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Taking EMS Into Tomorrow: Part 6

Can we deliver all our patients to the hospital pain-free?

Photo by Dan Limmer

“We haven’t got time for the pain.”

—Carly Simon

Pain management is one of the oldest aspects of medicine. Hippocrates wrote about the pain-soothing effects of willow bark and leaves in 400 B.C. Opium was cultivated for pain management long before that. Using the active ingredients in these traditional remedies, aspirin and morphine were isolated in the 1800s, providing the foundation of the modern pharmaceutical industry.

While some progress has been made in EMS pain management over the last few years, we believe the time has come to set a bold national goal: Deliver all EMS patients to hospitals pain-free. Some may say this goal is neither possible nor reasonable. Is Medtronic’s vision of “a world in which no person dies suddenly as a result of a cardio-respiratory event” reasonable? Reasonable people will not make great improvements in EMS. Great improvements

will be made by compassionate and patient-centered people committed to doing what others say can’t be done.

PAIN’S VITAL PURPOSE

Physical pain is not a primary disease; it is a symptom of a disease or injury. It serves a vital purpose in our survival. It’s our body’s way of telling us to yank that used IV needle somebody left on the bench seat out of our butt. Pain is our inspiration for calling 9-1-1 in the middle of the night when our coronary arteries clog from one too many extra-cheese pizzas. It’s what keeps us from doing more damage by climbing back on our mountain bike with a broken femur. Once pain has sounded the alarm and prompted a person to take action, it has served its primary purpose. Its secondary purpose is to remind us not to do things that aggravate the problem. Anyone who has taken a hot

What is Pain?

The experience of pain is always subjective. Each person learns about pain through bumps and bruises early in life. It starts with the receptors at the ends of nerves in the skin, muscles, bone, blood vessels and some internal organs. These receptors detect a potentially harmful stimulus. A message travels along the nerve to the spinal cord, which gets activated. The activated spinal cord sends the information to the brain and a signal to the muscles near the site of the pain to contract and move away. The message arrives in the brain and is sent to several areas that control physical sensation, emotional feeling and cognitive thinking.

According to the American Academy of Pain Management, "Pain is complex and defies our ability to establish a clear definition. Pain is far more than neural transmission and sensory transduction. Pain is a complex mélange of emotions, culture, experience, spirit and sensation." *Pain threshold* is the lowest level of pain a person can recognize. Some folks have a low pain threshold, as in the fairy tale of the princess and the pea, in which the princess found the slightest discomfort of a pea under her mattress so unbearable as to prevent her from sleeping. *Pain tolerance*, on the other hand, is the greatest level of pain a person can tolerate. A friend just gave birth to twins, each of which weighed more than 6½ pounds. In the delivery room after hours of hard labor, her hus-

band, a lifelong martial artist, concluded, "No man could take this level of pain."

There are several different ways to describe and classify pain. These four categories are useful for EMS professionals:

Somatic pain

This type of pain is sensed by nociceptors, which are sensory neurons found in external tissues such as the skin, corneas, joints, muscles and bones. The pain of a fractured wrist, a scratched cornea or a burned finger is somatic pain. This type of pain tends to be localized and may respond to cold packs, nonsteroidal anti-inflammatory drugs, acetaminophen, opioids and/or local anesthetics.

Visceral pain

This is the type of pain that occurs when our internal organs are damaged. The internal organs that have nociceptors are mostly the hollow viscera, the gut, the bladders and the uterus. Kidney stones, irritable bowel syndrome and dysmenorrhea are common causes of visceral pain. This type of pain tends to be generalized, diffuse and difficult to locate. It is most responsive to opioid therapy.

Neuropathic pain

This type of pain is difficult to understand and treat. Rather than the nervous system functioning properly to sound an alarm regarding tissue injury (as with somatic and visceral pain), in neuropathic pain the peripheral or central nervous system malfunctions and

becomes the cause of the pain. For example, the phantom pain that people feel in limbs that have been amputated is neuropathic pain. It is also common in people with alcoholism; back, leg and hip problems; cancer; diabetes; facial nerve problems; AIDS; multiple sclerosis and shingles. It may be resistant to opioid therapy. Sometimes it is effectively treated with antidepressants and anticonvulsants.

Breakthrough pain

This is a sudden increase of pain in people who already have chronic pain. Most of the literature describes this pain in cancer patients. It is a common reason for EMS to be activated for hospice patients. The undertreatment of this type of severe pain was highlighted by Donald Berwick, MD, president and CEO of the Institute for Healthcare Improvement, when he described the results of a study conducted by the Institute to an audience of more than 7,000 physicians and healthcare professionals. Berwick said that hospice patients transported to hospitals for breakthrough pain waited an average of 110 minutes from their arrival in the emergency department before receiving their first dose of pain medication. He said he considered requiring conference attendees to come naked to his presentation next year and sit on chairs covered with broken glass, tacks and rock salt. "Then," he said, "I'll stand here while you sit in pain for 110 minutes."

shower with a sunburn or tried to carry a 270-pound patient down the stairs before their torn back muscle was fully healed has experience with this benefit.

