Effective Management of Acute Pain

Recommendations from the Ad Hoc Committee on Pain Management and Prescription Drug Abuse

South Dakota State Medical Association

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Participants in the Ad Hoc Committee's recommendations on acute pain management:

Nurse Practitioner Association of South Dakota
South Dakota Board of Dentistry
South Dakota Board of Medical & Osteopathic Examiners
South Dakota Board of Nursing
South Dakota Board of Pharmacy
South Dakota Dentistry Association
South Dakota Department of Health
South Dakota Department of Social Services
South Dakota Pharmacists Association

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Executive Summary

Although the focus of much public and professional attention in the past decade has been on the problems related to opioid analgesics for treating chronic non-cancer pain, the treatment and management of acute pain is an equally important topic because many of the same dynamics (e.g., prescribing opioids when non-opioids may be just as effective, or prescribing higher doses/durations than needed) are at work with acute pain as with chronic pain.

Properly and responsibly managing acute pain is desirable not only because it relieves patient suffering, but because it reduces the chances that acute pain will morph into chronic pain, and responsible prescribing can help stem the tide of opioid diversion, misuse, and abuse. Opioids do, of course, play an invaluable role in the management of acute pain, but they carry important risks, as well, and thus are generally viewed as second-line agents or to be used only as part of a multi-modal approach. The risks of opioids, even when used for acute pain and for relatively short durations, are amplified among older adults, patients with impaired renal or hepatic function, those with COPD, cardiopulmonary disorders, sleep apnea, or mental illness, and in anyone likely to combine opiates with other respiratory depressants such as alcohol or benzodiazepines.[3]

This white paper summarizes the current evidence for optimal management of acute pain, with the key recommendations being:

- *Assess the degree of expected or actual pain from an injury, surgery, or procedure*
- *Consider patient-related and drug-related factors related to pain and pain relief*
- *Use multimodal pain control methods, emphasizing, when appropriate, non-pharmacological methods and non-opioid pharmacotherapy*
- *If opioids are deemed necessary, prescribe only an amount to cover the expected pain or realistic duration of time to a follow-up appointment*
    - *Check PDMP AWARxE, South Dakota's prescription drug monitoring program.*
    - *Screen for risk factors such as history of substance abuse disorder or mental illness.*
    - *Prescribe only short-acting opioids.*
    - *Discuss with patients safe storage, use, and disposal of opioids.*
    - *Taper or discontinue opioids as soon as possible.*
    - *Re-evaluate patients if healing does not follow the expected course.*

Although the practices described in these guidelines are intended to apply broadly, they are not intended to establish a "standard of care." Providers – to include all prescribers - must exercise their own

best medical judgment when providing treatment, taking all relevant circumstances into account, including the potential for abuse, diversion and risk for addiction.

Introduction

As unpleasant as it is, acute pain serves an important adaptive biological purpose: it alerts us to internal or external damage or dysfunction in our bodies. Acute pain can provoke a range of protective reflexes (e.g., withdrawal of a damaged limb, muscle spasm, autonomic responses) that can help the body heal. Even brief episodes of acute pain, however, can induce suffering, neuronal remodeling, and can set the stage for chronic pain.[4] Associated behaviors (e.g., bracing, abnormal postures, excessive reclining) may further contribute to the development of chronic pain. An example of this phenomenon is persistent postsurgical pain (PPP), which is pain persisting beyond the expected healing period. Many common operations (e.g., mastectomy, thoracotomy, hernia repair, coronary artery bypass surgery) are associated with an incidence of PPP of up to 30-50 percent.[5] The intensity of perioperative and postoperative pain is estimated to contribute about 20 percent of the overall risk for transition from acute pain to PPP.[6]

In addition to the purely humanitarian value of reducing or eliminating acute pain, therefore, effectively and aggressively treating acute pain may reduce complications and progression to chronic pain states.[7]

Acute pain is a multidimensional experience that usually occurs in response to tissue trauma, and although responses to acute pain may be adaptive, they can have adverse physiologic and psychological consequences (e.g., reduced tidal volume, excessive stress response, or inability to comply with rehabilitation). Acute pain is more difficult to manage if permitted to become severe, so prompt and adequate treatment of acute pain is imperative, with the basic goals of:

- Early intervention, with prompt adjustments in the regimen for inadequately controlled pain
- Reduction of pain to acceptable levels
- Facilitation of recovery from underlying disease or injury

Although much attention has been paid in the past decade to the range of problematic issues related to opioid analgesics and chronic pain, many similar issues can be at work in the treatment of acute pain. For example, a number of studies demonstrate increased risk of new persistent opioid use in opioid-naïve patients after having been prescribed opioids for acute pain.[8-11] Although the risk of opioid misuse in patients prescribed opioids for acute post-surgical or post-procedural pain is relatively small (roughly 0.6 percent), the volume of such procedures (approximately 48 million ambulatory surgeries or procedures in 2010) translates into large numbers of patients (i.e., approximately 160,000) who may develop dependence, abuse, or overdose every year.[12]

A related issue with opioid prescription for acute pain is the risk of diversion or inappropriate use from leftover pills. Approximately 40-50 percent of those who abuse opioids initially obtain the drugs

from family members or friends with pills remaining from legitimate prescriptions.[13] Many studies have found excessive levels of routine opioid prescriptions for a range of surgical procedures or emergency department visits for painful conditions.[14,15] One study of 1,416 patients in a 6-month period found that surgeons prescribed a mean of 24 pills (standardized to 5 mg oxycodone) but that patients reported using a mean of only 8.1 pills (utilization rate 34 percent).[16]

The South Dakota State Medical Association's Committee on Pain Management and Prescription Drug Abuse has reviewed current literature and existing clinical guidelines in order to articulate the following recommendations for effective and responsible treatment of acute pain, including the use of opioid analgesics. Although the practices described in these guidelines are intended to apply broadly, they are not intended to establish a "standard of care." All prescribers must exercise their own best medical judgment when providing treatment, taking all relevant circumstances into account, including the potential for abuse, diversion, and risk for addiction associated with opioid analgesics.

