Pain Management: Important Principles in the Drug Management of Pain

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As in the management of almost any medical condition, the best pharmacotherapeutic approach in the management of acute and chronic pain is no drug therapy at all. However, the option of not using drugs in managing many pain syndromes is not realistic. When a clinician has determined that the pain condition is substantial enough to affect the patient's quality of life and that it cannot be treated solely with physical medicine (eg, ice packs, massage, physical therapy), drug therapy is indicated. When drug therapy is contemplated, there are several important principles to keep in mind. This article reviews important principles in the drug management of pain.

MEASURE PAIN REGULARLY

As is the case for patients with high cholesterol levels, diabetes mellitus, or hypertension, the severity of the condition of the patient with chronic pain must be assessed regularly. However, without an objective measure of pain, it is difficult to determine the intensity of pain and measure the effectiveness and the efficacy of any analgesic intervention. The simplest form of measurement—the one that is most easy for the patient to understand and use appropriately—is the verbal analogue scale. With this system of pain measurement, the clinician asks the patient to grade his or her pain intensity numerically from 0 to 10, with 0 equivalent to "no pain at all" and 10 representative of "pain as bad as it can possibly be." Although a verbal analogue scale, Likert scale, or visual analogue scale cannot measure pain in absolute terms, these scales provide the clinician with a relative assessment of the patient's condition.

Pain should be graded as mild, moderate, severe, or excruciating before the drug regimen and drug delivery system are established. Also before treatment is started, it is important to ask what the patient's goal of treatment is. Before treatment is started, most patients with chronic pain will state that a substantial reduction in their level of pain will be satisfactory. For example, a patient with an average pain level of 6 will most likely be thrilled to achieve an average level of 2 or 3 with drug therapy. It is vital that such a goal be established from the start so that the patient is not disappointed with the reduction in the average pain level, when the results of pharmacotherapy leave the pain at any level above 0.

Contemporary pain management not only focuses on the mitigation of the pain but also includes the improvement of the patient's quality of life. Although pain intensity can largely be measured by using pain scales, the measurement of the quality of life of the patient with chronic pain includes an ongoing assessment of the patient's ability to perform self-care; the patient's ability to lift, walk, sit, stand, travel; the patient's sleeping pattern; and the impact of the pain-producing condition and its treatment on the patient's social and sex life. Adverse effects of drugs must also be taken into account. Often, while the pain is mitigated, the concomitant effects of the drugs can adversely affect the patient's activities of daily living.

DIFFERENTIATE BETWEEN NOCICEPTIVE AND NEUROPATHIC PAIN

In addition to the intensity of pain, the nature of pain must be determined in order to select the best pharmacotherapeutic approach. Whether the pain is acute or chronic must be considered, as well as whether the pain is malignant, benign, organic, psychogenic, vascular, or depression related.

A common oversight in evaluating pain is not differentiating nociceptive pain from neuropathic pain. Neuropathic pain is addressed in a completely different manner than is nociceptive pain. Simply stated, nociceptive pain is caused by activation of nociceptors by noxious stimuli (eg, trauma, intense heat or cold, chemicals, tissue damage). The stimuli activate an intact nervous system pathway running from the point of insult, through A-delta and C nerve fibers, to the central nervous system. Nociceptive pain is usually described in such terms as stabbing, sharp, pinching,

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or piercing. Such pain is generally responsive to the more traditional analgesic drugs, including aspirin and other nonsteroidal anti-inflammatory drugs (NSAIDs), acetaminophen, and the opioids.

Neuropathic pain occurs secondary to a damaged nervous system pathway, such as a severed, pinched, or compressed nerve.[1] Nerve destruction is common in accident-related trauma, tumor-related disease, postherpetic neuralgia, diabetic neuropathy, and trigeminal neuralgia. The pain is usually described as dull, burning, or electric-like. With nerve damage–related chronic pain that is opioid insensitive, unconventional drug therapy is indicated. Neuropathic pain is more likely to be responsive to antidepressant and antiseizure medications and less likely to be responsive to the more traditional analgesic medications.