Pain researcher Thomas J. Romano, MD, PhD, says, "When pain is no longer of value in warning the patient that there is a problem, it can become the problem." According to the American Medical Association, pain of all types is undertreated in

our society. The pediatric and geriatric populations are especially at risk for undertreatment. The Joint Commission on Accreditation of Healthcare Organizations' new standards require organizations to screen all patients for pain, ensure competency of their staff in pain management and collect data to monitor the appropriateness and effectiveness of their pain management. They emphasize that appropriate manage-

ment of patients with pain must be a top priority in healthcare.

In EMS there are many strong opinions on the subject of pain management. One medical director who doesn't want to change his system's pain-management protocols is fond of saying, "No one ever died from pain." It is unlikely that this physician has ever experienced severe pain. Some EMS systems are worried about drug seekers and addicts manipulat-

ing them to get high. Physicians may worry that field pain management will obscure their ability to properly diagnose a patient once that patient arrives in the emergency department. They also worry that once someone has been given a narcotic for pain, they will not be mentally competent enough to consent to surgery should they need it.

Our position is that pain can and should be aggressively managed in the prehospital setting. When you look at the reasons people call 9-1-1 for medical problems, pain is part of the picture more than half the time. If you ask EMS customers what they

rest of emergency medicine?

Folks in EMS tend to have strongly held beliefs about pain. Many of these beliefs do not match the research or the expert opinions of pain-management specialists. Examples of these beliefs include the medical director who said, "No one ever died from pain." Another is the paramedic with 31 years of experience who said, "I can tell when someone is really hurting and when they're just using me to get high." Or the veteran paramedic who said, "You don't understand—this area is packed with junkies and tweakers. You want me to give them more morphine? Don't

you know these people are addicts?" Or the emergency physician who said, "If you treat someone's abdominal pain, it will interfere with the diagnosis, possibly delaying treatment. And if they've been given narcotics and need surgery, we'll have to wait for it to wear off or give them Narcan so they can consent."

In an article published in the April 2004 *Annals of Emergency Medicine*, researchers Timothy Rupp and Kathleen Delaney found that

pain management in the emergency department, particularly in geriatric and pediatric patients; (4) clinicians' attitudes toward opioid analgesics that result in inappropriate diagnosis of drug-seeking behavior and inappropriate concern about addiction, even in patients who have obvious acutely painful conditions and request pain relief; (5) inappropriate concerns about the safety of opioids compared with nonsteroidal anti-inflammatory drugs that result in their underuse (opiophobia); (6) unappreciated cultural and sex differences in pain reporting by patients and interpretation of pain reporting by providers; and (7) bias and disbelief of pain reporting according to racial and ethnic stereotyping." If this is how pain is managed in our emergency departments, it's unlikely that EMS is in better shape.

PAIN'S CONSEQUENCES

Untreated pain has real consequences for patients above and beyond emotional and psychological suffering. Abdominal pain causes voluntary and involuntary splinting of respiratory muscles. If left untreated, this splinting can result in pooling of secretions, which promotes the development of pneumonia and atelectasis.

While opioids effectively decrease abdominal pain, they do not decrease localized tenderness, so diagnostic exams are not impaired. Actually, diagnosis is enhanced because effective pain management decreases abdominal muscle guarding, thus allowing for more effective palpation. In five prospective randomized, controlled studies, four of which were double-blinded, researchers found that providing analgesics decreased pain more than localization of tenderness. Thus, none of the studies found compromises in diagnosis or treatment of the acute abdomen after increasing the use of analgesia.