Types and levels of acute pain

Acute pain is typically defined as pain concordant with the degree of tissue damage and which remits with resolution of the injury. A more holistic definition is "a complex, unpleasant experience with emotional and cognitive, as well as sensory, features that occur in response to tissue trauma."[17] This definition captures the multiple levels of effects that pain can have, as well as the fact that cognitive and emotional factors can influence how pain is perceived. The subjective experience of pain (as opposed to the purely physical phenomenon of nociceptive nerve activation) varies widely in degree (from mild to severe) and quality (dull, sharp, stinging, burning, throbbing, etc.) and is significantly modulated by such factors as:

- Type of injury or surgical procedure
- Cultural or ethic factors
- History of drug or alcohol use
- History of anxiety or depression
- Anatomic location

Injuries or procedures involving bones and joints tend to be more painful than those involving soft tissues.[16] For example, in one study of 5,703 ambulatory surgical patients, those having microdiscectomy were most likely to have severe pain, followed by laparoscopic cholecystectomy, shoulder surgery, elbow or hand surgery, ankle procedures, hernia repair, and knee surgery.[18] Variations in pain levels for different procedures can also be seen in data about the amount of opioids needed to

control pain. In one study, in which opioid doses were standardized to units of 5 mg pills of oxycodone, 5 pills were adequate for patients having partial mastectomy, 10 pills for partial mastectomy with lymph node biopsy, and 15 pills for laparoscopic cholecystectomy and inguinal hernia repair.[19] (Significantly, in this study, many patients used no opioids, ranging from 22 percent after hernia repair to 82 percent after partial mastectomy.) Another study found that in the 3 days post-surgery, patients having wrist or hand surgery used about 7 pills, those having forearm or elbows procedures used an average of 11 pills, and those having upper arm or shoulder procedures used an average of 22 pills (all pills standardized to oxycodone or hydrocodone 5 mg or codeine 30 mg).[16]

Table 1. Common types of acute pain[20]

Type	Source or Examples
Acute illness	Appendicitis, renal colic, myocardial infarction
Perioperative	• Head and neck surgery • Chest and chest wall surgery • Abdominal surgery • Orthopedic and vascular surgery (back, extremities)
Major trauma	Motor vehicle accident
Minor trauma	Sprain, laceration
Burns	Fire, chemical exposure
Procedural	Bone marrow biopsy, endoscopy, catheter placement, circumcision, chest tube placement, immunization, suturing
Obstetrical	Childbirth by vaginal delivery or Cesarean section

Assessing pain

The etiology of acute pain, as opposed to chronic pain, is typically straightforward since it is usually associated with some kind of obvious injury, disease process, surgery, or procedure. Nonetheless, it can be helpful to systematically evaluate the pain using pain scales (numerical or visual-analog) to increase the precision of a patient's self-report and provide a baseline against which to evaluate analgesia and/or healing over time. Consider the following steps in assessing acute pain:[21]

Ask the patient to describe the pain using 5 characteristics:

a. What makes the pain more or less intense?

b. What does the pain feel like? (i.e., dull, throbbing, sharp, pins-and-needles)

c. Does the pain spread anywhere?
d. How severe is the pain?
e. Is the pain constant or does it come and go?

The answers to these questions can help determine if the pain is nociceptive (i.e., the result of injury to bones and muscles) or neuropathic (i.e., the result of injury to peripheral or central nerves). Making this determination is important because neuropathic pain is not particularly responsive to non-steroidal anti-inflammatory drugs (NSAIDs) or opioids. Other medications such as antidepressants or anticonvulsants may be more appropriate first-line agents for neuropathic pain.

As will be detailed later in these guidelines, opioid analgesics should not typically be considered as first-line agents for acute pain, nonetheless, just when assessing patients in chronic pain, it is important to evaluate a patient in acute pain for risk of opioid dependence or abuse. Such assessment is not completely objective, and opinions differ about which patients should be more rigorously assessed. Some favor a "universal precautions" approach, in which all pain patients are considered to have some degree of vulnerability to abuse and addiction and, hence, all patients are given the same screenings and diagnostic procedures.[22] Some patient characteristics, however, do appear to be predictive of a potential for drug abuse, misuse, or other aberrant behaviors, particularly a personal or family history of alcohol or drug abuse.[23] Some studies also show that younger age and the presence of psychiatric conditions are associated with aberrant drug-related behaviors.[23]

Relatively brief, validated tools can help formalize assessment of a patient's risk of having a substance misuse problem (Table 2) and these should be considered for routine clinical use.[23] For more information on risk reduction strategies, a free online CME is available at www.opioidprescribing.com.

The 4Ps of Screening

- Parents – Did any of your parents have a problem with alcohol or drug use?
- Partner – Does your partner have a problem with alcohol or drug use?
- Past – In the past, have you had difficulties in your life because of alcohol or other drugs, including prescription medications?
- Present – In the past month, have you drunk any alcohol or used other drugs – illicit or otherwise?

Table 2. Tools for Patient Risk Assessment

Tool	Who Administers?	Length
Diagnosis, Intractability, Risk, Efficacy (DIRE)	Clinician	7 items
Opioid Risk Tool (ORT)	Clinician or patient self-report	5 yes/no questions
Screener and Opioid Assessment for Patients with Pain, Version 1 and Revised (SOAPP, and SOAPP-R)	Patient self-report	24 items

Using state PDMP for patients with acute pain

A standard part of assessing any patient in acute pain, even if opioid analgesics are not expected to be immediately prescribed, should be accessing the South Dakota prescription drug monitoring program PDMP AWARxE. This can help identify patients at higher risk for opiate overdose or opiate use disorder, and help determine which patients may benefit from great caution and increased monitoring or interventions when risk factors are present. Research indicates that most fatal overdoses could be identified retrospectively on the basis of two pieces of information – multiple prescribers and high total daily opiate dosage – both of which are available to prescribers through the PDMP AWARxE.