Patients who provide the greatest clinical challenge have both opioid-sensitive (eg, nociceptive) and opioid-insensitive (eg, neuropathic) pain at different sites. Trials with traditional analgesic agents along with antidepressant or anticonvulsant medications, such as carbamazepine (Tegretol) and gabapentin (Neurontin), have been shown to be effective in mixed-pain syndromes.

CONSIDER THE NEWER MEDICATIONS FOR NEUROPATHIC PAIN

Antidepressant Medications

Most texts have considered tricyclic antidepressant drugs as the mainstay in pharmacotherapy for opioid-insensitive pain, including neuropathic pain. Antidepressant drugs are rather unique analgesic agents. Clearly, antidepressant medications are effective in the treatment of endogenous depression; considering that one of the symptoms of depression is chronic pain—usually vague in description—antidepressant agents exert an analgesic effect indirectly by combating the depressive illness. Antidepressant drugs also have an intrinsic analgesic activity that assists in chronic pain management. Additionally, these drugs may have a potentiating effect on narcotic medications, thereby facilitating the management of nociceptive chronic pain as well as neuropathic pain. The analgesic activity of antidepressant drugs is most likely a combination of all three of these phenomena.

Studies have demonstrated the effectiveness of antidepressant drugs in the management of chronic pain in hundreds of patients.[2] The analgesic activity of antidepressant drugs occurs within 5 to 7 days, as opposed to the 10 to 14 days required for their antidepressant effects. Usually, analgesic effects are achieved at slightly lower-than-normal doses than are required for antidepressant effects. (In contrast, pain mitigation with antiseizure medications usually requires doses that exceed those necessary for seizure control.)

Although most texts have considered tricyclic antidepressant agents as the mainstay in pharmacotherapy for opioid-insensitive pain, the newer serotonin and norepinephrine reuptake inhibitors, of which venlafaxine (Effexor) is the primary example, deserve consideration. Venlafaxine can be routinely administered in dosages of 75 mg to 300 mg daily and has been shown to be very effective in mitigating pain in this range.[3] This category of antidepressant drug appears to diminish neuropathic pain and combats any associated depression, while causing a minimum of adverse effects.

The more conventional tricyclic antidepressant drugs (eg, amitriptyline [Elavil]), although well established as effective in neuropathic pain control, are not well tolerated by many patients. Adverse effects associated with the tricyclic group of drugs include those related to the anticholinergic and sedative effects of this drug class. Of particular concern are the adverse effects of blurred vision, urinary retention, daytime drowsiness, and weight gain. The visual and urinary problems are legend. (Hence the phrase, “can’t see and can’t pee.”) Because of the adverse effects of the tricyclic agents, the newer antidepressant drugs may receive significantly greater attention in pain care in the future.

Antiseizure Medications

Carbamazepine has been the mainstay of antiseizure medication–related approaches to addressing neuropathic pain; however, more recently, gabapentin has also been beneficial in treating painful conditions not responsive to narcotic drugs. Carbamazepine is first administered in the dosage of 200 mg 3 times daily; afterward, the dosage is increased to as much as 800 mg daily. It is very effective in treating trigeminal neuralgia at higher dosages (ie, greater than 800 mg daily). Gabapentin is similarly effective when administered in doses of 300 to 500 mg, with reports of efficacy at 900 to 3600 mg (or higher) daily, in divided doses.[4–7] Patients who respond generally describe diminished levels of pain within 48 hours.

Lamotrigine (Lamictal), in dosages of 50 to 400 mg daily, has been shown to be effective in treating trigeminal neuralgia, HIV-induced neuropathy, and poststroke neuropathies unresponsive to other pharmacotherapy. However, adverse effects have caused a significant percentage of patients to withdraw from lamotrigine treatment.

Phenytoin (Dilantin) and valproic acid (Depakene) have also been used in treating neuropathic pain. However, they have not been shown to be uniformly useful

in several trials; data have yielded mixed results. Therefore, these two drugs should be reserved for treatment failures with other antiseizure medications.

