PATCH INITIAL DOSE (MCG/HOUR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>60-134</td>
<td>25</td>
</tr>
<tr>
<td>135-224</td>
<td>50</td>
</tr>
<tr>
<td>225-314</td>
<td>75</td>
</tr>
<tr>
<td>315-404</td>
<td>100</td>
</tr>
</tbody>
</table>

- Use only for stable, chronic pain in pts who are opioid tolerant, receiving the equivalent of > 60mg morphine daily for > 1 week and require a total dose > 25mcg/hr fentanyl patch.
- Do not use for short-term analgesia or postoperative pain.
- Calculate pt’s previous 24-hour opioid dose. Convert this dose to an equianalgesic dose of oral morphine. See table at left for initial fentanyl patch dose. Table is conservative - do not use for converting from fentanyl patch to another opioid as it could result in too high a dose.
- Apply patch every 72 hours.
- The fentanyl patch should be titrated no more frequently than every 3 days after patch initiation, with subsequent titrations no more frequently than every 6 days.
Methadone

- μ receptor agonist, also NMDA antagonist activity
- Short analgesic half-life (6 hrs), but long elimination half-life (18-36 hrs)
  - Slow release from the liver and other tissues may prolong duration of action
- 5-7 days to reach steady state
- Highly lipophilic, wide distribution (brain, liver, muscle)
- Renally eliminated, pH dependent
Methadone

• Dosing different for pain vs opioid withdrawal
  – Multiple times daily for pain therapy (q8, q12)
  – Usually once daily for opioid withdrawal, much higher dose
    ($ heroin spent = 1 mg methadone)

• Opioid-naïve dosing
  – Start at 2.5mg q8, 12, or 24hrs
  – ↑dose q5-7 days as needed

• Opioid-tolerant dosing
  – Conversion to methadone from another opioid
# Methadone Conversion

<table>
<thead>
<tr>
<th>Method</th>
<th>Morphine Dose (mg/day)</th>
<th>Morphine: Methadone Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ripamonti (18)</strong></td>
<td>30–90</td>
<td>4:1</td>
</tr>
<tr>
<td></td>
<td>90–300</td>
<td>6:1</td>
</tr>
<tr>
<td></td>
<td>&gt;300</td>
<td>8:1</td>
</tr>
<tr>
<td><strong>Ayonrinde (3)</strong></td>
<td>&lt;100</td>
<td>3:1</td>
</tr>
<tr>
<td></td>
<td>101–300</td>
<td>5:1</td>
</tr>
<tr>
<td></td>
<td>301–600</td>
<td>10:1</td>
</tr>
<tr>
<td></td>
<td>601–800</td>
<td>12:1</td>
</tr>
<tr>
<td></td>
<td>801–1,000</td>
<td>15:1</td>
</tr>
<tr>
<td></td>
<td>&gt;1,001</td>
<td>20:1</td>
</tr>
<tr>
<td><strong>Mercadante (4)</strong></td>
<td>30–90</td>
<td>4:1</td>
</tr>
<tr>
<td></td>
<td>90–300</td>
<td>8:1</td>
</tr>
<tr>
<td></td>
<td>&gt;300</td>
<td>12:1</td>
</tr>
<tr>
<td><strong>Methadone Product Information (20)</strong></td>
<td>&lt;100</td>
<td>20–30%</td>
</tr>
<tr>
<td></td>
<td>100–300</td>
<td>10–20%</td>
</tr>
<tr>
<td></td>
<td>300–600</td>
<td>8–12%</td>
</tr>
<tr>
<td></td>
<td>600–1,000</td>
<td>5–10%</td>
</tr>
<tr>
<td></td>
<td>&gt;1,000</td>
<td>&lt;5%</td>
</tr>
<tr>
<td>Oral Methadone as Percent of Total Daily Morphine Dose</td>
<td>20–30%</td>
<td>10–20%</td>
</tr>
</tbody>
</table>
American Pain Society Guidelines: Methadone and QTc monitoring

- Risk of QTc prolongation and arrhythmias at higher doses (>100mg per day)

- Obtain ECG prior to initiation of methadone in all patients as baseline
  - If risk factors, can use ECG from within 3 months
  - If no risk factors, can use ECG from past year

- Obtain follow-up ECG at 2-4 weeks after starting methadone if risk factors:
  - Prior ECG QTc > 450 ms
  - History of syncope
  - Significant dose increase

- Obtain ECG when methadone dose reaches 30 - 40 mg/day, again at 100 mg/day
- Recommends against use of methadone in patients with baseline QTc interval > 500 ms
  - Recommends clinicians consider alternate opioids in patients with baseline QTc ≥ 450 ms but < 500 ms
Medications that can prolong QT Intervals

