The Greatest Evil is Physical Pain

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ABSTRACT

Physicians should continuously review their understanding of fundamental labels, definitions, and differentiation of medicine, especially when dealing with intricate pain management issues. The basic pathology of pain, the distinction of the different types of pain—nociceptive, neuropathic, acute, and chronic—and diagnosis methods are discussed. A summary of treatment methods for types of pain and important reminders regarding opioid use in pain management are also outlined.

INTRODUCTION

Both acute and chronic pain are high-priority issues that require careful attention in both diagnosis and treatment. Without proper attention, diseases and illnesses that cause this pain can become burdening in the best case and debilitating or life-threatening at its worst. A physicians' role has always been to act in a way that respects a patient's wishes while also maintaining the standard of beneficence. Due to the increasing need for relief from pain, doctors must also be aware of the possible misuse of pain remedies like opioids by first seeking out natural pain remedies or elements that can decrease their use. To preserve the balancing act between doing too much and doing too little, it is vital for both general and specialist physicians to continuously remind themselves of the nature of pain, its pathology, common causes, and treatments.

BASIC CLINICAL PATHOLOGY OF PAIN

The skin is home to many specialized sensory structures sensitive to distinct stimuli. Pacini corpuscles detect strong pressure change in the lower dermis. Meissner corpuscles in the dermal papillae and Merkel cells in the epidermis perceive light touch. Free nerve endings located in the dermis transmit pain signals, while other structures detect temperature. These free nerve endings, associated with nociceptive and acute pain, consist of fast-acting myelinated A-fibers and slow-acting unmyelinated C-fibers and can be found throughout the skin. While unmyelinated nerve endings are more abundant, both nerve types transmit signals to the dorsal root ganglion, an example of which can be seen in Figure 1.¹

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FIGURE 1.

Unmyelinated Nociceptors (C-fibers, red) Project to Superficial Laminae I and II of the Dorsal Horn. Myelinated Nociceptors (A-fiber) Project to Superficial Laminae I and V¹.

Neuropathic and chronic pain is characterized by increased sensitivity to stimulation of normally harmless nerve fibers. Due to the nervous system's plasticity in response to continuous pain or stimulus, maladaptive changes of these pain receptors can be brought upon by structural reorganization, increased excitability, and decreased inhibition.^{2,3}

NOCICEPTIVE AND NEUROPATHIC PAIN

The sense of common pain reflects the culminating signals brought by one or two physiological types of transmissions: nociceptive and neuropathic. While both are more intricate labels that describe what is simply

the body's way of warning the brain that it is experiencing possibly lethal environmental stimuli, the individual mechanisms for either are unique and, thus, worthy of exploring further.

Nociceptive pain is experienced due to physical trauma and is transmitted by nociceptor sensory neurons housed throughout the body and in the dorsal root ganglion.⁴ Nociceptors can be either myelinated or unmyelinated; the former accounting for the burning sensation attributed to prolonged noxious heat stimuli while the latter brings upon the sharp pain sensation attributed to heat or pressure.^{5,6} In nociceptive pain cases, excitation of the neurons can lead to sharp, throbbing pain and is usually acute. Inflammation of the area affected can be common, and the sensation of pain usually leaves after the underlying condition or trauma is treated.¹ If the pain persists despite intervention to resolve the trauma, physicians might relieve the pain with steroid injections in combination with other pain relief methods, such as surgery, medication, or physical therapy/OMT.

Somatic pain triggered by nociceptors in the skin, muscles, or bones is the most common type of nociceptive pain and is highly localized. Radicular pain, occurring when a nerve root is agitated, sends pain down extremities from the point of irritation. Radiculopathy, or the pinching of a nerve in the spine, is a common example of radicular pain and usually brings forth feelings of tingling or numbness.⁷ While nociceptors are most linked to the skin's sensory neurons, and these nerves can also be found throughout the body in organs—in these cases, it might be hard to correctly locate or identify the source as the pain sensation is sometimes dull or diffuse. This type of nociceptive pain, labeled visceral pain, is usually described as "aching" by patients.