DO NOT DISCOUNT THE VALUE OF NONPRESCRIPTION ANALGESIC DRUGS

Aspirin and acetaminophen, when used properly at correct dosages, are very effective analgesic drugs for treating mild pain. Aspirin should be considered the first-choice agent; however, for the patient allergic to aspirin, acetaminophen is an excellent alternative, although it has insignificant anti-inflammatory activity. Over-the-counter (OTC) analgesics are the mainstay for mild pain, and sales of these agents (ie, aspirin, acetaminophen, ibuprofen, naproxen sodium, and ketoprofen) total approximately $3 billion annually.[8]

Over-the-Counter NSAIDs

Aspirin. Aspirin, administered as a 650-mg dose (in 2 tablets) every 4 hours, is the cornerstone of first-line drug therapy in various mild pain–related conditions, such as minor arthritis flare-ups, mild tension–type headaches, and chronic minor low back pain. As with all salicylates, aspirin is metabolized in the liver and is highly albumin bound. Therefore, caution is warranted when aspirin is administered to a patient who is taking an oral anticoagulant (OAC) drug, because OAC agents are approximately 97% albumin bound. The concomitant use of aspirin will displace a significant amount of the OAC drug from its inactive (albumin) binding site, causing an increase in the active dose (drug level) of the OAC drug.

Aspirin has a tentative pregnancy category label of D, which means that studies in pregnant women show positive evidence of human fetal risk. Aspirin also passes into breast milk. For infants and children (into their teens), aspirin is contraindicated in the setting of viral infections, including influenza and chicken pox, because it has been implicated in Reye's syndrome. Complete blood counts should be monitored in patients taking daily doses of aspirin. It is also recommended that kidney function/urine analyses be monitored, along with liver function.

Perhaps the most significant fallacy about aspirin is that it continues to be increasingly effective only up to 650 mg. In fact, it has significant added analgesic effect up to 1000 mg.[9] Thus, if the standard 650-mg dose is not effective, the clinician should increase the dose to 1000 mg (in adults) before trying an alternative analgesic agent.

Other over-the-counter NSAIDs. Ibuprofen, ketoprofen, and naproxen sodium are excellent OTC analgesic agents; however, in OTC doses (ie, doses below the low doses of prescription NSAIDs), these agents exhibit little or no anti-inflammatory action. Only when patients double-up on their doses (eg, achieving doses equaling the lowest prescription doses), do the agents combat inflammation. It must also be clearly understood that patients frequently increase their OTC doses to prescription levels.

The best advice a clinician can give to a patient who is experiencing mild gastrointestinal (GI) problems secondary to the use of an NSAID (OTC or prescription) is to take the medication with a full glass of water and not to lie down for at least 30 minutes afterwards. A small amount of food may be taken with the drug as well.

Acetaminophen

For patients who cannot tolerate aspirin, acetaminophen is indicated, administered in doses similar to those used for aspirin. However, some caution is warranted for higher dosing schedules.

Acetaminophen tends to be better tolerated than aspirin in individuals who experience GI-related complications with analgesic agents. Acetaminophen has been widely used largely because of its reputation for safety. Its pregnancy category is B, which means that animal studies are negative for fetal abnormalities, or animal studies are positive while human studies are negative.

Although its reputation for safety is deserved, acetaminophen is not without risks. Hepatotoxicity is a significant adverse drug reaction associated with the use of acetaminophen. Because many patients with pain take medications on a routine basis, it is the clinician's responsibility to warn of possible liver damage with as little as 2.6 g (some studies say 4.0 g[10]) of acetaminophen daily over extended periods of time. Patients should not take acetaminophen if they have experienced an allergic reaction to it, have diminished liver function, have alcoholism, are fasting, or have substantial kidney damage or loss of kidney function.

