Outpatient Practice Management Tips

Principles of Pain Management

C. Schneider, MD, *Department of Internal Medicine, Marshfield Clinic, Marshfield, Wisconsin*
Steven H. Yale, MD, *Department of Internal Medicine, Marshfield Clinic, Marshfield, Wisconsin*
M. Larson, PhD, *Department of Pain Management, Marshfield Clinic, Marshfield, Wisconsin*

REPRINT REQUESTS:

Steven Yale, MD
Department of Internal Medicine
Marshfield Clinic
1000 North Oak Avenue
Marshfield, WI 54449
Telephone: 715-387-5436
Fax: 715-389-3808
Email: yale.steven@marshfieldclinic.org

KEYWORDS:

Pain; Pain measurement; Pain threshold; Drug therapy; Analgesia; Analgesics; Analgesics, opioids; Antidepressive agents, tricyclic; Anticonvulsants

Clinical Medicine & Research

Volume 1, Number 4: 337-340
©2003 Clinical Medicine & Research
<http://www.mfldclin.edu/clinmedres>

An 8 step approach to exchanging one opioid agent or route of administration for another.

Physicians often find that the process of converting from one opioid agent to an equivalent dose of another agent, or changing the route of opioid administration challenging. This process is easiest to learn by using morphine as the reference standard. By following the steps listed below, the physician can safely convert from one opioid or route of administration while maintaining adequate pain control. It should be emphasized that patients must be closely monitored and pain routinely assessed during the first 24 to 72 hours following a change in dose or route of administration.

Step 1: Determine the total 24-hour dose of the currently prescribed analgesic.

Step 2: Convert the currently prescribed opioid to an equivalent morphine dose (tables 1 and 2).

Step 3: Convert the morphine dose to the new dose using the same route or convert the route to the new dose using the following conversion (tables 1 and 2).

- Consider reducing the dose by 50% in the elderly and patients with renal failure.
- When changing the route of administration, it is suggested that the morphine equianalgesic dose first be determined prior to calculating the new dose (PO:IV morphine conversion is 3:1, PO: SQ is 2:1).

Step 4: If the pain is controlled start at 50% to 75% of the equianalgesic dose. If the pain is uncontrolled than start at 100% of the dose.

Step 5: Determine the appropriate intervals of administration (tables 1 and 2) and amount per dose by dividing the dose calculated in Step 4 by the dosing interval.

- Use the dosing schedule that is consistent with the medication system of action.
- OxyContin (Purdue Pharma L.P., Stamford, CT) is only approved for a q12 hour dosing schedule.
- Kadian (Faulding Laboratories Inc., Piscataway, NJ) is approved for a qd or q12 hour dosing schedules.
- Avinza (Ligand Pharmaceuticals, San Diego, CA) is approved only for a qd dosing schedule.
- MS Contin (Faulding Laboratories Inc., Piscataway, NJ) is approved for a q12 hour or q8 hour dosing schedule.
- Methadone can be used at q12, q8, or q6 depending on patient response and duration of action.
- Duragesic Patch (Janssen Pharmaceutica, Inc., Titusville, NJ) is approved for a q72 hour change.

Step 6: Provide appropriate “rescue” dosing for breakthrough pain.

- 10% of the total opioid dose is given every one to two hours as needed.
- In the elderly, the rescue dose should be 5% of the total opioid dose administered every 4 hours as needed.
- When using slow release preparations, intermediate release (IR) opioids are provided for breakthrough pain with the dose being 1/6th to 1/3rd of the q12 hr dose (equivalent to 50% to 100% of the q4 hour dose).

Step 7: Titrate baseline and as needed doses to provide effective pain relief.

- Add the schedule and breakthrough pain doses.
- For mild pain, increase the dose by 25% to 30%.
- For moderate pain increase the dose by 50%.
- For severe pain increase the dose by 50% to 100%.
- Be alert to allow for steady state to occur before additional increases. This is especially important in long-acting preparations such as methadone (5 days), OxyContin (2 to 3 days), Kadian (2 to 3 days), and Avinza (2 to 3 days). If the above medications are increased too rapidly (especially methadone) they may lead to drug overdose and even death, most often seen with methadone.

