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Two cases of intranasal naloxone self-administration in opioid overdose

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Abstract

Background—Overdose is a leading cause of death for former prisoners, exacting its greatest toll during the first 2 weeks post-release. Protective effects have been observed with training individuals at high risk of overdose and prescribing them naloxone, an opioid antagonist that reverses the effects of the opioid-induced respiratory depression that causes death.

Cases—We report two people with opiate use histories who self-administered intranasal naloxone to treat their own heroin overdoses following release from prison. Patient A is a 34-year-old male, who reported having experienced an overdose on heroin the day after he was released from incarceration. Patient B is a 29-year-old female, who reported an overdose on her first injection of heroin, 17 days post release from incarceration. Both patients self-administered the medication but were assisted at some point during the injury by a witness whom they had personally instructed in how to prepare and administer the medication. Neither patient experienced withdrawal symptoms following exposure to naloxone.

Discussion—Self-administration of naloxone should not be a goal of overdose death prevention training. A safer, more reliable approach is to prescribe naloxone to at-risk patients and train and also equip members of their household and social or drug using networks in overdose prevention and response.

Keywords

overdose; naloxone; criminal justice

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Introduction

Overdose is a leading cause of death for former prisoners, exacting its greatest toll during the first 2 weeks post-release¹⁻⁴. Opioid drugs such as heroin or prescription opioids are the agent of overdose death in the majority of these cases⁵. Known risk factors include polydrug use, change in tolerance, using opioids alone by oneself, drug use by injection, previous nonfatal overdose, using in public places, and illness, especially metabolic and respiratory conditions or infectious diseases like HIV.⁶ Protective effects have been observed with training and provision of naloxone, an opioid antagonist that reverses the effects of the opioid-induced respiratory depression that causes death, to individuals at risk of overdose. These training programs are targeted at people who use opioids, their family and friends, and service providers who could administer naloxone to the overdosing victim⁷⁻⁸.

We report two people who had recently been released from incarceration who self-administered intranasal naloxone, to treat their own heroin overdoses.

Case Presentation

Both patients are participants in a feasibility study of overdose prevention training coupled with naloxone prescription and dispensing at release from incarceration for prisoners in Rhode Island, Project SOON (Surviving Opioid Overdose with Naloxone). As consented participants, they viewed a 19-minute overdose prevention and naloxone administration educational training video (Staying Alive on the Outside, www.prisonerhealth.org), participated in a brief discussion of the video, and were provided a prescription for intranasal naloxone. The prescription included two mucosal atomization devices, two prefilled syringes with 2 mg/2 mL naloxone hydrochloride (Figure 1) and a simple educational card for teaching others about how to administer the study medication to them if they should experience a life-threatening overdose. These materials were dispensed to the inmate at release by study staff. Because opioid overdose victims are nonresponsive and experiencing severe respiratory depression, witnesses to the overdose must intervene, providing assistance with respiratory ventilation and/or administering naloxone to effectively treat the victim and prevent death. Per our research protocol, the participants nominated up to two family members or friends living in the community to also be trained in overdose recognition and response prior to the inmate's release from incarceration. These individuals are referred to as the patient's "nominees". This process ensured that someone in the participant's social network was made aware of the signs of overdose, steps to call for an ambulance, and how to use the medication in an emergency. The cases reported herein were consented participants in Project SOON and gave their permission for their data to be analyzed and disseminated for scientific purposes. No protected health information is presented. The Institutional Review Boards of the Rhode Island Department of Corrections and The Miriam Hospital as well as the Office of Human Research Protection approved the Project SOON protocol.

Patient A, is a 34-year-old male, who reported having experienced an overdose the day after he was released from prison. The participant had a history of opiate addiction since age 20. Per self report, he injected heroin and injected or smoked cocaine daily prior to his 4-month

incarceration. He did not report opiate use during his incarceration. In his second use of heroin, one day after his release, Patient A self-injected street-obtained heroin at a private location. Prior to administration, he prepared his prescribed intranasal naloxone (i.e., affixed the mucosal atomizer device, loaded the naloxone), knowing that he was at high risk of fatal overdose. He injected heroin alone in the room, took no other substances, and reported having had no other substances in the prior 12 hours. A friend (not Patient A's nominee) was also present and using heroin at the same location and had been trained by Patient A in naloxone administration. Patient A reported immediately feeling strong effects of the heroin and decided he needed naloxone. The naloxone was across the room from where he had injected. Patient A reported that he attempted to walk towards the medication, but struggled to do so, falling down, and partially lost consciousness. Patient A continued to try several times but did not reach the naloxone. Patient A reported that his friend found him coming in and out of consciousness, experiencing signs of respiratory depression, and recognized that he was trying to reach the naloxone. Patient A then reported that his friend administered 1cc of intranasal naloxone (i.e., half of a dose) to him. The dose brought him back to full consciousness, whereupon Patient A self-administered the rest of the vial of naloxone (i.e., the remaining 1 cc), to bring himself completely out of the overdose. Patient A stated that the overdose was very frightening for him and he feared death. Since experiencing the overdose, Patient A has not terminated his heroin use but reported amending his drug use behavior by trying to use heroin in moderation and less frequently. Patient A attempted to get treatment, but he reported that all inpatient programs had waiting lists and no openings. Due to financial constraints, he could not afford the \$90 per week for methadone maintenance therapy and enrolled in a 30-day detoxification program instead. Immediately after completing the detoxification program, Patient A relapsed and used for 3 days, whereupon he was arrested, approximately 10 weeks after the initial release from incarceration.