MONITOR THE USE OF NSAIDS WITH CARE

NSAIDs account for approximately 20% to 25% of all reported adverse drug reactions. The chief symptom is GI irritation. With increased dosing levels, there will be an associated increase in the likelihood of an adverse effect. Studies have shown that up to 4% of patients treated with NSAIDs on a long-term basis will develop GI complications, including ulcers, bleeding, or perforation.[11] The elderly and patients with a history of peptic ulcer disease are at highest risk.

Also, substantial GI irritation is widely reported in some patients taking even small amounts of NSAIDs. In

this case, it appears that a person sensitive to one NSAID will be sensitive to all NSAIDs. It is the responsibility of the clinician to recommend discontinuation of NSAID therapy before GI-related problems lead to significant GI bleeding. Even the nonoral form of these drugs can cause significant GI irritation—because GI effects appear to be not just a local effect of the drug on the GI mucosa.

As previously mentioned, patients should be instructed to take their OTC and prescription NSAIDs with a full glass of water and not to lie down for at least 30 minutes afterwards; a small amount of food may also be taken with the drug. This simple procedure will significantly decrease the incidence of local GI-related distress, considering that these drugs are acidic. Although the majority of cases of GI irritation from NSAIDs are secondary to their pharmacologic effects, it must be understood that most NSAIDs, including aspirin, are acids and have intrinsic local acidic effects.

Hepatotoxicity and nephrotoxicity are the only major adverse drug reactions associated with NSAIDs. (GI distress is considered a minor adverse effect.) Therefore, kidney and liver function should be monitored, especially in patients taking long-term doses or very large short-term doses of NSAIDs or patients on concomitant doses of acetaminophen.

Recently, a new category of NSAID, cyclooxygenase-2 (COX-2) inhibitors, has become available. The name of this class of drug is derived from the ability of these agents to inhibit selectively the COX-2 enzyme. This leads to a reduction in the conversion of substrates to prostaglandins that enhance pain transmission and provoke inflammation, while not blocking the production of prostaglandins that cause platelets to aggregate (clump) or that protect the GI mucosa. Therefore, these new drugs have more favorable adverse-effect profiles, because they do not significantly provoke GI irritation. However, they do not contribute to platelet antiadhesin; thus, they do not possess the beneficial cardiovascular effects of aspirin and traditional NSAIDs.

The 4 COX-2 inhibitor drugs most widely available in the United States are celecoxib (Celebrex), rofecoxib (Vioxx), valdecoxib (Bextra), and meloxicam (Mobic). Celecoxib, rofecoxib, and valdecoxib are excellent choices for patients experiencing GI irritation with other NSAIDs. They are also excellent choices when the analgesic dose must be pushed upwards, which often provokes GI irritation when traditional NSAIDs are used. Celecoxib, rofecoxib, and valdecoxib are indicated for osteoarthritis. Celecoxib and valdecoxib are indicated for rheumatoid arthritis, and rofecoxib and celecoxib are also indicated for pain. However, valdecoxib should also be considered for pain, although it has not yet been approved by the US Food and Drug Administration for this indication. Additionally, celecoxib, rofecoxib, valdecoxib, and meloxicam are approved for primary dysmenorrhea. Meloxicam is significantly less COX-2 selective; therefore, it should be considered a more distant fourth choice.

If increasing the dose of an NSAID does not prove successful, an alternate NSAID may be substituted. It is recommended that the second NSAID be selected from a different chemical class. Prescription-strength ibuprofen, ketoprofen, naproxen sodium, and naproxen are most commonly chosen. However, a COX-2 inhibitor is recommended. Chemical classes of commonly used NSAIDs are listed in **Table 1**. The drug-specific information related to effective use of NSAIDs is summarized in **Table 2**.

Injectable NSAIDs, of which there are only two currently available, ketoprofen and ketorolac—parecoxib may become available within a year—are not indicated for moderate pain, even if the pain is acute and would seem to demand a treatment that is more immediate in action than are oral medications. It is important to remember that the drug is to be matched to the type and intensity of pain, and injectable NSAIDs are not appropriate for moderate pain that is effectively treated with oral NSAIDs.