Step 8: Cathartic and stool-softening medications should be started with the initiation of opioids.

- Docusate and senna are a good choice for constipation prophylaxis.
- In those that are nauseated, a bisacodyl suppository or sodium phosphate enema may be used.
- In cases of uncontrolled constipation, an osmotic laxative such as lactulose, magnesium citrate, or polyethylene glycol may be added.

Rating scales for pain assessment

Pain rating scales are instruments used to quantify a patient's perception of the quality of their pain and to longitudinally monitor their response to analgesic therapy. The various tools available for assessing pain attest to a patient's preferences or physical condition, which make certain tools more useful. These pain tools should be used before dosing and at regular intervals after dosing. More frequent pain assessments may be required when adjusting medications, when there is new pain, when there is a change in the pattern or intensity of pain, or when diagnostic or therapeutic procedures are performed.

Table 1. Approximate oral equianalgesic doses.

Opioid	Equianalgesic Oral Dose (mg)	Dosing Interval (hours)
meperidine (Demerol*)	300	2-3
codeine	200	3-4
morphine	30	3-4
oxycodone IR (Roxicodone*, Also in Percocet*, Percodan*, Tylox*, others)	20 -30	3-4
Avinza*	30	24
oxycodone SR	30	8-12
methadone (Dolophine*, others)	20	6-8
levorphanol (levo-dromoran)	4	6-8
hydromorphone (Dilaudid*)	7.5	3-4
fentanyl (Duragesic Transdermal System*)	25 mcg/hr	72

*Demerol (Sanofi-Synthelabo, Malvern, PA); Roxicodone and Dolophine (Roxane Laboratories, Inc. Columbus, OH); Percocet and Percodan (Endo Pharmaceuticals Inc., Chadds Ford, PA); Tylox (Ortho-McNeil Pharmaceutical, Raritan, NJ); Avinza (Ligand Pharmaceuticals, San Diego, CA); Dilaudid (Abbott Laboratories, Chicago, IL); Fentanyl Transdermal System (Janssen Pharmaceutica, Inc., Titusville, NJ).

Table 2. Approximate parenteral equianalgesic dose.

Opioid	Equianalgesic Parenteral Dose (mg)	Dosing Interval (hours)
meperidine (Demerol*)	75	3
codeine	120	3-4
morphine	10	3-4
methadone (Dolophine*, others)	10	6-8
levorphanol (levo-dromoran)	2	6-8
hydromorphone (Dilaudid*)	1.5	3-4
fentanyl	0.1	1-2

*Demerol (Sanofi-Synthelabo, Malvern, PA); Dolophine (Roxane Laboratories, Inc. Columbus, OH); Dilaudid (Abbott Laboratories, Chicago, IL).

Commonly used pain scales include numerical, categorical and visual analogue scales. In numeric rating scales, numbers from 0 to 10, or 0 to 100 are evenly spaced on a 10 cm line (figure 1), with 0 indicating no pain, and 10 or 100 indicating the worst pain possible. Categorical scales use words (e.g., none, mild, moderate, severe, worst possible) that are evenly spaced along a horizontal or vertical line (figure 2). Using either of these scales, patients are asked to either verbally respond or mark the label that best describes their level of pain. The visual analogue scale is a blank line that has the words “no pain” or “worst pain possible” written at opposite ends. Patients are asked to mark the space on the line which best characterizes the intensity of their pain.

In addition, it is often beneficial to gain information about the range of the pain by asking, “What is the worst it has been in the past 24 hours (few days, week, or 2 weeks)?” and “What is the best that it has been in the past (few days, week, or 2 weeks)?” To gain an understanding of the nature of the pain ask the patient, “What percentage of the time when you are awake have you had pain?” This information will identify if the patient will benefit from a long-acting sustained release medication (i.e., pain is present most of the

Figure 1. Pain scale—numeric rating system.

time they are awake), versus a short-acting, as needed medication because the pain is present only at certain times of the day or in combination with certain activities.