PDMP AWARxE offers point-of-care access to pharmacy dispensing records of controlled substances from prescribers. From these, clinicians can quickly assess patterns of prescription drug use that can be helpful in confirming or refuting suspicions of aberrant behaviors.

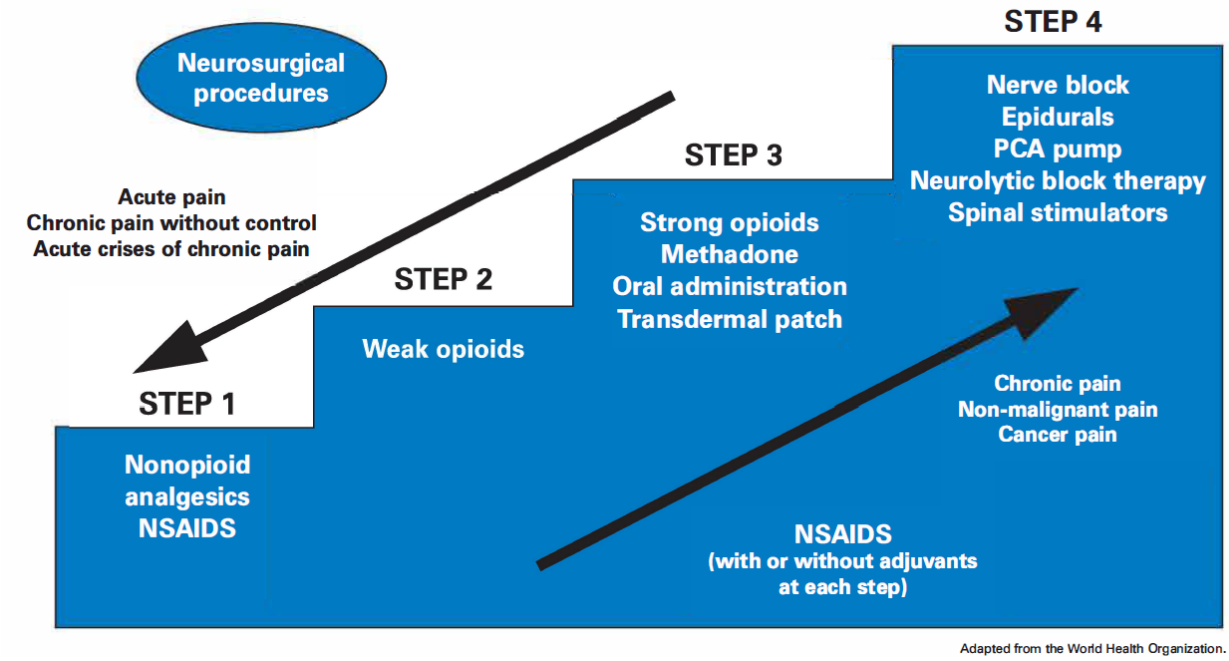
Information from PDMP AWARxE may also reveal that a patient is being prescribed medications whose combinations are contraindicated. By reviewing the PDMP each prescriber can identify other prescribers involved in the care of their patient. Pharmacies and practitioners that dispense any Schedule II, III, or IV controlled substances in South Dakota, or to an address in South Dakota, must report such dispensing to PDMP AWARxE.

Strategies for acute pain control

Ladder of pain

The World Health Organization advocates a 3-step "Pain relief ladder" model in which non-pharmacologic or non-opioid approaches are preferred as first-line pain treatment, followed by low-dose or low-potency opioids with or without adjunctive pharmacological or non-pharmacological therapies, and, for moderate to severe pain, higher doses and/or more potent opioids with or without adjunctive treatment.[24] Variations on this model include a "fast-track" approach that skips directly to step 3 for controlling intense acute pain, incorporation of "movement" on the ladder both up (when, for example, a disease process worsens) as well as down (in response to healing or remission of symptoms), and adding a 4th step that includes invasive procedures such as nerve blocks, neurolysis, epidurals, and spinal stimulators.[25]

Figure 1. 4-Step Adaptation of WHO analgesic ladder



Adapted from the World Health Organization.

Clinicians should bear in mind that the goal of pain treatment is not necessarily zero pain, but a level of pain that is tolerable and that allows the patient maximum physical and emotional functioning with the lowest risk of side effects, progression to chronic pain, or misuse or abuse. This requires an adroit balancing of many factors (both patient-related and drug-related). One way to operationalize this paradigm is with multimodal analgesia, in which several therapeutic approaches, each acting at different

sites of the pain pathway, are used, which can reduce dependence on a single medication and may reduce or eliminate the need for opioids.[26] Using both pharmacological and non-pharmacological interventions, and, if warranted, opioid and non-opioid medications can reduce overall opioid use as well as opioid-related adverse effects.

This approach involves the use of more than one method or modality of controlling pain (e.g., drugs from two or more classes, or drug plus non-drug treatment) to obtain additive beneficial effects, reduce side effects, or both. These modalities may operate through different mechanisms or at different sites (i.e., peripheral versus central actions).[26] One example of multimodal analgesia is the use of various combinations of opioids and local anesthetics to manage postoperative pain. Table 3 summarizes some specific examples of multimodal therapy; Appendix 1 provides a workflow guidline.

Some benefits of multimodal analgesia include earlier ambulation, oral intake, and hospital discharge for postoperative patients as well as higher levels of participation in activities necessary for recovery (e.g., physical therapy).[26] Some pain experts advocate revision of traditional postoperative care programs to include accelerated multimodal postoperative recovery programs.

Table 3. Examples of multimodal therapy

Combination of Agents
Systemic NSAID plus systemic opioid
Systemic NSAID plus epidural opioid and local anesthetic
Systemic NSAID plus local infiltration of anesthetic plus systemic opioid
Regional block plus systemic NSAID plus epidural opioid and local anesthetic
Ketamine plus opioid

Non-pharmacological treatments for acute pain

When possible, non-pharmacologic methods should be used, alone or combined with analgesics, to manage acute pain. The degree to which this can be done depends on the severity of pain, availability, and patient preference, but many non-pharmacological approaches can be very effective and their use avoids the potential side effects and risks associated with pharmacological interventions.

