

Costs of Pain Management

Caventure
Drug Discovery

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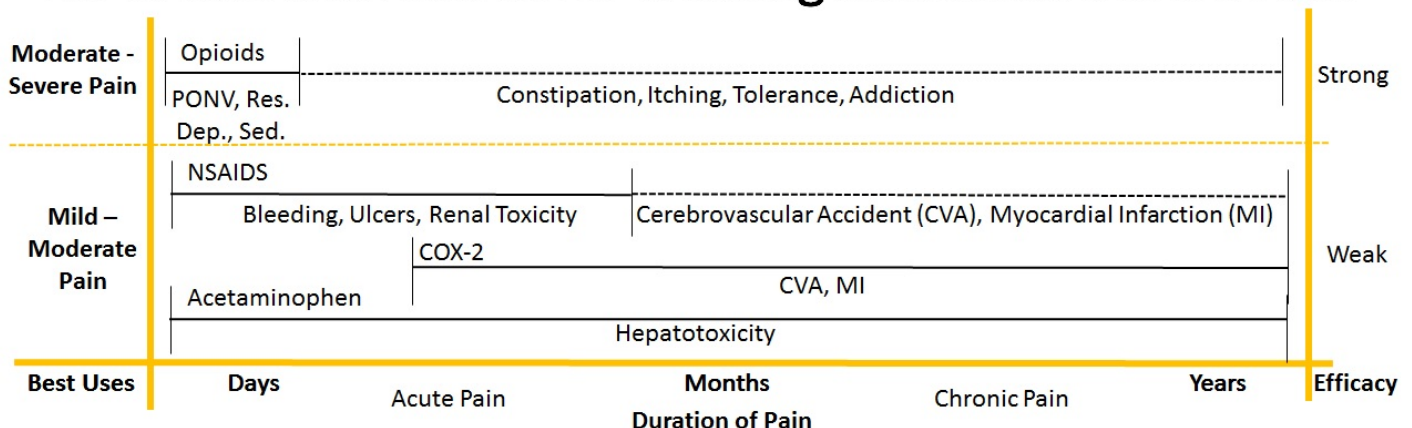
Inadequate Pain Management is widely recognized as a major public health problem in the United States, impacting patients, healthcare providers and economies at a cost to society of \$560-\$635 billion annually; that is equivalent to \$2,000 per person living in the U.S each year. Moreover, an estimated 26.4 to 36 million people worldwide and an estimated 2.1 million people in the U.S. abuse opioids, with 80% of U.S. individuals addicted to opioids having first received opioids from their physician. The U.S. government has declared this a public health crisis: appropriately termed, the *Opioid Epidemic*.

Many factors have contributed to the Opioid Epidemic. Among the most significant contributing factors is that despite having serious adverse side effects, such as respiratory depression, sedation, addiction and constipation, opioids are often still the best option for moderate-to-severe pain. In truth, opioids are best used short-term. This is because opioid-induced tolerance leads to dose escalation over time, and dose escalation is a major contributor to opioid addiction.

Opioid Facts

- Opioid analgesics are the most commonly prescribed class of medications in the U.S.
- More than 30% of Americans have some form of acute or chronic pain
- 9.6-11.5 million U.S. adults (3 to 4% of total population) were prescribed longer-term opioid therapy in 2014
- 1 in 4 people receiving prescription opioids long-term struggle with addiction
- In the US, 128 people died every day in 2018 after overdosing on opioids

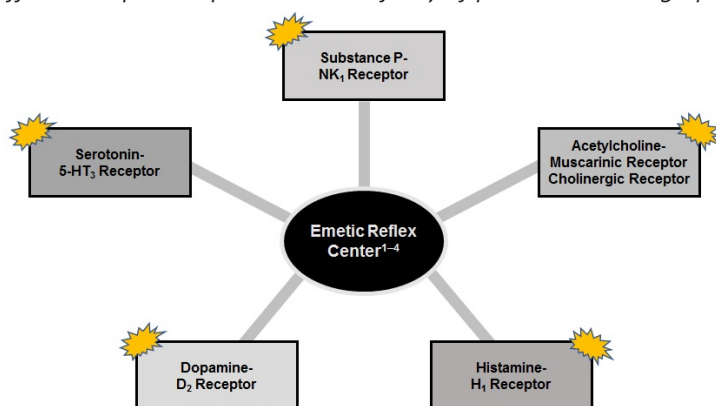
No Great Alternatives for Treating Moderate-Severe Pain



Current analgesics that lack the addictive potential of opioids also lack sufficient potency to treat moderate-to-severe acute pain. Opioids, even when used for chronic pain, are less effective in dealing with the numerous pain states having significant involvement of the inflammatory cascade and subsequent sensitization of pain pathways. These conditions include major public health problems, such as low back pain, arthritis, and neuropathic pain. As a result, these types of pain impact businesses; the annual value of lost productivity due to pain is estimated between \$297.4 billion and \$335.5 billion.

Using Multimodal Therapy to Treat Adverse Effect of Opioids

Many factors contribute to PONV; typically a multimodal approach is needed to affect multiple receptors in the majority of patients receiving opioids



Neurotransmitters in the brainstem vomiting center

Even when using opioids for short-term therapy, currently medical professionals are advised to use a multimodal approach. In a recent study, 80% of subjects receiving medication after surgery suffered adverse effects. Therefore, physicians dispense smaller doses of pain medication and use multiple different medications, each with differing side effect profiles, to balance the need for improved management of the pain with

the induction of adverse effects, such as nausea, vomiting, constipation, and respiratory depression. These multiple drug approaches, and the need to treat the adverse effects, contribute to increasing healthcare costs.

In conclusion, despite the increasing use of non-opioid analgesic strategies, opioids remain a vital part of the treatment of moderate-to-severe pain; however, the costs associated with the use of traditional mu opioids are very substantial. An ideal opioid would be potent, not induce respiratory depression and thus eliminate the need for intensive monitoring, not cause adverse effects requiring multimodal nausea prophylaxis or multimodal bowel protocols for constipation, and have low addictive and abuse potential. The need for a better opioid alternative is now critical.

To learn more about the dynamics of pain management, contact Dr. Craig Hartrick, M.D., FIPP at chartrick@caventuredrugdiscovery.com.

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