Patient B, is a 29-year-old female, with a history of opiate addiction since age 19, who reported having overdosed on her first injection of heroin, 17 days post-release from prison. Per self report, she used heroin daily prior to her 3-month incarceration, and did not use any opiates during incarceration. Upon release from incarceration, she went to the home of her drug dealers to purchase marijuana and left her prescribed naloxone dose there, as this was the only place she ever used heroin. She informed the dealers what the naloxone was and how to administer it to her if she overdosed. The dealers agreed to keep it in the house but were dismissive of her outreach efforts. On the day she overdosed, she purchased heroin from her dealer there at a cost and dose that she had used previously without issue. The dealers had told her that the heroin purity was higher than usual. She was accompanied by a companion (who was not her nominee) whose heroin use is unknown. No other substances were used by Patient B prior to or at the time she self-injected the heroin; she then fell unconscious. After an unknown lapse of time, Patient B reported being dragged outside, during which time Patient B regained partial consciousness and asked for her naloxone. She was handed the medication as she lay on the curb outside of the house. Patient B described her overdose symptoms as difficulty breathing and going in and out of consciousness, which intensified as minutes passed. She was fearful for her life and asked her companion, who had stayed with her as she was moved outside, to help her assemble the intranasal naloxone.

Over a 5 to 10 minute period and while struggling to remain conscious, Patient B assembled the first naloxone dose and self-administered the intranasal naloxone. The medication quickly ameliorated the opioid-induced respiratory depressive symptoms and several minutes later Patient B assembled and self-administered the second naloxone dose to treat the persistent overdose symptoms (i.e., partial consciousness, trouble breathing) she was experiencing. A short time after the second dose she felt stable, no longer high, and no longer fearful of death. Patient B has been sober for 3 months since the incident. She is cognizant of her risk and feels that overdose is certain if she relapses.

Patients A and B, both reported that the naloxone took effect very quickly. Both reported that they did not experience any withdrawal symptoms nor did they notice diminishing effects of the naloxone. No call to 911 was made and no other rescue steps (e.g., rescue breathing) were reported in either situation. In both overdose cases, their friend stayed with them after the reversal for at least 60 minutes.

Study staff had successfully reached the nominees of both patients to inform them of the study and offer training materials. Patient A's nominee, with whom he uses heroin, had been trained in person by study staff and also opted to obtain naloxone through PONI, a community based overdose prevention program in Providence. Patient B's nominee was informed of the study and received a website link to view the overdose prevention video.

Neither patient reported that they were with a nominee at the time of their overdose. While Patient A had trained his friend in naloxone administration, it is unknown whether Patient B's companion was trained or referred to PONI following the overdose event.

Discussion

To our knowledge, this is the first report of self administration of naloxone to prevent fatal overdose. Clearly the recent education and training of these two individuals, particularly about the high risk of overdose after release from incarceration and in how to use naloxone, was instrumental in having them self-administer naloxone. Furthermore, without the ready availability of naloxone, the outcomes could have been fatal. While these cases are unusual, they highlight the fact that people can be educated about the high risk of overdose. These individuals were highly concerned about overdosing, enough to act on that concern in the setting of a potential overdose. Training of people at risk of overdose, including inmates about to be released and people who actively use drugs, as well as the members of their social and drug use networks, on the signs of overdose and how to respond with naloxone is possible, effective, and cost-effective⁹⁻¹⁰.

While this case series demonstrates that self-administration of naloxone can be done, both participants initially required intervention of a bystander. The frequency of self-administration of naloxone among opioid users who are equipped with the rescue medication has not been systematically assessed. In most serious overdoses, it is unlikely that the victim will have the awareness of the diagnosis, nor the tools to act to prevent fatal overdose; therefore, self-administration should not be a goal of training. A safer, more reliable approach would be to prescribe naloxone to patients at risk and train and also equip

members of their household and social or drug using networks in overdose prevention and response, including encouraging calls to 911 in an overdose emergency. As others have also suggested¹¹, the well established model for prescribing epinephrine, training patients, caregivers, and other community lay responders (e.g., teachers, school bus drivers) in administration of the medication to treat allergy-induced anaphylactic shock can serve as a working clinical model.

Populations with criminal histories may be reluctant to involve 911 in an emergency, despite the presence of Good Samaritan laws designed to protect individuals who respond to an overdose¹², in states like Rhode Island. In the absence of emergency medical professional intervention, available naloxone and encouragement to train others around them are critical survival tools for people at high risk of overdose such as prisoners returning to the community. Explicit communication when training laypersons about naloxone around the correct, effective dose to administer should be emphasized (Table 1). Preferably, an auto-injector or nasal device could administer a fixed, effective dose to the victim; however, such a product is not currently available.