Non-pharmacologic methods for managing early-phase acute pain:[20]

- Application of cold (standard protocols are icing for 20 minutes every two hours or every 10 minutes, alternating with 10 minutes of rest)
- Compression

- Elevation
- Immobilization (although recovery from some injuries, such as ankle sprains, may be faster with graduated exercises rather than rest alone)[27]

Non-pharmacologic methods for late-phase acute pain and/or pain prophylaxis

- Physical therapy
- Yoga
- Hypnosis/guided imagery
- Massage

Physical methods of acute pain management can be helpful in all phases of care, including immediately after tissue trauma (e.g., rest, application of cold, compression, elevation) and late during the healing period (e.g., exercises to regain strength and range of motion). Mind/body or psychological therapies can encourage active patient participation in their care, address psychological or social dimensions of pain, and can support sustained improvements in pain and function with minimal risks. These therapies are not always, or fully, covered by insurance, and access and cost can be barriers, but for many patients, non-pharmacologic management can be used even with limited access to specialty care. A randomized trial comparing patients assigned to low-cost group aerobics vs. more expensive individual physiotherapy and muscle reconditioning sessions found similar reductions in low back pain intensity, frequency, or disability.[28] Low-cost options to increase physical activity include brisk walking in public spaces or use of public recreation facilities for group exercise.

Cognitive behavioral therapy (CBT) can help address psychosocial contributors to pain and has been shown to improve function.[29] Primary care clinicians can integrate elements of CBT into their practice by simply encouraging patients to take an active role in their care plan, by supporting patients in engaging in beneficial activities such as exercise, or by providing education in relaxation techniques and coping strategies. There may be free or low-cost patient support, self-help, and educational community-based programs in more populated areas of South Dakota that can provide stress reduction and other mental health benefits. Patients with more entrenched anxiety or fear related to pain, or other significant psychological distress, can be referred for formal therapy with a mental health specialist.

Multimodal therapies should be considered for patients not responding to single-modality therapy, and combinations should be tailored depending on patient needs, cost, and convenience. Additional details on some common non-pharmacological treatments shown to be effective in managing acute pain follow.

Physical therapy

Physical therapy may be useful for a range of musculoskeletal issues and can be helpful in recovering from acute pain-producing traumas initially treated with other methods. A 2018 study reported that patients with low back pain who first consulted a physical therapist were less likely to receive an opioid prescription compared to those who first saw their primary care provider.[30] Physical therapists typically create individualized exercise, stretches, and body alignment adjustments to help relax tight muscles, decrease back and joint pain, and improve range of motion. Professional guidelines have strongly recommended aerobic, aquatic, and/or resistance exercises for patients with osteoarthritis of the knee or hip[31] and maintenance of activity for patients with low back pain.[32]

Yoga

Yoga involves poses with a range of extensions and challenge, which can be tailored to an individual's level of flexibility, strength, and conditioning. Moderate evidence suggests that yoga can reduce late-stage acute pain, as well as chronic pain conditions, particularly back pain. For example, a 2017 trial randomized 131 patients (mean age 75) with lower extremity osteoarthritis to twice-weekly sessions of chair yoga vs. a health education program.[33] At 3-month follow-up, participants in the yoga group showed greater reductions in pain interferences (P=0.01) compared to control.[30] During the intervention, patients in the yoga group had reduced pain and improved gait speed compared to the control group. In addition to reducing pain, the people in the yoga group were more likely to have stopped taking pain relievers at one-year follow-up.

Massage

Massage therapy may help relieve muscular pain (acute or chronic) as well as reduce stress and anxiety. Some massage therapists specialize in working with people recovering from injuries or surgeries, or they may have focused training for treating particular conditions such as back or neck pain. A review of seven randomized trials with 352 participants suggests that massage as a stand-alone treatment may be better than no treatment for reducing pain.[34] The trials were diverse with respect to outcomes, massage techniques, and patient populations. Clinical effect sizes for pain were moderate with about a 20-point reduction in pain scores from a baseline of 50-60 points. The functional benefits were less clear; some trials showed no benefit while others showed improvement in the 50-foot walk test.

A 2011 study randomized 401 adults with back pain to two types of weekly massage (structural and relaxation) for 10 weeks vs. a usual care group. At the end of the study 36 percent of the adults having structural massage and 40 percent of the adults having relaxation massage reported that their pain was "much better" or "gone" vs. 4 percent of the control group.[35]

Hypnosis

Clinical hypnosis is a procedure in which a trained clinician or therapist gives a patient a series of verbal instructions with the goal of helping the patient enter a state of deep relaxation. In this relaxed state, the patient is aware of everything that is going on, but at the same time, becomes increasingly absorbed in using his or her imagination as directed by the therapist. Therapists often teach their patients self-hypnosis methods that they can employ on their own to reinforce and continue the process at home.

Evidence-based research on the use of hypnosis to relieve pain is limited, but a large, well-designed study, however a 2000 trial evaluated the effectiveness of hypnosis—termed "nonpharmacologic analgesia"—in easing pain and anxiety in people who were having minimally invasive surgical therapies such as angiograms, angioplasty, simple kidney procedures, or liver biopsies, during which they remained conscious.[36] Patients participated in a self-hypnosis relaxation session that involved deep-breathing and concentration techniques. The researchers found that these patients required less than half the amount of analgesic drugs compared to those receiving standard treatments. Procedures also took less time for the hypnosis group, and participants had lower levels of anxiety and pain at both one hour and four hours into the procedure.

Pharmacological management of acute pain

Most acute pain is nociceptive and responds to non-opioids and opioids. However, some adjuvant analgesics (e.g., local anesthetics) also are used to manage acute pain and medications for neuropathic pain are also important agents in the analgesic armamentarium. In general, mild-to-moderate acute pain responds well to oral non-opioids (e.g., acetaminophen, NSAIDs, and topical agents). Moderate to severe acute pain is more likely to require opioids, although, as mentioned earlier, lower doses and short durations may be appropriate.