AVOID PROBLEMATIC OPIOIDS

There are three primary reasons for initiating potent opioid pharmacotherapy: (1) the pain is significantly more debilitating than is moderate pain, (2) the pain is unresponsive to the milder opioids, or (3) the patient has a history of success with the more potent opioids. When a decision is made to use a more potent opioid, it is prudent to consider carefully which agent to use. Simply using what was most frequently used in the past or what has been used on the service is not an adequate justification for drug selection.

Special problems of neurotoxicity are most common with meperidine (Demerol) and pentazocine (Talwin)—problems that limit their usefulness beyond 2 days (eg, in chronic pain or acute pain that persists longer than 2 days). Meperidine is metabolized to normeperidine, a well-known compound causing convulsions, especially with prolonged dosing, and renal compromise. Pentazocine has sigma-opioid activity and has provoked aberrant behavior in some persons.

Clearly, morphine is the gold standard in pharmacotherapy for significant, unremitting pain. It can be used without significant complications in long-term and progressive illnesses. Although constipation is a

Table 1. Commonly Used Nonsteroidal Anti-inflammatory Drugs by Chemical Class

Acetylated carboxylic acid	Acetic acids	Fenamic acids	Nonacidic compounds
Aspirin	Carprofen	Flufenamic acid	Bufexamac
Nonacetylated carboxylic acids	Fenbufen	Mefenamic acid	Nabumetone
Choline salicylate	Fenprofen	Meclofenamic acid	Proquazone
Diflunisal	Flubiprofen	Meclofenamate (fenamate)	**COX-2 inhibitors**
Magnesium salicylate	Ibuprofen	Niflumic acid	Celecoxib
Salicylamide	Ketoprofen	**Enolic acids**	Rofecoxib
Salsalate	Ketorolac	Isoxicam	Meloxicam
Sodium salicyiate	Pirofen	Oxyphenbutazone	Valdecoxib
	Indoprofen	Phenylbutazone	**Pyrole acetic acid**
	Naproxen	Piroxicam	Indomethacin
	Naproxen sodium	Sudoxicam	
	Oxaprozin	Tenoxicam	
	Suprofen		
	Tiaprofenic acid		

COX-2 = cyclooxygenase-2.

commonly encountered adverse effect of morphine, the reports of drug-dependence syndrome[12,13] and significant respiratory depression[14,15] have been overemphasized in cases of chronic pain.[12–15] Most often, morphine is initiated at a modest dosage of 5 mg orally every 4 hours and titrated to achieve the desired effect, keeping the dosing schedule of 4-hour intervals intact. Hydromorphone (Dilaudid) and oxycodone are reasonable alternatives, if morphine is not acceptable.

There are no kinetic and few therapeutic advantages to administering opioids by any other route other than orally, if feasible. In fact, in the Clinical Practice Guidelines of the Agency for Health Care Policy and Research, recommendations concerning opioid dosing for malignant pain is "by mouth."[16] It is clear that neither subcutaneous, intramuscular, nor intravenous administration offers any real advantage in eliciting pain relief, and these routes usually require the participation of a caregiver. Absorption in the GI tract is excellent and rapid. Also, oral administration is significantly more acceptable to patients with cancer.

TAKE SPECIAL CARE WHEN TREATING PATIENTS WITH CANCER

Approximately 8 million Americans have cancer, and there are approximately 1 million new cases of cancer diagnosed each year.[16,17] One in every five deaths in the United States—approximately 1400 per day—results from cancer.[17] More than 70% of patients with cancer experience or will experience substantial pain; however, pain can be managed effectively in 90% of the patients who experience it.[17–21] Unfortunately, despite this truth, cancer pain remains undertreated.[22]

Treat Cancer Pain Aggressively

Simply stated, malignant pain does not resolve unless the underlying malignancy is resolved. Too often, patients with cancer are deemed to be "fragile," and consequently, their pain is left undertreated. There is some evidence that insufficiently treated cancer pain actually hastens death, whereas adequate pain management enhances both the quality and length of the life of the patient. There is simply no good reason to treat cancer pain hesitantly.

