Pain Management Updates:

Covid and Chronic Pain
The Future of Pain Management

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Disclosures: None

The Relationship between Chronic Pain and COVID

Piotor Szyhalski, COVID-19: Labor Camp Report: April 26, 2020

Why?

Main Themes in the literature:
- Viral infection
- Worsening of chronic pain
  - physical and mental symptoms
  - Increased susceptibility to contract COVID?
- New chronic pain in patients who survive COVID
- New chronic pain in non-infected patients
  - triggered by exacerbation of risk factors (poor sleep, inactivity, fear, anxiety, depression)
- Effects of hospitalization

Impact on Body Systems: Myalgia

- One of the most common manifestations
  - ~36% patients reported, ~15% primary presenting symptom was arthralgia and myalgia
- Increased release of cytokines, increased inflammatory markers suggest generalized inflammatory response.
- Weakness of lower limbs, suggests possible motor peripheral neuropathy

Impact on Body Systems: Abdominal Pain

- Less common
  - 2-6% of adults, teens, children
- Related to diarrhea, anorexia
- Gastroenteritis?

Impact on Body Systems: Neurological Manifestations

- Headache, up to 90% prevalence rate
- Generalized inflammatory response, cytokine release, endothelial vessel injury, macrophage activation
- PTSD: 25-44% of Hong Kong residents affected by SARS, 41% in Healthcare workers

Impact on Body Systems: Post-viral syndrome / viral related organ damage

- Onset of chronic, widespread pain after viral illness
- Post-viral syndrome of pain, fatigue, memory difficulties for up to 12 months post infection
- Presence and severity of somatic symptoms closely correlated with subsequent development of chronic fatigue and pain
- Worsening of pre-existing pain physical and mental symptoms

How does COVID Worsen Chronic Pain?

- 60% of people affected by COVID have been affected in one or more social and daily activities (sleep, diet, exercise)
  - pain/discomfort 19%
  - Anxiety/depression 18%
- Chronic pain effects significantly more in the elderly population, also at higher risk of developing severe symptoms of COVID
- Pain is more frequent in patients who have been hospitalized in ICU and required interventional life support

Pain and ICU Stays

- Patients who remember high pain and distress during an ICU stay have greater risk of developing chronic pain after discharge
- Often symptoms are related to severity of disease
  - Include cognitive, physical and psychological dysfunction post COVID
- Chronic pain is reported in 38-56% of ICU survivors when measured 2-4 years after ICU admission

Chronic Pain Treatment during a Pandemic

- Regular medical care was interrupted
- Clinic access was restricted
- Waiting times increased, especially for care deemed non-urgent
- Patients less willing to travel
- Reduced ability to monitor prescriptions, less prescribing
- Reduced access to pain management procedures
- Reduced access to interdisciplinary team (therapists, rehab, groups)
- Turn to alcohol or nonmedically prescribed substances to cope

Chronic Pain and Catastrophes

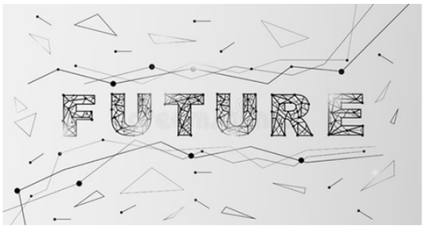
- Chronic pain thought to be highly related to stress and distress, however studies have consistently shown that high levels of baseline psychological distress is only modestly related to the development of chronic pain.
- 911 studies
  - Post terrorist attack levels of pain and somatic complaints did not increase compared to just before levels.
- Daily hassles and personally relevant stressors more likely to cause pain symptoms than catastrophes

Social Isolation

- Patients with chronic pain have a higher rate of depression
- Social isolation worsened depression
- Pain Management services were postponed or cancelled.
- Access to medications, treatments diminished
- Closure of group activities (pool, gym, leisure activities)

Now What?

- Time limits the ability to develop high quality, evidence based management decisions
- Integration with work done on intensive care survivorship
- Increased focus on opioid and substance use disorder
- Continued push for multi-discipline pain management
- Push for future health care policies that seek to reduce the impact of future epidemics
- Short term- prompt and targeted treatment of pain



The Future of Pain Management

HEAL Initiative (Helping to End Addiction Long-Term)

- Introduced in 2018
- Aggressive trans-agency effort to speed scientific solutions to stem the national opioid public health crisis
- Prevention
- Treatment
- Awarded $945 million in 2019 funding for grants, contracts, and cooperative agreements across 41 states
- https://heal.nih.gov/

Improving Prevention and Treatment for Opioid Misuse and Addiction

- Novel Medication Options for Opioid Use Disorder and Overdose
- Enhanced Outcomes for Infants and Children Exposed to Opioids
- New Strategies to Prevent and Treat Opioid Addiction
- Translation of Research to Practice for the Treatment of Opioid Addiction

Novel Medication Options for Opioid Use Disorder and Overdose

- Optimizing novel, targeted, non-addictive medications and non-pharmacological treatments for acute and chronic pain
- Developing technology to control the release of opioid medications in the body to lower the risk of addiction
- Developing medications to manage opioid withdrawal, reduce cravings, and lower the risk of a relapse in people receiving treatment for OUD
- Optimizing oral, injectable, and implantable, long-acting medication to treat OUD
- Developing medical devices to detect an opioid overdose and automatically administer life-saving medications

"Human-on-a-Chip"

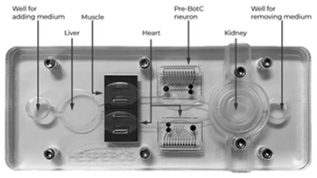
Potential new drugs are tested in animals

- Animals do not always accurately predict what will happen in humans
- Chip is used to model the effects of repeated opioid overdose

Made up of several collections of cells that mimic organs, all connected by channels.