NSAIDs and acetaminophen

NSAIDs, which include aspirin and other salicylic acid derivatives, and acetaminophen are used in the management of both acute and chronic pain such as that arising from injury, arthritis, dental procedures, swelling, or surgical procedures. Although they are weaker analgesics than opioids, acetaminophen and NSAIDs do not produce tolerance, physical dependence, or addiction and they do not induce respiratory depression or constipation. Acetaminophen and NSAIDs are often added to an opioid regimen for their opioid-sparing effect. Since non-opioids relieve pain via different mechanisms than opioids, combination therapy can provide improved relief with fewer side effects.

These agents are not without risk, however. Potential adverse effects of NSAIDs include gastrointestinal problems (e.g., stomach upset, ulcers, perforation, bleeding, liver dysfunction), bleeding (i.e., antiplatelet effects), kidney dysfunction, hypersensitivity reactions and cardiovascular concerns, particularly in the elderly.[37] The threshold dose for acetaminophen liver toxicity has not been established; however, the SDSMA recommends that the total adult daily dose should not exceed 3,000 mg in patients without liver disease (although the ceiling may be lower for older adults).[38]

The Food and Drug Administration (FDA) currently sets a maximum limit of 325 mg of acetaminophen in prescription combination products (e.g., hydrocodone and acetaminophen) in an attempt to limit liver damage and other potential ill effects of these products.[32]

Topical agents

Topical capsaicin and salicylates can both be effective for short term pain relief and generally have fewer side effects than oral analgesics, but their long-term efficacy is not well studied.[39,40] Topical NSAIDs and lidocaine have been reported to be effective for short-term relief of superficial pain with minimal side effects, although both are more expensive than topical capsaicin and salicylates. None of the topical agents are useful for non-superficial pain.

Anticonvulsants

Antiepileptic drugs (AEDs) are increasingly used for treating neuropathic pain because they can reduce membrane excitability and suppress abnormal discharges in pathologically altered neurons.[41] The exact mechanism of action for their analgesic effects, however, is unclear. It does not appear to be specifically related to their antiepileptic activity. Other drugs that suppress seizures (e.g., barbiturates) do not relieve pain, and some AEDs with effective antiepileptic activity do not necessarily have good analgesic activity.[42] Few trials have evaluated AEDs in acute pain conditions, so the evidence base is weak.[43] A 2017 trial, for example, randomized 209 patients with acute or chronic sciatica to pregabalin 150 mg/day vs. placebo and found no significant differences in leg pain or functional outcomes.[44]

Ketamine

Ketamine has been used as a general anesthetic since the 1960s, but its use in subanesthetic concentrations for analgesia has grown rapidly in recent years, due, in part, to efforts to reduce the risks of chronic opioid use.[45] Ketamine has been successfully used to treat such acute pain conditions as sickle cell crises, renal colic, and trauma.[45]

Opioids for acute pain in opioid-naïve patients

If an opioid is deemed necessary to treat acute pain, oxycodone, hydrocodone, or tramadol in short-acting formulations are commonly used. Guidelines from the Centers for Disease Control and other organizations strongly recommend that only short-acting opioids be prescribed for acute pain because they reach peak effect more quickly than extended-release formulations and the risk of unintentional overdose is reduced.[46] (One study looking at the prescription of opioids in about 840,000 opioid-naïve patients over 10 years found that unintentional overdose was 5 times more likely in patients prescribed extended-release opioids compared to immediate-release opioids.[47])

Legal limits on opioid prescribing

A number of states have passed laws in recent years regulating the prescription of opioids for acute pain, with allowed durations of prescriptions for opioid-naïve patients ranging from 5-10 days.[1] To date, South Dakota does not have similar regulations, although the South Dakota Department of Health has appointed a Prescription Opioid Abuse Advisory Committee (to which SDSMA has a representative) to review opioid use in the state and develop strategies for preventing opioid misuse and abuse.[2]

Research shows general equivalency of efficacy and tolerability between different opioids. Hydrocodone 5 mg, oxycodone 5 mg, and tramadol 50 mg alone or in combination with acetaminophen or ibuprofen have similar analgesic power to treat acute pain.[48-50] Oxycodone and hydromorphone are available as pure drugs, whereas hydrocodone (in the United States) is only available co-formulated with acetaminophen or ibuprofen, therefore oxycodone or hydromorphone might be preferred if a patient is already taking acetaminophen or NSAIDs, or if those drugs are prescribed simultaneously with the opioid as part of multi-modal therapy.

Dose and duration of opioid therapy

Only enough opioids should be prescribed to address the expected duration and severity of pain from an injury or procedure (or to cover pain relief until a follow-up appointment). Several guidelines about opioid prescribing for acute pain from emergency departments[51,52] and other settings[3,53] have recommended prescribing ≤ 3 days of opioids in most cases, whereas others have recommended ≤ 7 days,[54] or ≤ 14 days.[55] CDC guidelines suggest that for most painful conditions (barring major surgery or trauma) a 3-day supply should be enough, although many factors must be taken into account (for example, some patients in South Dakota might live so far away from a health care facility or pharmacy that somewhat larger supplies might be justified).[46]

Clinician discretion in choosing an opioid and deciding how much to prescribe is always necessary because so many factors influence how a patient will respond to both pain and an analgesic. These factors include:

- Age
- Hepatic or renal impairment
- Genetic polymorphisms
- Comorbid conditions
- History of substance abuse
- Potential drug-drug interaction
- Co-administration with other central nervous system depressants

Opioid-induced hyperalgesia

Basic science and clinical data suggest that patients receiving opioids can actually become more sensitive to painful stimuli.[56] This opioid-induced hyperalgesia is probably due to upregulation of pro-nociceptive pathways in the peripheral and central nervous systems.[57] Although hyperalgesia has traditionally been associated with chronic pain, it can also occur after intraoperative or postoperative administration of high-dose opioids as well as in low-dose or maintenance-dose regimens.[58] Opioid-induced hyperalgesia is different pharmacologically from the phenomenon of opioid tolerance, although both can lead to an increased need for opioids and disentangling the two, clinically, can be difficult.