Use Opioid Agonists

Nonagonist opioids, such as butorphanol, pentazocine, nalbuphine, and buprenorphine, have no place in progressive cancer pain management. Nonagonists all exhibit a ceiling effect by which increased doses provide no additional analgesic effects. When cancer pain reaches significant levels—levels that require opioids—an agonist (eg, morphine, hydrocodone, oxycodone, hydromorphone, fentanyl, methadone) should be initiated. As agonists, these opioids exhibit no ceiling effect; therefore, as the pain level increases, the dose of the agonist can be increased to provide additional analgesia. The doses of these agonists are limited only by their adverse sedating effects at higher levels. The adverse effects of dependence and respiratory depression do not present themselves when the doses are progressively increased over time. However, one opioid agonist,

Table 2. Commonly Used Nonsteroidal Anti-inflammatory Drugs and Their Prescription Doses

Generic Name	Trade Name	Usual Prescription Dose	Dosing Schedule
Aspirin	(Various)	325–1000 mg	4–6 hours
Celecoxib	Celebrex	100–200 mg	12 hours
Choline magnesium	Trisate trisalicylate	750–1000 mg	12–24 hours
Diclofenac potassium	Cataflam	50–200 mg	8 hours
Diclofenac sodium	Voltaren	50 mg	8 hours
Diflunisal	Dolobid	250–500 mg	8–12 hours
Etodolac	Lodine	200–400 mg	6–8 hours
Fenoprofen	Nalfon	400 mg	4–6 hours
Flubiprofen	Ansaid	50–100 mg	8 hours
Ibuprofen	Motrin, Advil, Nuprin	200–800 mg	4–8 hours
Indomethacin	Indocin	25–50 mg	8–12 hours
Ketoprofen	Orudis	25–75 mg	6–12 hours
Ketorolac	Toradol	30–60 mg intramuscularly immediately, then 15–30 mg every 6 hours, not to exceed 150 mg 1st day or 200 mg/day thereafter	As described
Meclofenamate	Meclomen	50–100 mg	4–6 hours
Mefanamic acid	Ponstel	250 mg	6 hours
Nabumetone	Relafen	500–1000 mg	4–6 hours
Naproxen	Naprosyn	250–500 mg	12 hours
Naproxen sodium	Anaprox, Aleve	275–550 mg	12 hours
Oxaprozin	Daypro	1200–1800 mg	24 hours
Phenylbutazone	Butazolidin	100 mg	6–8 hours
Piroxicam	Feldene	10–20 mg	12–24 hours
Rofecoxib	Vioxx	12.5–25 mg 50 mg (acute pain)	24 hours 24 hours
Salsalate	Disalcid	1000–1500 mg	8–12 hours
Sulinac	Clinoril	150–200 mg	6–8 hours
Tolmetin	Tolectin	200–800 mg	6–8 hours
Valdecoxib	Bextra	10–20 mg	12–24 hours

meperidine, should not be considered, because its active metabolite is problematic when the drug is administered for periods longer than a day.[23]

Follow the World Health Organization 3-Step Analgesic Ladder

The World Health Organization (WHO) has developed cancer pain treatment strategies that have gained wide acceptance.[23] The WHO analgesic ladder (**Figure 1**) calls for NSAIDs and acetaminophen for mild malignant pain (step 1). If the pain persists or increases with the progression of the malignancy, a weak opioid, such as codeine, is recommended for moderate pain (step 2). If the pain persists or increases with the progression of the disease, a potent opioid agonist is recommended (step 3). Additionally, at each level, coanalgesics should be considered. These include NSAIDs at the moderate or severe pain levels and psychotropic agents, such as antidepressant or anxiolytic drugs, at any pain level. Finally, as pain persists at the third step of the

analgesic ladder, the dose of the agonist can be progressively increased to mitigate the pain. If sedation occurs, a stimulant, such as methylphenidate, may be added to maintain wakefulness and add to the patient's quality of life and family interactions, especially in the final days of a terminal illness.[23]