Neuropathic pain, contrastingly, results when neurons or the nervous system in general misfires pain signals due to them being damaged by disease or injury. Imbalances in excitatory or inhibitory sensory signals, along with incorrect moderations of pain signals received by the central nervous system, have been linked to neuropathic pain.² This type of pain transmission often results in chronic or intractable pain, leading to worsened quality of life for patients and persistence despite intervention. Here, pain management has become vital in attempting to restore some semblance of normalcy to a patient's life, but the risk of increasing pain management methods to counteract increasing chronic pain has left many at risk of escalating treatment methods. When dealing with this type of pain, both physicians and patients need to try lower risk methods of management before more aggressive (and more addictive) alternatives (Figure 2).⁸

ACUTE AND CHRONIC PAIN

While seemingly intuitive, it might be helpful to remind oneself of the exact differences between acute and chronic pain to diagnose and treat new patients effectively.

When dealing with acute pain, treating the injury or disease that lies at the root of the pain usually causes alleviation. This label describes pain that lasts less than six months and is usually sharp or strong, can be intermittent, and can vary in severity depending on the cause. Tests used to determine the underlying conditions of acute pain include blood work, nerve conduction tests, common imaging tests, or the Visual Analogue Scale. Acute pain is regularly caused by injury or surgery and is associated with numbness, soreness, and limited mobility.

On the other hand, chronic pain describes almost daily somatosensory discomfort that lasts longer than six months, can continue after the initial injury or illness is treated, and often causes other physical and mental conditions that can lower a person's quality of

FIGURE 2.

Remodeling of the Analgesic Ladder for Acute and Chronic Pain⁸

life drastically. For this reason, doctors need to note commonly associated conditions that might signal chronic pain leading up to or shortly after the initial six-month window. Headaches, back and nerve pain, arthritis, stiffness, and fibromyalgia pain correlate to chronic pain.⁹ It is also accompanied by depression, stress, irritability, social withdrawal, weight loss, and sleep disorders.⁴ Doctors should know that studies have been found to correlate the onset and persistence of some chronic pain forms with psychological vulnerability factors such as fear, depression, and anxiety. Simultaneously, psychological “protective” factors like active coping strategies, favorable recovery expectations, and self-efficacy beliefs have been shown to reduce this risk potentially.¹⁰

Due to the variation in the perception of this type of pain and its source, treatment options for chronic pain can vary wildly—from over-the-counter pain relievers, topical ointments, osteopathic therapy, or medication. Oral medication or ointments can help relieve this type of pain but are not meant to be used over long periods as many patients see decreased effectiveness in its use. In these cases, therapy or natural pain remedies

such as fish oils, Vitamin D, or other anti-inflammatories are often accompanied to decrease medication use and relieve inflammation.⁹

More serious forms of both acute and chronic pain should be examined carefully, and the use of opioid medications should always be tightly regulated. Specialists in pain management should be contacted to determine the appropriate course of action if more serious treatment methods are considered, especially when controlled substances are involved. Conservative management, above all, should always be remembered by practicing physicians.

DIAGNOSIS AND TREATMENT FOR LIMITED CASES

The correct diagnosis needs to be given regarding neuropathic, nociceptive, acute, or chronic pain for proper treatment. If acute pain is not treated effectively, neuroplastic pain receptors can eventually lead to chronic pain symptoms that are more difficult to treat.⁴ If chronic pain is not managed effectively, quality of life can become unbearable to the point where drastic action might be taken, including diversion and drug addiction development.

Acute pain, linked mainly to underlying illnesses or injuries, can usually be effectively resolved by treating the underlying cause. Whatever route of treatment a physician undertakes, it is important to note that if surgery is undertaken, scar tissue can propagate pain signals in the area and is often symptomized by inflammation, itchiness, stiffness, and sensitivity. Studies show that painful scar tissues have high-density nerve fiber areas that cause pain through inappropriate, close-proximity cross-stimulation.^{11, 12} Scar area pain may also spread to other parts of the body, as some studies suggest sensory functions can be disturbed at contralateral sites.¹¹

FIGURE 3.

Flowchart for Diagnosing Neuropathic/Chronic Pain²

For chronic pain, symptoms can continuously worsen until few other alleviation remedies work as decreased pain thresholds, coupled with increased tolerance to medication, can result. An important diagnostic tool physicians can utilize to diagnose and manage symptoms during onset quickly is the painDETECT questionnaire, which helps identify patients with neuropathic/chronic pain.¹³ Musculoskeletal exams can also test coordination, sensation, and mobility when pain leads to stiffness in chronic pain. For acute and chronic pain, common imaging tests like x-rays, MRIs, or CT scans can reveal any underlying damages responsible for the discomfort. A flowchart for diagnosing neuropathic/chronic pain can be seen in Figure 3.² While sources of treatment vary due to the variation of the pain source, common therapies for chronic pain can be seen in Table 1.¹⁴ When assessing chronic pain, physicians should remember