It is also beneficial to assess functional improvements that follow medication changes. This can be easily done by using a 0 to 10 numeric rating scale, where 0 is equal to “lying in bed all day” and 10 is equal to “very active and able to do anything you want.” An individual’s function should increase with improvement in pain control and vice-versa. This provides an additional measure to monitor benefit of the medication.

Medications for the treatment of neuropathic pain

Pain can be categorized into three primary types: somatic, visceral and neuropathic categories. Understanding the nature and pathophysiological mechanism responsible is important since treatment approaches vary depending upon the type of pain a patient is experiencing. Neuropathic pain like visceral pain is poorly localized. Similar to somatic pain, neuropathic pain is typically constant. Neuropathic pain can be described as an unpleasant burning, shooting, tingling, electric or shock-like sensation. In some cases, patients may experience allodynia, or a painful response to a stimulus that normally does not cause pain. Other patients may report hyperalgesia, or an exaggerated painful response to a stimulus that typically does cause pain.

Tricyclic antidepressant (TCA’s) (e.g. amitriptyline, nortriptyline, desipramine) and anticonvulsants (e.g. carbamazepine, valproate, phenytoin, gabapentin) have traditionally been used as initial treatment for neuropathic pain. Other adjuvants for treating neuropathic pain include membrane stabilizing drugs (e.g. tocainamide, lidocaine, mexiletine), α_2 agonist (e.g. clonidine), corticosteroids, and topical capsaicin. The

Wong-Baker FACES Pain Rating Scale

From Wong D.L., Hockenberry-Eaton M., Wilson D., Winkelstein M.L., Schwartz P.:
Wong's Essentials of Pediatric Nursing, ed. 6, St. Louis, 2001, p. 1301
Copyrighted by Mosby, Inc. Reprinted by permission.

Figure 2. Pain scale—categorical rating system.

doses of these medications for the treatment of neuropathic pain are typically below the dose used for treating seizures or depression. Drugs within a given class should be prescribed based on the side effect profiles and its effect on age (e.g. anticholinergic potencies of TCA's).

If a person presents with sleep problems, as well neuropathic pain, it is quite reasonable to start with a low dose TCA (e.g., amitriptyline 10 or 25 mg qhs) and titrate gradually to effect, hopefully, noticing benefit in both sleep and pain syndrome. If this fails to provide improvement in the pain symptomatology move to gabapentin in a gradual taper dose. Often it is recommended to start at 300 mg at night and then increase in a step-wise fashion adding one tablet every 3 to 4 days, eventually going to tid or qid. Benefit is usually realized quite quickly even with the low doses. It is always important to wean individuals in a reverse step-wise fashion off of most anticonvulsants. If the pain is specific to a location (e.g., ankle, toe, low back) lidocaine patches can provide solid benefit when prescribed as follows: 12 hours on and 12 hours off.

Lastly, neuropathic pain may also be managed using non-pharmacological methods. For example, neural blockade (e.g. continuous infusion catheter, neuroablation) or neuro-augmentation (e.g. peripheral nerve stimulation, spinal cord stimulation) may be used in treating neuropathic pain refractory to conventional techniques.

FURTHER READING

- Abraham JL, Synder L. Pain assessment and management. *Prim Care* 2001;28:269-297.
- Khouzam HR. Chronic pain and its management in primary care. *South Med J* 2000; 93: 946-952.
- Li JMW. Pain management in the hospitalized patient. *Med Clin N Am* 2002;86:771-795.
- Practice guidelines for chronic pain management. A report by the American Society of Anesthesiologists Task Force on Pain Management, Chronic Pain Section. *Anesthesiology* 1997;86:95-1004.
- Practice guidelines for cancer pain management. A report by the American Society of Anesthesiologists Task Force on Pain Management, Cancer Pain Section. *Anesthesiology* 1996;84: 1243-1257.
- Skipper G, Davis GG. Methadone, an effective drug for pain, must be used with caution. *Alabama Board of Medical Examiners Newsletter* 2003;18:1-2.