ADMINISTER ANALGESICS AROUND-THE-CLOCK

For pain that will be sustained for long periods of time, studies have shown that administering analgesics on a regular schedule, or around-the-clock (ATC), provides superior results when compared with administering the medications on an as-needed basis. This is particularly evident in cancer-related pain.[23] There are three principal rationales for this dosing regimen. First, with ATC analgesic administration, the effect of troughs in drug levels can be minimized. That is, as the levels of the first analgesic dose decrease and approach therapeutic threshold, a second dose can be administered to assure that drug levels never fall below the threshold. This will keep the patient comfortable for long periods of time. Second, ATC drug administration can diminish the effects of the phenomenon known as pain *wind-up*. Wind-up, in simple terms, is the phenomenon of additive, unmitigated, rapid-fire pain impulses combining to cause significant pain. Third, ATC drug administration allows the patient to "forget" the pain. That is, when a patient knows that persistent pain will re-present every 4 hours between doses of an analgesic drug, the anticipation of the pain can lead to discomfort and anxiety and, perhaps, a request for a greater dose of an analgesic agent than is necessary. Preempting pain is easier than treating pain.

For significant pain that is unresponsive to NSAIDs (moderate-to-severe pain), long-acting opioids should be used, but they should never be administered on an as-needed basis. Sustained-release dosage forms have limited the need for repetitive dosing; long-acting opioids may be administered every 12 hours. As with other dosage forms, the transdermal method (eg, fentanyl [Duragesic]) does offer the often-desired extended duration of action; however, as with any extended-action dosage form, some complications may arise. Extra care must also be exercised when disposing of the patches, because significant amounts of unabsorbed drug may remain. It is, however, clear that the extended action afforded by the fentanyl patch system does provide the patient with some freedom from the need to receive repeat doses.

Whenever possible, substantial cancer pain should be preempted, not treated after presentation. Only ATC medication administration can accomplish this, and it is accomplished most effectively with long-acting opioids. If breakthrough pain occurs, it should be treated with additional immediate-release medication. If breakthrough pain occurs routinely, the long-acting opioid dose should be adjusted upward.

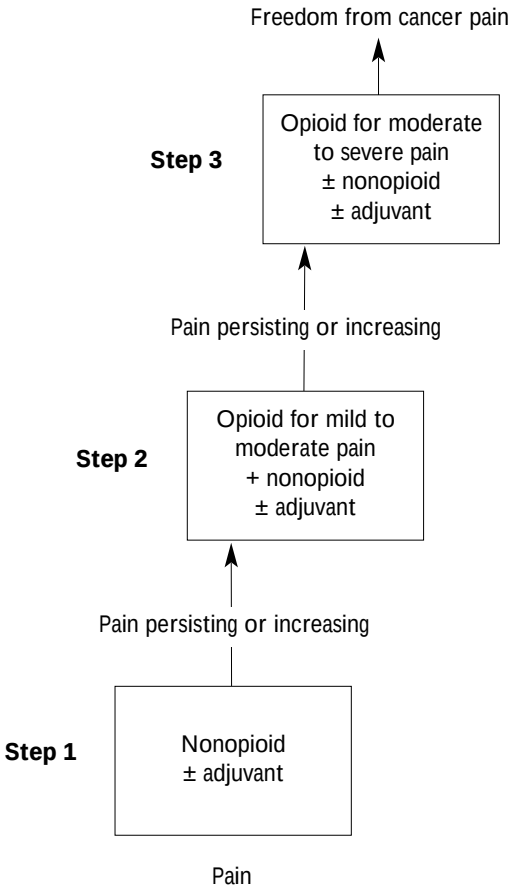

Figure 1. The World Health Organization 3-step analgesic ladder. (Adapted with permission from World Health Organization. Cancer pain relief and palliative care. Geneva: The Organization; 1990.)