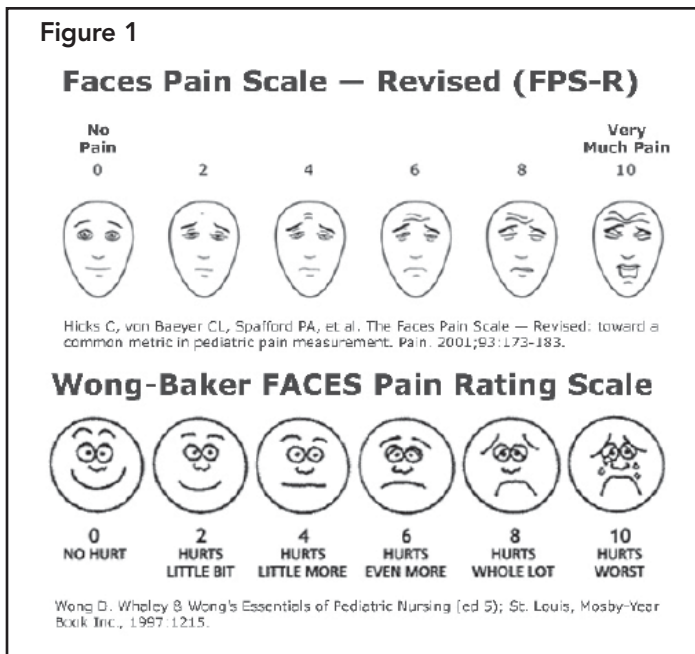
A person's ability to provide informed consent is determined by his or her ability to understand the need for treatment and the risks and options for treatment, not by what

want from their EMS service, they'll tell you "Get here fast, make me feel better, make my pain go away and take me to the hospital." Pain is one of the primary reasons people call us, yet in most EMS systems pain management is approached the way third-graders approach cleaning their rooms. They know they have to do a little bit, but it's not a high priority, and there are other things they'd rather do.

WHY PAIN IS UNDERTREATED

What gets in the way of adequate pain management in EMS and the

a review of ED pain-management practices "demonstrates pain treatment inconsistency and inadequacy that extends across all demographic groups. This inconsistency and inadequacy appears to stem from a multitude of potentially remediable practical and attitudinal barriers that include (1) a lack of educational emphasis on pain management practices in nursing and medical school curricula and postgraduate training programs; (2) inadequate or nonexistent clinical quality management programs that evaluate pain management; (3) a paucity of rigorous studies of populations with special needs that improve



medications the person has been given. It is rare that the amount of medicine needed to manage pain would be so great as to materially impair cognitive function. In fact, severe pain impairs a patient's ability to listen and understand and may interfere with the informed-consent process. Withholding pain medication until consent is obtained may be viewed as making the patient give permission for procedures against their will.

It is reasonable for EMS systems to have the goal of delivering their patients to emergency departments pain-free, or with dramatically reduced levels of pain.

Myths surround addiction and the administration of analgesia. It is important to start with a clear understanding of what is and is not addiction. Addiction is a primary, chronic neurobiological disease with genetic, psychosocial and environmental factors. It is characterized by behaviors that include an inability to control drug use, compulsive drug use, continued use despite harm, and drug craving.

Physical dependence is a state of adaptation that includes drug-specific withdrawal syndrome. It can be caused by stopping drug use abruptly, rapidly reducing the dose and/or administration of a drug-specific agonist. This can occur in patients who have been taking around-the-clock narcotics for as little as two weeks, but it is not addiction.

Tolerance is a state in which exposure to a drug induces changes that result in the reduction of one or more of the drug's effects over time. Too often, healthcare professionals incorrectly assume that the development of tolerance is an indicator of addiction. It is an indication that in a therapeutic setting, increased doses of the drug will be necessary to achieve the desired effect.

One of the dynamics of inadequate pain management is pseudo-addiction. This is where people use manipulative behavior to obtain pain medication because they hurt. Research indicates that when opioids are used to treat acute and chronic pain, the incident of addiction is less than 0.3%. One study evaluated more than 12,000 hospitalized patients treated with opioids for pain and found only four of them were addicts.

Another way that patients can decrease their chances of receiving adequate pain management is to request specific drugs. Imagine an African-American teenager complaining of severe pain from a sickle cell anemia crisis asking for morphine. For some healthcare providers, this would be a red flag for drug abuse. But the proper EMS treatment for a sickle cell crisis is high-flow oxygen, IV fluids and morphine. If a patient has had a crisis in the past, chances are, they know what works for them. We should thank them for the information and act on it, rather than judging them as a drug seeker or addict.

Alcohol or drug abuse does not interfere with a person's ability to experience pain and should not prohibit pain management. A history of addiction doesn't necessarily

mean narcotics should not be used to treat a person's pain. Unfortunately, many healthcare providers tend to undertreat pain in this population, which may have the effect of increasing their use of illegal drugs.

Most clinicians believe that their years of experience working with people in pain increases their ability to assess a person's level of pain and identify people who are intentionally deceiving them. But studies show that clinicians

who pride themselves on their ability to assess pain levels and identify folks who are faking often turn out to be the poorest judges of other people's pain.