• Antibiotics/antifungals
  • Azithromycin, ciprofloxin, clarithromycin, erythromycin, fluconazole, levoflaxacin

• Antiemetics
  • Chlorpromazine, dolasetron, droperidol, granisetron, haloperidol, ondansetron

• Antineoplastics
  • Arsenic, crizotinib, dasatinib, erbulin, lapatinib, nilotinib, sorafenib, sunitinib, tamoxifen, vandetanib, vemurafenib

• Miscellaneous
  • Amitriptyline, cocaine diphenydramine, octreotide, quetiapine, tacrolimus
# Drug-Drug Interactions

<table>
<thead>
<tr>
<th>Opioid</th>
<th>Interacting Drug</th>
<th>Result</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Codeine, Oxycodone</td>
<td>CYP2D6 inhibitors (Celecoxib, fluoxetine, paroxetine, quinidine, amiodarone, ritonavir)</td>
<td>Inhibit conversion to active metabolites</td>
<td>Decreased analgesic effects</td>
</tr>
<tr>
<td></td>
<td>SSRIs/SNRIs</td>
<td>Increase central serotonin levels</td>
<td>May cause serotonin syndrome; use with caution in combination</td>
</tr>
<tr>
<td></td>
<td>Rifampin</td>
<td>Decreases oxycodone concentrations</td>
<td>Decreased analgesic effects</td>
</tr>
<tr>
<td>Fentanyl</td>
<td>Ritonavir, Ketoconazole, Itraconazole, Clarithromycin, Diltiazem, Erythromycin, Nelfinavir</td>
<td>Increase concentrations of fentanyl</td>
<td>Adjust fentanyl dose based on clinical effects</td>
</tr>
<tr>
<td>Meperidine</td>
<td>Acyclovir</td>
<td>Increase concentration of meperidine</td>
<td>Also increases concentration of normeperidine-neurotoxic metabolite</td>
</tr>
<tr>
<td></td>
<td>Phenytoin Ritonavir</td>
<td>Decrease concentration of meperidine</td>
<td>Increases concentration of normeperidine-neurotoxic metabolite</td>
</tr>
<tr>
<td></td>
<td>SSRIs, SNRIs</td>
<td>Increase serotonin concentration</td>
<td>May cause serotonin syndrome; use with caution in combination</td>
</tr>
<tr>
<td></td>
<td>Cimetidine</td>
<td>Increase concentration of meperidine</td>
<td>Choose alternative H2-blocker</td>
</tr>
<tr>
<td>Morphine</td>
<td>Rifampin Ranitidine</td>
<td>Decrease concentration of morphine Decrease conversion to active metabolites</td>
<td>May result in reduced analgesia</td>
</tr>
</tbody>
</table>
## Drug-Drug Interactions

<table>
<thead>
<tr>
<th>Opioid</th>
<th>Interacting Drug</th>
<th>Result</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methadone</td>
<td>CYP inducers: Carbamazepine, Efavirenz, Nelfinavir, Nevirapine, Ritonavir, Phenobarbital, Phenytoin, Rifampin, Risperidone, Spironolactone, St. John’s wort, Tipranavir</td>
<td>CYP enzyme increases the metabolism of methadone, resulting in decreased concentration of methadone</td>
<td>May precipitate opioid withdrawal. Encourage use of rescue opioid.</td>
</tr>
<tr>
<td></td>
<td>CYP inhibitors: Amitriptyline, Ciprofloxacin, Citalopram, Clarithromycine, Desipramine Diazepam, Erythromycin, Fluconazole, Fluoxetine, Fluvoxamine, Grapefruit juice, Itraconazole, Ketoconazole, Paroxetine, Sertraline</td>
<td>CYP enzyme slows the metabolism of methadone, resulting in increased concentration of methadone</td>
<td>Reduce dose of methadone (by 25% or more)</td>
</tr>
<tr>
<td></td>
<td>Gefitinib (Iressa) - Moderate Imatinib (Gleevec) - Moderate Pazopanib (Votrient) - Major Sorafenib (Nexavar) - Moderate</td>
<td>Increase concentration of methadone</td>
<td>Reduce dose of methadone</td>
</tr>
<tr>
<td></td>
<td>Zidovudine</td>
<td>Increase concentration of methadone and zidovudine</td>
<td>May need to adjust dose of methadone and zidovudine</td>
</tr>
<tr>
<td>Tramadol</td>
<td>CYP2D6 inhibitors (Celecoxib, fluoxetine, paroxetine, quinidine, amiodarone, ritonavir)</td>
<td>Inhibit conversion to active metabolites</td>
<td>Decreased analgesic effects</td>
</tr>
<tr>
<td></td>
<td>SSRIs/SNRIs, 5-HT agonists (buspirone, triptan, cisapride)</td>
<td>Increase serotonin concentration</td>
<td>May cause serotonin syndrome; use with caution in combination</td>
</tr>
<tr>
<td></td>
<td>Carbamazepine</td>
<td>Increases tramadol metabolism</td>
<td>Avoid combination</td>
</tr>
<tr>
<td></td>
<td>Bupropion</td>
<td>Lowers seizure threshold</td>
<td>Avoid combination</td>
</tr>
</tbody>
</table>
Special Populations