CONCLUSION

Patients with pain represent a very challenging patient population to treat, yet if pain management strategies are successful, these patients are usually the most appreciative of the clinician's skills. Many patients with chronic pain change physicians at least once during therapy because of unmet expectations of the clinicians. An understanding of the pain care principles outlined in this article may serve the physician well in meeting the needs of these patients. **HP**

REFERENCES

1. McQuay HJ. Opioids in chronic pain. Br J Anaesth 1989;63:213–26.
2. Tollison CD, Kriegel ML. Selected tricyclic antidepressants in the management of chronic benign pain. South Med J 1988;81:562–4.
3. Kunz N. Report. 60th Scientific Sessions of the American Diabetes Association; San Antonio, Texas, 2000.
4. Rosner H, Rubin L, Kestenbaum A. Gabapentin adjunctive therapy in neuropathic pain states. Clin J Pain 1996;12:56–8.
5. Neville MW. Gabapentin in the management of neuropathic pain. Am J Pain Manage 2000;10:6–12.
6. Herndon CM, Finley MR, Dole EJ, et al. Successful use of gabapentin in the treatment of phantom limb pain. Am J Pain Manage 1999;9:124–7.
7. Mellick GA, Seng MI. The use of gabapentin in the treatment of reflex sympathetic dystrophy and phobic disorder. Am J Pain Manage 1995;5:7–9.
8. Levy S. Mass-merchandisers pull ahead of drugstores in OTC sales. Drug Topics 2000;17:24.
9. Lange R, Schwarz JA, Hohn M. Acetylsalicylic acid effervescent 1000 mg (Aspirin) in acute migraine attacks; a multicentre, randomized, double-blind, single-dose, placebo-controlled parallel group study. Cephalalgia 2000;20:663–7.
10. Bolesta S, Haber SL. Hepatotoxicity associated with chronic acetaminophen administration in patients without risk factors. Annals of Pharmacotherapy 2002;36:331–3.
11. Stern WR. Food and Drug Administration's Gastrointestinal Drugs Advisor Committee. September 15-16, 1988. The ACG Committee on FDA-related matters. American College of Gastroenterology. Am J Gastroenterol 1989; 84:351–4.
12. Porter J, Jick H. Addiction rare in patients treated with narcotics. N Engl J Med 1980;302:123.
13. Portenoy RK. Opioid therapy for chronic nonmalignant pain: a review of the critical issues. J Pain Symptom Manage 1996;11:203–17.
14. Lipman AG. Pain management. In: Herfindal ET, Gourley DH, Hart LL, editors. Clinical pharmacy and therapeutics. 4th ed. Baltimore (MD): Williams & Wilkins; 1988:945–62.
15. Walsh TD, Baxter R, Bowerman K, et al. High-dose morphine and respiratory function in chronic cancer pain. Pain Suppl 1989;S1:39.
16. Clinical Practice Guideline, Number 9. Management of Cancer Pain (AHCPR Publication 94-0592). Washington (DC): US Department of Health and Human Services; 1994:14.
17. American Cancer Society. Cancer facts and figures—1994. Atlanta (GA): American Cancer Society; 1994:1.
18. Goisis A, Gorini M, Ratti R, Luliri P. Application of a WHO protocol on medical therapy for oncologic pain in an internal medicine hospital. Tumori 1989;75:470–2.
19. Schug SA, Zech D, Dorr U. Cancer pain management according to WHO analgesic guidelines. J Pain Symptom Manage 1990;5:27–32.
20. Teoh N, Stjernsward J. WHO cancer pain relief program—ten years on. Seattle: International Association for the Study of Pain. IASP Newsletter 1992:5–6.
21. Ventafridda V, Carceni A, Gamba A. Field-testing of the WHO Guidelines for Cancer Pain Relief: summary report of demonstration projects. In: Foley KM, Bonica JJ, Ventafridda V, editors. Proceedings of the Second International Congress on Pain. Advances in pain research and therapy. Vol 16. New York: Raven Press; 1990:451–64.
22. National Cancer Institute. NCI Workshop on Cancer Pain. September 14-15, 1990; Bethesda, Maryland.
23. Cleeland CS. Management of cancer pain. Clin Cancer Briefs 1985;7:3–12.