PAIN MANAGEMENT STRATEGIES

Effective pain management begins with a detailed assessment. All pain is subjective, and research shows that the only reliable rating of pain severity is the patient's own description of how bad it hurts. The use of a 1–10 numerical scale is common, with 1 representing no pain and 10 being the worst pain the person has ever experienced. It's helpful to ask a person what their worst pain experience was to help understand the number they give. For children and some adults, the face rating system (see *Figure 1*) may be more effective. In addition to severity, EMS personnel should assess the pain's location, characteristics and onset time, what makes it better, what makes it worse and what the patient has already done to try to relieve it.

Pharmacology is the most common and effective way to treat most types of pain. Pain medications work by blocking the production and/or transmission of the pain signal within the body. Opioids, including morphine and fentanyl, are the analgesics most commonly used in EMS. Demerol (meperidine) should not be used anymore. It is the most toxic of the opioids and can cause confusion, tremors and seizures.

Morphine has been used in EMS for more than 35 years. It is a narcotic analgesic that acts as a central nervous system (CNS) depressant by binding to and activating the μ -opioid receptors in the CNS. Activation of these receptors is associated with analgesia, sedation, respiratory depression and euphoria. Morphine also acts as a mild peripheral vasodilator. For prehospital pain management, it is typically given intravenously in doses of 2–5 mg aliquots. For pediatrics it is given in 0.2 mg/kg doses. When given intravenously, morphine has a peak action at 5–10 minutes and a clinical duration of action of 2–3 hours.

Fentanyl is the newer opioid analgesic in EMS. Like morphine, fentanyl binds with opioid receptors in the central nervous system, causing analgesia, sedation and respiratory depression. However, fentanyl causes less respiratory depression than morphine and has a minimal effect on peripheral vasodilation, and thus a minimal risk

of hypotension. Fentanyl is given intravenously in 1–2 mcg/kg doses. It is a rapid-acting (<5 minutes) analgesic with a short half-life (90 minutes) and therefore is ideal for prehospital use. It has been found both safe and effective for prehospital pain management.

Nitrous oxide is also an analgesic that has been used in the field

ing sedation in pain management. The synergistic effects of the narcotic and benzodiazepine can lead to sedation that's deeper than intended. Therefore, anyone administering sedation in pain management must be appropriately trained and certified in procedural sedation and capable of providing advanced life support airway management. Patients must be

improve the care and service they provide. His experience with pain has been limited to fighting systems that do not really want to take good care of patients, and a couple of kidney stones. Contact him at www.miketaigman.com.

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for many years, but not widely. It is delivered as a mixture of nitrous oxide and oxygen, typically in a 50% nitrous/50% oxygen mixture. Like morphine and fentanyl, it is a CNS depressant. It is typically self-administered: The patient holds a mask over his or her face and breathes deeply. The mask should not be strapped on. If a patient becomes too sedated, they will drop the mask, preventing significant overdosing. Nitrous must be used with caution: It is 34 times more soluble than nitrogen. It will diffuse into areas of trapped gases and can cause increased pressure and tissue damage. Therefore, it should not be used in cases of pneumothorax and intestinal obstruction.

Frequently it is necessary to combine a narcotic (analgesic) and a benzodiazepine (anxiolytic) to provide adequate pain management. Administration of a narcotic with a benzodiazepine has historically been considered conscious or procedural sedation and analgesia. For pain management, we like the term *sedation*, which describes a reduction in the degree of anxiety, pain and awareness a patient may experience during a painful illness or injury. The patient should retain their ability to maintain a patent airway independently. They should maintain their protective reflexes and their ability to respond appropriately to physical stimulation and/or verbal commands, and should remain easily arousable. Care must be exercised when administer-

appropriately monitored with EKG, pulse oximetry and capnography.

High-flow oxygen therapy has been found to provide significant pain relief to the majority of cluster headache sufferers. Cluster headaches are an intense, severe affliction characterized by brief and frequent attacks.

Some systems are experimenting with other pain-management techniques, such as acupressure, guided imagery and therapeutic touch. There is not enough data to recommend them for EMS use at this time.

The bottom line is that there is no physical pain known that does not have the potential to respond to appropriate interventional therapy. It is reasonable for EMS systems to have the goal of delivering their patients to emergency departments pain-free, or with dramatically reduced levels of pain. While it is true that this goal may not be achievable 100% of the time, it is something to work toward. As physician, humanitarian and Nobel Peace Prize winner Albert Schweitzer said, "Whosoever is spared personal pain must feel himself called to help in diminishing the pain of others." ■

Arthur Kanowitz, MD, is an emergency physician, EMS medical director, paramedic, researcher and innovator. He has firsthand experience with severe pain. He was also Mike Taigman's EMT instructor in 1976, which may have been somewhat painful.

Mike Taigman is a lifelong student who works with EMS systems worldwide, helping them