The Opioid Epidemic: History and Current Treatment

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The current opioid epidemic in the United States was fueled, in part, by aggressive prescribing of narcotic pain medications in the preceding decade. In addition to heroin, health care professionals are seeing patients who are addicted to prescription opioid medications such as oxycodone and fentanyl. There are many different medications and psychosocial treatments available to treat opioid use disorder. Healthcare professionals can create a personalized treatment plan using a combination of the treatments available based on the individual needs of their patients.

Keywords

Opioids, Buprenorphine, Methadone, Harm Reduction

How did we get here?

Opioids have been used by humans for both euphoric and medicinal reasons for almost 5000 years. Morphine is a naturally occurring opioid synthesized in both plants and animals. Heroin, also known as di-acetyl morphine, is a synthetic drug that is broken down into morphine by the liver after being ingested. Because opioids are highly addictive, there have been repeated epidemics of abuse. The most recent opioid epidemic stands out for several reasons, including the role that physicians played in the increased rate of prescription of opiates late 1990's. In addition, health care professionals today have many medications and psychosocial treatments

available to them when designing a treatment plan for a patient.

Pain as the 5th Vital Sign

In 1980, a brief letter to the editor was published in the *New England Journal of Medicine*. (Porter and Jick, 1980) The writers of this letter had reviewed 11,882 patient charts of patients prescribed opiates, and found only four cases of documented addiction. The summary sentence of this letter stated "We conclude that despite widespread use of narcotic drugs in hospitals, the development of addiction is rare in medical patients with no history of addiction."[1]

In the 1990's, pain doctors began to advocate for more aggressive treatment of pain, citing the low risk of addiction if opioid pain medications were taken as prescribed for a medical condition. The Joint Commission on the Accreditation of Healthcare Organizations (JCAHO) identified "pain" as the fifth vital sign, along with blood pressure, heart rate, respiratory rate and temperature. All patients were asked to rate their level of pain, regardless of the reason that they were seeking health care services. Pharmaceutical companies who used to only market opioid pain medications to oncologists, orthopedic surgeons and other specialists, began to market these medications to general practitioners (Atlantic Monthly, 2017).

The result of these various factors was that prescription of opiates in the United States nearly tripled from 76 million in 1991 to 207 million in 2013. As sales of opioids increased, so did the rate of death attributed to opioid overdose. The rate of death in 2008 for opioid overdose was almost four times the rate of death in 1999 (CDC, 2011).

The Rise of Fentanyl

One aspect of this particular epidemic that has been unique is the increased recreational use of fentanyl and related drugs. Fentanyl is a synthetic opiate that has a potency 50-100 times greater than morphine (NIDA, 2016). It was designed to be used for cancer pain and other forms of severe pain. Someone who is ingesting fentanyl when he believes that he is ingesting heroin is at greater risk of overdose and death. The rise in the rate of overdose from opiates has coincided with the increased rates of recreational use of fentanyl. Other forms of the drug are being seen more in the recreational opioid supply. This includes carfentanil, a drug 10,000 times more potent than morphine that is used as a general anesthetic for large animals, such as elephants (DrugBank, 2017).

What do we do now?

Medication-Assisted Treatment

Medication assisted treatment involves using a prescribed medication to prevent cravings for a drug of abuse, thereby preventing relapse. Medication options for opioid use

[1] EDITOR'S NOTE: *It should be noted here that in June 2017 NEJM published a critical follow-up letter and an unprecedented editor's note on the online version of the original warning readers that it had been "heavily and uncritically cited" as evidence of the evidence of the rarity of addiction in opioid users. See the follow-up letter here:*

https://www.nejm.org/doi/full/10.1056/NEJMc1700150

and the original letter with the Editor's Note here:
https://www.nejm.org/doi/10.1056/NEJM198001103020221

disorder include a collection of medications like buprenorphine and methadone referred to as Opioid Replacement Therapy, as well as Opioid Antagonist Therapy with medications like naltrexone.