A liquid medium plays the part of blood, carrying nutrients and other molecules between the different organs.

Scientists can add a drug to the system and test its effects.



The multi-organ chip will be about 2.5 inches by 5.5 inches, with a special spot for each kind of cell. Sensors built into both the chip and the plate underneath (not pictured) record the activity of each organ. Credit: Christopher J. Long and Yunqing 'Melody' Cai

Finding Morphine alternatives

- Could buprenorphine could be used as an alternative to post-surgical morphine?
- Current formulation for acute pain is a painful IM injection every 6H
- Testing a polymer that could deliver buprenorphine as a single injection
- POZ: many copies of the medication attached via chemical bonds, like individual bulbs on a string of lights
- Initially used for delivery of Parkinson's disease medication Rotigotine

Enhanced Outcomes for Infants and Children Exposed to Opioids

- Advancing Clinical Trials in Neonatal Opioid Withdrawal (ACT NOW)
- HEALthy Brain and Child Development
- Goal Outcome:
  - Understanding changes in brain and behavioral development resulting from early exposure to opioids will inform precision prevention for substance use disorders and mental illness.

Medical Device Trials:

The Prapela SVS hospital bassinet pad produces a very gentle, random vibration that soothes a baby with NOWS.
Credit: Prapela Inc.

This transcutaneous auricular neurostimulation device, known as "Roo," wraps around the ear of a baby with NOWS and delivers soothing electrical signals that calm the infant.

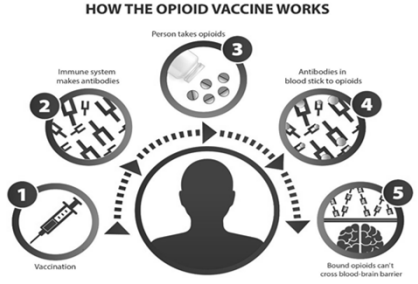
Credit: Spark Biomedical

New Strategies to Prevent and Treat Opioid Addiction

- Develop anti-opioid vaccines and monoclonal antibodies and test their safety and efficacy in clinical trials.
- Developing opioid vaccines to reduce the risk of an opioid overdose and to treat OUD
- Developing medications to treat insomnia in people who are receiving treatment for OUD

University of MN Research:

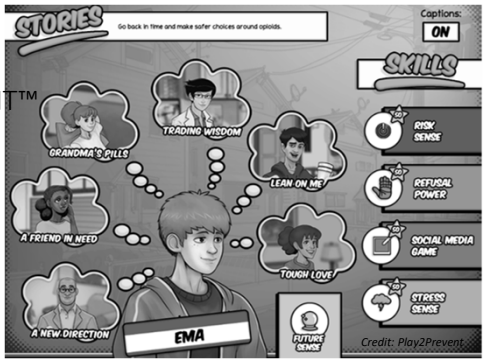
Marco Pravetoni, Ph.D., an immunologist and pharmacologist at the University of Minnesota



Opioid Misuse: The STOP Intervention

- Primary Care provider talks to patient about opioid use, then a "video doctor" gives same advice
- Telephone call by a behavioral health coach (2-6 sessions)
- Nurse care manager from primary care clinic is available to patient and provider for individual health care needs for one year

Prevention: play2PREVENT™



Optimizing Retention, Duration, and Discontinuation Strategies for Opioid Use Disorder Pharmacotherapy study

Precision medicine approach

- test various doses, types, and lengths of treatment
- Goal of understanding how to personalize therapy for people with OUD
- Challenge: characteristics and circumstances can vary significantly.

Preclinical and Translational Research in Pain Management

- 1.6 million people in the United States who are living with the loss of a limb, expected to grow to 3.6 million by 2050
- designed to electrically stimulate the nerves that remain in the residual limb
- enable users to sense the prosthesis as though it is a part of their body.

Clinical Research in Pain Management

Acute to Chronic Pain Signatures Program

- Research from the Acute to Chronic Pain Signatures Program will form a comprehensive data set that can be used to help predict which patients will recover from acute pain associated with surgery or injury and which ones will develop long-lasting chronic pain. This information will help guide approaches to pain management.

Pain Management Effectiveness Research Network

- The Pain Management Effectiveness Research Network (ERN) will provide infrastructure to conduct Phase 3 clinical trials designed to evaluate the effectiveness of pharmacologic and non-pharmacologic therapies for a broad array of acute and chronic pain conditions. The ERN will help provide critical information for optimal pain management in clinical settings.

Integrated Approach to Pain and Opioid Use in Hemodialysis Patients

- The Hemodialysis Opioid Prescription Effort consortium will support an integrated approach to pain and opioid use in hemodialysis patients. Large amounts of opioids for pain are typically prescribed for the hemodialysis patient population. This consortium will support studies to develop and test the combination of various non-opioid treatment approaches with this population.

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Thank you!

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