Defining the point at which an intoxication event becomes life-threatening is challenging. Self-reported “overdose” and other behaviors of drug users have long been questioned. One may doubt that what these two individuals experienced were, in fact, life-threatening intoxication events, rather than “heavy nods” associated with opioid use. In this instance, the naloxone may have been used unnecessarily. For several reasons, we reject this hypothesis. First, the two patients have long histories of opioid use, including prior overdose histories. Second, their participation in a research study meant that “overdose” was consistently defined in assessments and in the training intervention. Third, the consistency of the reported symptoms, including fear and sensations of overdosing, align with those from our prior work, showing that trained drug using peers can recognize when an overdose is occurring and when to administer naloxone as well as medical experts¹³. Fourth, research supports the validity and reliability of drug users' self reported behaviors such as overdose¹³⁻¹⁷.

It is important to note that the revived individuals reported no withdrawal symptoms with the naloxone administration. One reason may be due to the nasal delivery of naloxone, as absorption may lower by this route of administration¹⁸⁻¹⁹. Alternatively, it is possible that the lack of withdrawal symptoms in these patients was because they had not been using opioids regularly for a period long enough to develop the withdrawal syndrome. Typically, after prolonged abstinence from opioids, for even a few weeks or less, tolerance is rapidly lost. This situation puts individuals at increased risk for fatal overdose if they resume opioid use at levels used prior to their loss of tolerance. However, the withdrawal/abstinence syndrome, a substantial driver in ongoing opioid use by dependent individuals, is also lost. Such a finding has implications for the initiation of buprenorphine/naloxone in individuals who have been abstinent from opioids for more than a few days, such as people returning to society after incarceration. The initiation of buprenorphine is often challenging because people who are using opioids regularly are likely to experience precipitated withdrawal²⁰⁻²¹ if they have sufficient opioids in their system. However, for people who have recently

relapsed, if they have used opioids for only a short time, they may be less likely to experience precipitated withdrawal.

In conclusion, these cases illustrate the high risk of death by overdose that former prisoners face and highlight the opportunity for creative, self-protective behavior change presented by training and distributing naloxone prescribed at the time of release from incarceration.

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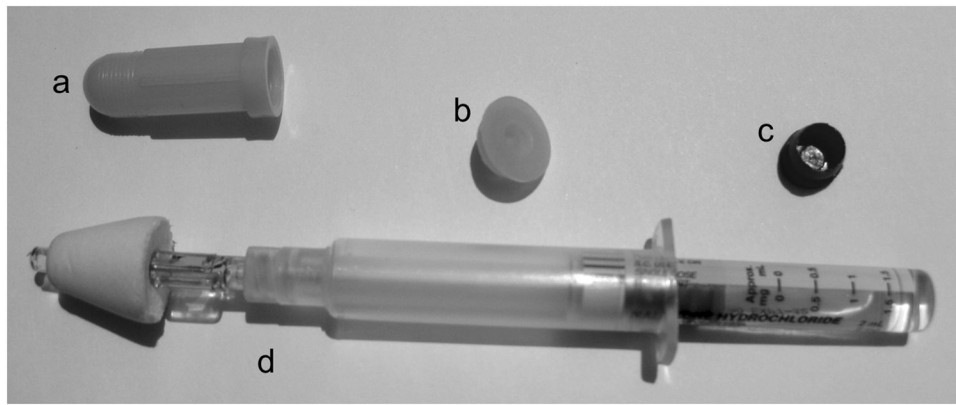


Figure 1. Intranasal Naloxone used in Project SOON, Providence, Rhode Island, USA, a=top cap of delivery device, b=bottom cap of delivery device, c=medication vial top, d= medication assembled in delivery device, with nasal adapter affixed

Table 1
Intranasal Naloxone Instruction

<p>Naloxone Prescription: At least 2 luer-lock prefilled syringes containing 2 mL of naloxone hydrochloride (1mg/mL) (NDC 0548-3369-00) and atomizer device(s) (e.g., MAD 300, www.lmana.com)</p>
<p>Naloxone administration instructions: To assemble the device and administer:</p> <ul style="list-style-type: none"> • remove all three caps • screw the atomizer device onto the (pointed) end of the adapter holding onto the atomizer's "wings" (see Figure 1) • gently screw the prefilled naloxone syringe into the open barrel of the adapter • 1 vial of naloxone should be given as a single dose, spray half in each nostril • re-administer if no response in 1-3 minutes or if overdose returns after initial dose wears off (may be 30-90 minutes later)
<p>Additional training: Other topics that are often included in a training:</p> <ul style="list-style-type: none"> • overdose prevention strategies • identifying an overdose • calling 911 • administering rescue breaths

More information on prescribing and dispensing naloxone, including patient information sheets, is available at: www.prescribeprevent.org