Calculating morphine equivalents

Calculating a patient's total daily dose of opioids is important to appropriately and effectively prescribe, manage, and taper opioid medications use for both acute and chronic pain. This can be done with printed or online equianalgesic charts, which provide conversion factors and dose equivalents of all available opioid medications relative to a standard dose of morphine.

Care must be taken in using such charts because dose is not the only relevant variable. Clinicians must also consider the route of administration, cross tolerance, half-life, and the bioavailability of a drug. In addition, the patient's existing level of opioid tolerance must be taken into account. Printed equianalgesic charts are common, and online calculators are also freely available (a common one can be accessed at clincalc.com/Opioids). The CDC provides a helpful guide to opioid conversions available at: www.cdc.gov/drugoverdose/pdf/calculating_total_daily_dose-a.pdf

Pain medicine specialists

Integrated pain management requires coordination of medical, psychological, and social aspects of health care and includes primary care, mental health care, and specialist services when needed Consultation with an addiction medicine specialist or psychiatrist may be necessary if an episode of acute

pain involves many complicating variables (such as multiple comorbidities) or if opioids are needed but the patient is already using an opioid for chronic pain and/or opioid maintenance therapy.

Patient education

Before prescribing an opioid for acute pain, providers should discuss the known risks and benefits of such therapy. Providers should talk openly and honestly to patients in order to arrive at informed decisions about opioid therapy. Here are some suggestions:

- Be explicit and realistic about expected benefits, including the fact that complete pain relief is unlikely and not necessarily desired
- Emphasize improvement in function as a primary goal and that function can improve even when some pain in present
- Advise patients about potential serious adverse effects including respiratory depression, constipation, and development of an opioid use disorder
- Review common effects such as dry mouth, nausea, vomiting, drowsiness, confusion, tolerance, physical dependence, and withdrawal symptoms when stopping opioids
- Discuss effects that opioids might have on one's ability to operate a vehicle, particularly when opioids are initiated, when dosages are increased, or when other central nervous system depressants, such as benzodiazepines or alcohol are used concurrently
- Review increased risks for respiratory depression when opioids are taken with benzodiazepines, other sedatives, alcohol, illicit drugs such as heroin, or other opioids
- Discuss risks to household members and other individuals if opioids are intentionally or unintentionally shared with others from whom they are not prescribed.
- Consider whether cognitive limitations might interfere with management of opioid therapy, and if so, determine whether a caregiver can responsibly co-manage the therapy

In addition, whenever an opioid is prescribed, the patient should be educated about the safe storage and disposal of opioid medications. This can be done by a non-physician/provider, if desired, and the key points can be included in patient-provider agreements or treatment plans. Safe use means following clinician instructions about dosing, avoiding potentially dangerous drug interactions, and assuring full understanding of how the medication should be consumed or applied.

Remind patients that pain medications are sought after by many people, and, thus it is best if opioids are stored in a locked cabinet or other secure storage unit. If a locked unit is not available, patients should, at least, not keep opioids in a place that is obvious to, or easily accessed by others, since theft by

friends, relatives, and guests is a known route by which opioids become diverted.[59] Storage areas should be cool, dry, and out of direct sunlight.

Proper disposal methods should be explained:

- Follow any specific disposal instructions on the prescription drug labeling or patient information that accompanies the medication
- Do not flush medicines down the sink or toilet unless this information specifically instructs to do so
- Return medications to a pharmacy, health center, or other organization with a take-back program
- Mix the medication with an undesirable substance (e.g., coffee grounds or kitty litter) and put it in the trash

Specific acute pain populations

Management of acute perioperative pain

A full discussion of ways to manage perioperative pain is beyond the scope of this document because it can involve a diverse array of pharmacological and invasive measures administered by hospital-based anesthesiologists or pain specialists in order to relieve suffering, achieve early mobilization post-surgery, and reduce hospital stay. It is worth noting, however, that a multimodal approach to acute pain management is the primary model for dealing with perioperative pain as it is, more generally, for the treatment of acute pain in primary care settings. Also, just as competent and responsible treatment of acute pain in primary care can help prevent the development of chronic pain and attendant morbidities, research has shown an array of adverse outcomes associated with the under-treatment of perioperative pain, including thromboembolic and pulmonary complications, additional time spent in an intensive care unit or hospital, hospital readmission for further pain management, needless suffering, impairment of health-related quality of life, and development of chronic pain.[60]

In addition, the issue of opioid analgesic over prescription is as important an issue in the perioperative arena as it is anywhere in medicine. A 2018 cohort study of 2,392 adults having a range of surgeries found that, overall, a median of 30 pills of hydrocodone/acetaminophen (5/325 mg) were prescribed for postsurgical pain, but patients only used a median of 9 pills.[61] The study also found that the strongest association with higher use of opioids was not level of pain, but the quantity of opioids prescribed: 0.53 more pills used (95 percent CI 0.4-0.65 $p < 0.001$) for every additional pill prescribed.[62]

Table 4 summarizes a set of 2019 recommendations from the Michigan Opioid Prescribing Engagement Network.