- Chronic non-malignant pain
- Concurrent or history of substance use
- Renal dysfunction
- Older adults and children
Special Populations: Chronic Non-Malignant Pain

- Rarely benefit from > 150 oral morphine equivalents in 24 hrs
- Ensure there is a single prescriber
- Recommend patient obtain refills at the same pharmacy
- At each clinic visit, assess the need for:
  - Multi-dimensional approaches
  - Non-pharmacological approaches
  - Patient-provider agreement
  - Random urine drug testing
- Enroll patient in a recovery program if evidence of addiction
- Provide supportive counseling
- Manage psychiatric comorbidities
### Opioid Risk Tool (ORT)

**Mark each box that applies**

<table>
<thead>
<tr>
<th></th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Family Hx of substance abuse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Illegal drugs</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Prescription drugs</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>2. Personal Hx of substance abuse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Illegal drugs</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Prescription drugs</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>3. Age between 16 &amp; 45 yrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>4. Hx of preadolescent sexual abuse</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>5. Psychologic disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADD, CCD, bipolar, schizophrenia</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Depression</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

**Scoring Totals:**

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**Administer**
- On initial visit
- Prior to opioid therapy

**Scoring (risk)**
- 0-3: low
- 4-7: moderate
- ≥8: high
Special Populations: Substance Use

Document the 5 “A”s:

• Analgesia
• Aberrant behaviors
  – review state prescription monitoring programs and previous urine tox screens to identify aberrant behavior
  – verify information provided by patient with other providers or with pharmacists
• Adverse Events
• Activities of Daily Living
  – encourage discussion to focus on improvement of patient function
• Agreement
  – Complete or verify existence of patient-provider agreement
### Special Populations: Renal Dysfunction

<table>
<thead>
<tr>
<th>Do not use</th>
<th>Caution</th>
<th>Safest to Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Morphine</td>
<td>• Gabapentin</td>
<td>• Fentanyl</td>
</tr>
<tr>
<td>– Metabolites M-6-G and M-3-G are centrally acting</td>
<td>• Tramadol</td>
<td>– No active metabolites</td>
</tr>
<tr>
<td>– sedation, myoclonic twitches, seizures</td>
<td>• Oxycodone</td>
<td>– Methadone</td>
</tr>
<tr>
<td>• Meperidine</td>
<td>• Hydromorphone</td>
<td>– No active metabolites</td>
</tr>
<tr>
<td>– Metabolite normeperidine</td>
<td>– Parent drug does not accumulate in HD pts</td>
<td>– Limited plasma accumulation because enhanced elimination in the feces</td>
</tr>
<tr>
<td>• Codeine</td>
<td>– Active metabolite quickly accumulates between HD tx, but effectively removed during HD</td>
<td></td>
</tr>
<tr>
<td>• NSAIDs</td>
<td>– Use with caution if not on HD</td>
<td></td>
</tr>
</tbody>
</table>
Special Populations: Older adults and Children

- High risk for inadequate pain control

- Older adults:
  - “start low and go slow”

- Children:
  - weight-based dosing

Pain Assessment IN Advanced Dementia - PAINAD (Warden, Hurley, Volicer, 2003)
Barriers to Treatment

- Fear of addiction
- Fear of regulatory agency sanctions
- Fear of medication side effects
- Ignorance of proper assessment of pain
- Ignorance of pain physiology
- Lack of appropriate education in pain management
- Beliefs in how the “good patient” should respond
- Failure to identify pain relief as a priority
- Cost constraints and inadequate insurance coverage
- Patient reluctance to take medications

Objectives

• Distinguish between different pain syndromes
• Discuss rationale for particular analgesic selection
• Apply knowledge of pain syndromes and analgesic selection to practice cases
Refer to Handouts