TABLE 1.Summary of Non-Opioid Analgesics¹⁴

Analgesic	Addictive	Notes
Acetaminophen	No	Should normally not exceed 4 g/day; in adults with hepatic disease, the maximum dose is 2 g/day. Potentiates analgesia without potentiating respiratory and sedative side effects.
NSAIDs	No	Are used to relieve numerous types of pain, especially bone, dental, and inflammatory, and enhance opioid analgesia. May cause gastrointestinal bleeding and renal insufficiency.
Serotonin-Norepinephrine Reuptake Inhibitors (SNRIs)	No	Are used to relieve several nonstructural types of pain (e.g., migraine, fibromyalgia, low back pain) and probably others.
Tricyclic Antidepressants	No	Have demonstrated efficacy in migraine prophylaxis, fibromyalgia, many neuropathic pains, vulvodynia, and functional bowel disorders. Watch for anticholinergic side effects and orthostatic hypotension (fall risk in older people).
Anticonvulsants	No	Some have demonstrated efficacy in relieving fibromyalgia, migraine prophylaxis, and neuropathic pains.
Topical Analgesics	No	Comprise several unrelated substances (e.g., NSAIDs, capsaicin, local anesthetics). Work locally, not systemically, and therefore usually have minimal systemic side effects.
Antipsychotics	No	Have no demonstrated analgesic effect, except to abort migraine/cluster headache. Risks include extra-pyramidal reactions and metabolic syndrome.
Muscle Relaxants	Carisoprodol (Soma) is addictive. Some others have significant abuse potential.	Have not been shown to be effective beyond the acute period. Some potentiate opioids and are not recommended.

some common causes, including but not limited to trauma, genetic disorders and autoimmune disorders (such as rheumatoid/psoriatic arthritis and Lupus). Additionally, doctors should pay attention to possible disrupted sleep patterns as chronic pain and sleep apnea/insomnia have been found to have a reciprocal relationship—that is, sleep disturbance is a predictive factor for the emergence and progression of chronic pain and a common side effect.¹⁵

For other treatment options, cognitive-behavioral therapy (CBT), manipulative therapy, and other physiotherapies can help decrease pain, recommend pacing activities, improve mobility loss and provide relaxation techniques that can improve the patient's quality of life independent from medication.

PAIN TREATMENT OPTIONS TO DECREASE THE USE OF OPIOIDS

Discussion of pain and pain management would be remiss without discussing opioids and other controlled

substances frequently utilized in practice. The use of opioids and other controlled substances should always be tightly regulated and used only when approved by addiction and/or pain specialists. Physicians prescribing opioids should routinely check on patient usage with periodic drug tests and be aware of common diversion scams on all levels—by employees, friends, and family, and patients. Drug diversion—or the abuse of prescribed drugs for unlawful reasons—is an increasing health and safety risk that has brought national attention to the field of pain relief.¹⁶ To effectively combat opioid abuse and shield both patient and physician, it is imperative to utilize other treatment methods before resorting to controlled substances. At the same time, it is just as important to mitigate any unintended side-effects of opioid use; physicians might consider simultaneously prescribing DHEA to account for opioid-induced endocrinopathy, muscle-relaxants, stool softeners, or other adjuvants.¹⁷

CONCLUSION

As the field of pain management continues to grow in-depth, physicians need to remember more general aspects that can allow for more effective and safe diagnoses and treatment options. Continuous relearning of basic labeling, pathology, and risks regarding pain management should remain at the forefront of a physician's duty in their practice to help mitigate errors and liability. Simultaneously, it also helps reinforce essential practices and tools beneficial to any doctor who desires to improve inpatient care.

AUTHOR DISCLOSURES:

No relevant financial affiliations or conflicts of interest.

Martin J Porcelli, DO, has been in private practice in Pomona, California, for the past 42 years. He is past co-director of the family practice residency training program at Doctors Hospital Medical Center in Montclair, California, and Ontario Community Hospital in Ontario, California. Dr. Porcelli earned his biological science degree from the University of California-Irvine, and his doctorate of osteopathic medicine from the Chicago College of Osteopathic Medicine. He is a diplomate of the National Board of Examiners for Osteopathic Physicians and Surgeons and is board certified by the American Osteopathic Board of Family Practice in Geriatrics, Sports Medicine, and Pain Management. He has been involved in numerous clinical trials, and he has been an invited speaker and lecturer at state and national medical conferences.

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