Table 4. Opioid Dose Recommendations for Post-procedural Pain[63]

Procedure	**Number of Oxcodone 5 mg tablets (or equivalent)**
Dental extraction	0
Thyroidectomy	5
Breast biopsy or lumpectomy	5
Lumpectomy plus sentinel lymph node biopsy	5
Sentinel lymph node biopsy only	5
Laparoscopic anti-reflux (Nissen procedure)	10
Hernia repair (minor or major)	10
Sleeve gastrectomy	10
Laparoscopic cholecystectomy	10
Carotid endarterectomy	10
Prostatectomy	10
Open cholecystectomy	15
Colectomy (laparoscopic or open)	15
Cesarean delivery	15
Hysterectomy (all types)	15
Cardiac surgery via median sternotomy	15
Open small bowel resection	20
Simple mastectomy with or without sentinel lymph node biopsy	20
Total hip arthroplasty	30
Total knee arthroplasty	50

Of note, professional opinions on this topic will continue to evolve and while this paper summarizes current findings and provides South Dakota prescribers with clear, evidence-based guidance about the appropriate prescription of opiate analgesics and the treatment of acute pain, these guidelines are intended to apply broadly, they are not intended to establish a "standard of care." Providers – to

include all prescribers - must exercise their own best medical judgment when providing treatment, taking all relevant circumstances into account, including the potential for abuse, diversion and risk for addiction.

Management of acute pain in patients already using opioids or on Medication-Assisted Treatment

When caring for patients who are physically dependent on opioids—whether because of ongoing chronic pain or opioids used as part of treating opioid use disorder (OUD)—clinicians must know the type and quantity of opioid the patient is currently using so that an equivalent (equianalgesic) dose can be administered by an appropriate route to cover their baseline opioid requirement as well as the additional medication required for the acute pain.

Some clinicians mistakenly believe that the opioid agonist therapy (methadone) or partial agonist therapy (buprenorphine) used for medication-assisted therapy (MAT) provides enough analgesia to "cover" acute pain.[64] In fact, the doses of methadone and buprenorphine typically used in MAT do not provide sustained analgesic effects and are insufficient to treat acute pain.[62] Patients on opioid agonist therapy also develop cross-tolerance, which means they require higher and more frequent doses of short- or long-acting opioids to provide analgesia for episodes of acute pain. Because buprenorphine binds to mu-receptors with much higher affinity than other opioid agonists, pain management in patients using buprenorphine can be complicated. Several types of regimens using both buprenorphine and other opioids for acute pain have been described in the literature with choices of regimen guided by the specifics of a patient's existing regimen, presence of comorbid conditions, setting, and degree of acute pain.[64]

Patients Served by Multiple Providers

Ideally, patients in pain, whether acute or chronic, would receive prescriptions for analgesic prescriptions or other pain treatments from a single provider. In the real world, this is often neither possible nor feasible. Unfortunately, the risks of overdose and overdose-related death rise steeply as the number of prescribers increases. For example, the risk of overdose (from prescribed opioids or sedatives) is 3.5 times higher for patient with 4-5 prescribers compared to patients seeing a single prescriber.[65] Increasing numbers of prescribers is a potential indicator of opioid misuse or abuse, but it can also be related to non-problematic causes such as high use of emergency room services, suboptimal medical care, "nomadic" or "migrant" populations, or of populations in which providers rotate through clinics on a short-term, regular basis (as can be the case in areas serviced by the Indian Health Service). It is not always easy to determine whether a patient with multiple providers is obtaining overlapping prescriptions in an attempt to obtain more medication than a single provider would give. But the existence of multiple

providers should be a "red flag" warranting investigation, starting with conversations with the patient, but always including use of a PDMP.

Emergency department considerations

Although emergency departments prescribe only a fraction of opioid analgesics prescribed nationwide, ED prescriptions for opioids are reported to account for about 45 percent of the opioids diverted for non-medical use.[52] Guidelines from the American Academy of Emergency Medicine and other groups have attempted to reduce the variability in pain management and prescribing practices that has been evident in past decades. These guidelines mirror recommendations by the CDC and other organizations, with the following key provisions:[52]

- Give short-acting opioids as second-line treatment to other analgesics unless there is clear indication for opioid (e.g., acute abdominal pain or long bone fracture)
- Start with lowest effective dose
- Prescribe no more than a 3-day course of opioid for most acute pain conditions
- Address exacerbations of chronic pain with non-opioid analgesics, non-pharmacological therapies, or referral to pain specialists for follow-up
- Assess for opioid misuse or addiction using validated screening tools
- Access PDMPs when available
- Avoid long-acting or extended-release opioids
- Refrain from refilling chronic opioid prescriptions—refer to treating clinician who provided original prescription
- Refrain from replacing lost, stolen, or destroyed opioid prescriptions
- Understand that the federal Emergency Medical Treatment and Labor Act (EMTALA) does not state that severe pain is an emergency medical condition, and that EMTALA allows emergency medical providers to withhold opioid treatment if in their professional judgment such withholding is clinically justified

Older adults

Older patients are at increased risk of acute pain related to trauma, surgery or procedures, or degenerative conditions such as osteoarthritis. The elderly undergo surgery four times more often than other age groups, and are therefore more likely to suffer from associated pain.[66] In those 65 years and older, acute pain leads to about 4 million U.S. emergency department visits each year.[67]

Assessing and treating pain in older patients can be complicated by issues such as age-related physiologic changes, physical accessibility to treatment, cognitive impairment, coexisting illnesses, and

polypharmacy. Elderly patients may under- or over-report their experience of pain due to functional impairment or psychological distress. Doses of NSAIDs often need to be reduced to avoid hepatic or kidney damage, and opioids may induce unacceptable risks related to falls, constipation, or respiratory depression. Clinical decision-making must take into account all of these considerations, each of which can increase the risk for adverse outcomes.

Pregnancy

In general, and whenever possible, opioids should be avoided in pregnancy due to associations between opioid use and adverse fetal outcomes such as stillbirth, poor fetal growth, pre-term delivery, and neonatal opioid withdrawal syndrome.[46] If a opioid is indicated however, don't hesitate to prescribe based on concern for neonatal abstinence syndrome alone (NAS).

Before prescribing opioids in pregnancy:

- Ensure opioids are indicated
- Maximize non-opioid therapy, including exercise, physical therapy, behavioral approaches, and non-opioid medications
- Discuss the risks and benefits of opioids, including the risk of physiologic dependence and the risk of NAS
- Take a thorough history of substance use and review the PDMP AWARxE.

For reproductive age women who are not pregnant, discuss family planning and effects on pregnancy.