Med	Action at mu opioid receptor
Naltrexone/Naloxone	Antagonist
Buprenorphine	Partial agonist
Methadone	Full agonist

Table 1. Medications used to treat opioid use disorder

Opioid replacement therapy is predicated on the concept that replacing a short-acting opioid like morphine, the active ingredient in heroin, with a long-acting opioid will allow the opioid to be present in the brain at a steady state. The brain does not experience the cycles of intoxication and withdrawal; therefore the patient does not go through the behaviors associated with obtaining opioids that cause the significant morbidity.

Methadone is an opioid with a long half-life, roughly 22 hours. Therefore it can be taken once a day while still maintaining a steady concentration in the body. It is a full agonist, meaning it binds to the mu-opioid receptor and activates it fully. Methadone is dispensed in federally regulated clinics, which means that most patients need to come to the clinic on a daily basis in order to obtain their dose (CSAT, 2005).

Buprenorphine is also an opioid, however it is a partial agonist. This means that it binds to the mu-opioid receptor and only activates it partially. This has the benefit of lower rates of side effects like sedation, as well as lower risk of overdose. Buprenorphine has been available for a long time as a pain medication, however, if a physician is prescribing it for the purpose of treating opioid use disorder, she must have a special waiver from the federal government.

When buprenorphine is prescribed for the purpose of treating opioid use disorder, it usually contains a second medication called naloxone. The common medication Suboxone is one example of the combination of buprenorphine and the opioid antagonist naloxone. If the medication is taken under the tongue as intended, the naloxone is not absorbed and has no pharmacologic activity. It only becomes active if the medication is taken by another route, such as inhalation or injection. (Chiang and Hawks, 2003)

The combination of naloxone and naltrexone is an opioid antagonist, meaning it binds to the mu-opioid receptor and blocks any activity from happening. Naltrexone is available both as a pill that is taken orally every day as well as a once a month injection known as Vivitrol. Naltrexone has been shown to be effective in reducing use of both opioids as well as alcohol (Krupitsky E, 2011).

Psychosocial Treatment

Medication assisted treatment works best when it is paired with non-medication therapies that focus on changing behavior related to addiction. 12-step programs like Narcotics Anonymous and other mutual support groups such as Smart Recovery have been available for many years. Though research on their effectiveness is mixed (Ferri, 2006), there are a large number of people in recovery who credit these kinds of groups with their success.

Relapse prevention therapy is a form of therapy focused on increasing self-control in order to reduce drug and alcohol use. Contingency management is a form of behavioral therapy that uses positive reinforcement (i.e., financial incentive) to

reward a desired outcome (i.e., negative urine toxicology screen.)

Harm Reduction

Harm Reduction is a strategy that does not aim to eliminate opioid use altogether, rather the aim is to reduce negative consequences and secondary harm from use. Syringe exchange programs are one harm reduction strategy. These are programs where someone can exchange used syringes for new, sterile ones, which decreases the risk of infectious disease transmission from IV drug use (CDC, 2007). Supervised injection facilities (SIFs) are monitored locations for injection drug use where staff can assist in maintaining the safety of the people using the facility. SIFs have been shown to decrease the rates of fatal overdose as well as the risk of victimization and criminal activity (Marshall, 2001).

An important public health development that has been implemented with great success during this opioid epidemic is the dissemination of by-stander administered intranasal naloxone. Naloxone, also known by the brand name Narcan, is like naltrexone in that both are opioid receptor antagonists. Naloxone is used in emergent situations to reverse an overdose. Naloxone can be distributed to non-medical people in the community, and there have been wide-spread efforts to train people on how to use it correctly. Communities where naloxone is being widely disseminated have lower rates of death from opioid overdose than other communities (Walley 2013).

Conclusion

Health care professionals have a number of treatments, both pharmacologic and psychosocial, available to them today. Treatment for opioid use disorder is not "one size fits all." Different people are going to respond better to certain interventions. Some people benefit from the structure of attending a methadone clinic every day. Others do better with the flexibility of an office-based treatment like buprenorphine. People who have problems with adherence may find a long-acting injectable like naltrexone to be beneficial. Some people benefit from the 12-step model of peer support while others have better results with the more therapy-based interventions like relapse prevention therapy. Healthcare professionals can create a personalized treatment plan using a combination of treatments available based on the individual needs of their patients.

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