Conclusions

Although the focus of much public and professional attention in the past decade has been on the problems related to opioid analgesic prescribing for chronic pain, as this report had demonstrated, the treatment and management of acute pain is an equally important topic because many of the same dynamics (e.g., prescribing opioids when non-opioids may be just as effective, or prescribing higher doses/durations than needed) are at work with acute pain as with chronic pain.

Properly and responsibly managing acute pain is desirable not only because it relieves patient suffering, but because it reduces the chances that acute pain will morph into chronic pain, and it can help stem the tide of opioid diversion, misuse, and abuse. Opioids can, of course, play an invaluable role in the pain management armamentarium, but they carry important risks, as well, and thus should be generally viewed as second-line agents or as part of a multi-modal approach. The risks of opioids, even when used for acute pain and for relatively short durations, are amplified among older adults, patients with impaired renal or hepatic function, those with COPD, cardiopulmonary disorders, sleep apnea, or mental illness, and in anyone likely to combine opiates with other respiratory depressants such as alcohol or benzodiazepines.

These guidelines present evidence-based recommendations for treating acute pain with a range of pharmacological and non-pharmacological strategies to be administered usually in a step-like fashion, with opioids only used when necessary and then at the lowest dose and shortest duration deemed clinically beneficial. As with treating chronic pain, the appropriate deployment of opioids for chronic pain can be challenging, but it is not inherently different from using any other treatment option with significant risks of harm. With proper pain assessment, primary reliance on non-pharmacologic and non-opioid analgesics, and a view that includes critical emotional, psychological, and social dimensions of pain, clinicians can both relieve immediate suffering and maximize their patients' long-term health.

Appendix 1. Acute Pain Workflow Guideline

Patient presents with acute pain or anticipated postoperative pain

Brief Pain Assessment:

In the emergency setting use opioids judiciously to alleviate pain when it overwhelms the patient's ability to contribute to the assessment.

Comprehensive Pain Assessment:

Inclusive of the following:

- Etiology and nature of the pain
- Appropriate diagnostics
- Medication history, including past and current opioid use
- Check PDMP (Prescription Drug Monitoring Program)

Acute Exacerbation of Chronic Pain

Treatment Options:

- Avoid prescribing increased dosage or additional opioids because of potential risks and adverse effect.
- Check prescription monitoring program (PDMP) for history of opioid prescriptions.
- Consult the patient's pain care agreement prior to prescribing any medications.
- Consider collaborating with the clinician managing the patient's chronic pain care plan, an interdisciplinary team or available resources to provide appropriate chronic pain management.
- Assess the patient's mental health status and social situation to determine if additional resources, e.g. social services, behavioral health, pain management or addiction medicine consult may be appropriate.

Non-traumatic tooth pain

Symptom Management could include:

Symptom Management could include:

- Long-acting local anesthetic.
- NSAID and/or acetaminophen.
- Topical anesthetic rinse for stomatitis or mouth ulcers.
- Antibiotics with presence of swelling or exudates in cheek or jaw.
- Chlorhexidine mouth wash for localized gum inflammation/infection.
- Stress need for dental follow up and avoid prescribing opioids without examination and diagnosis of the underlying reason for tooth pain, including appropriate tests and X-rays.

Other Acute Pain

See Page 2

Acute Pain Workflow Guideline

Other Acute Pain

Severe Pain that may require opioid:
(i.e. fracture, post operative pain, severe injury)

Determine if prescribing opioid Is appropriate.

Assess for risk:

- Personal or Family History of Substance abuse?
- Personal History of misuse of prescription controlled substance?
- Concurrent sedative, alcohol, muscle relaxant use?
- Respiratory insufficiency or sleep apnea?
- Identify risk factors such as age, delirium, dementia, and fall risk.
- Check PDMP

Is the answer yes to any of the above?

NO

YES

High Risk Patients:

- Avoid prescribing opioid and use alternative if at all possible and refer to PCP or to pain specialist or provider experienced in case of opioid at risk patients.
- If must prescribe such as in severe injury.
  - Use lowest dose for shortest period of time.
  - Educate and document risks with patient
  - Monitor closely.
- Consider naloxone prescription
  - Particularly for total daily dosage > 50 mg Morphine Equivalents (MME).

Common pain conditions that are almost never indicated for opioids (non-inclusive):

- Fibromyalgia
- Headache
- Self-limited illness, i.e., sore throat
- Uncomplicated back and neck pain
- Uncomplicated musculoskeletal pain

Appropriate therapy and/or referral:

- Treat with other analgesics or NSAIDs, physical, psychological , interventional, or other appropriate non-opioid therapies.
- Reassure and provide patient education, include expected duration of pain episode and warning signs that would require immediate medical attention.
- Arrange appropriate follow-up.

NO

Does potential benefit of opioids outweigh potential risk?

YES

Prescription of Opioids:

- Educate patient on opioid risks/benefits to make informed decision and review side effects.
- If opioids are deemed necessary, prescribe only an amount to cover the expected pain or realistic duration of time to a follow-up appointment. (Tramadol is an atypical opioid and should be managed appropriately).
- Never prescribe long-acting/extended–release for acute pain.
- Caution using opioids in the elderly.
- Review safe driving, work, storage, and disposal.
- Follow-up with patient within 3-5 days.
- Maximize appropriate non-opioid therapies.

Acute Pain Workflow Guideline

Clinical Pearls

1. Over 5 million Americans report that they currently (within 30 days) abuse prescription opioids and 10.3 million have abused them at some point in their lifetime. It has been noted that although most of these pills originated from a licensed prescriber, only 20% of users were the legitimate recipient of the initial prescription, with 71% of users having received the drug through methods of diversion. In addition, it is reported that 55% of these people received pills for free from a family member or friends who had excess pills.[2,3,4]
2. In one study of 642 general surgery patients it was found that opioid pills are greatly over-prescribed for the treatment of acute postoperative pain in general surgery patients: over 70% of the prescribed pills were never taken. In this study, depending on the procedure, 22-82% of patients never took any opioid following surgery.[1]

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