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Journal

BMJ, 326

Author

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Publication Date

2003-02-22

Peer reviewed

Strategies for preventing heroin overdose

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Making naloxone available in addicts' homes is one of several official or unofficial ways that are being tried out to reduce the rising toll of fatalities from heroin overdose.

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BMJ 2003;326:442-4

Dead addicts don't recover.

Anonymous

The recent "heroin epidemic" has led to a dramatic increase in the incidence of fatal and non-fatal heroin overdose in many countries.¹⁻³ Deaths from opioid overdose increased 55-fold in Australia between 1964 and 1997,⁴ and heroin overdose was the leading cause of death among men aged 25-54 in Portland, Oregon, in 1999.¹

In 1999, the Drug Abuse Warning Network recorded 4820 heroin related deaths in the United States, as well as 16 646 non-fatal cases of heroin overdose in patients presenting to emergency departments. Every year about 2% of people who inject heroin die, which is six to 20 times the rate expected in peer controls who do not use drugs.⁵ This epidemic of deaths among injecting heroin users has led many organisations to develop strategies other than simple abstinence to prevent this tragedy.^{6,7} Several underground and government programmes to this end have recently been implemented in several countries, but their effectiveness and community acceptance needs evaluation.

Epidemiology of heroin overdose

The epidemiology, clinical presentation, and pharmacology of fatal and non-fatal heroin overdoses have recently been reviewed.^{8,9} Most deaths occur among users of intravenous heroin in their late 20s or early 30s who have used heroin for 5-10 years and have definitely become dependent on it. Heroin related deaths occur at a steady rate and are not caused by sudden changes in the purity of heroin. Research from Australia has shown that most of these deaths occur in the company of other people, and that medical help is not sought or is sought too late.¹⁰ Instant death does not seem common, and in most fatal cases death is estimated to have occurred one to three hours after injection. Only a minority of heroin related deaths (17%) occur among new users. Other drugs, especially alcohol and benzodiazepines, are commonly involved in fatal cases.

The clinical epidemiology of non-fatal overdoses is quite similar.¹¹⁻¹³ Interviews with active injecting heroin users have shown that 23-33% have taken a non-fatal overdose in the past year, and 43% have

Summary points

Heroin overdose is a leading cause of morbidity and mortality among active injectors of heroin

Education, family support groups, motivational post-overdose interviews, and safe injecting rooms have been proposed as complementary strategies to reduce the incidence of heroin overdose

Methadone maintenance is the most effective proved method of reducing mortality from overdose

Home treatment with naloxone by an acquaintance is a controversial programme being tried out in a variety of locations, but research is needed to measure its effectiveness and safety

witnessed a heroin overdose in another user within the last year.⁸

Most (66%) of these events occurred in the home, and 85% occurred in the company of others. No ambulance was called at all on half these occasions, and in only 14% was calling an ambulance the first response to a peer's overdose. The death rate in heroin overdoses managed at home is 10%.

A recent period of abstinence may lead to a reduction in tolerance and has been shown to be a time of particular risk. Addicts have seven times the risk of death from an overdose during the first two weeks after their release from residential treatment.⁸ Two recent intriguing studies examined the morphine content of the hair of people who had died from an overdose; this measures the average use of heroin use over the last few weeks.^{14,15} Levels of morphine in their hair were much closer to those in a control group of abstinent peers than to those of regular users.

Methadone maintenance

Maintenance of addicts on methadone reduces the incidence of fatal and non-fatal heroin overdoses.^{5,13,16}

A small trial in opiate addicts randomised to methadone maintenance or to no treatment showed a marked reduction in mortality in the methadone group.¹⁷ Several other cohort studies have shown a similar effect.¹⁸⁻²¹ In a meta-analysis of these studies, methadone maintenance reduced heroin addicts' risk of death by 75% (risk ratio 0.25, 95% confidence interval 0.19 to 0.33).¹⁶ This reduction in mortality was almost entirely due to a decrease in deaths due to accidental overdose. Methadone detoxification programmes do not decrease mortality and actually increase the risk of heroin overdose.¹³

Anecdotal reports of French experience with the introduction of community based buprenorphine treatment indicate that this has also caused a large decrease in deaths from heroin overdose.²² Plans for the expansion of opiate substitution programmes for injecting users of heroin should be evaluated for their effect on mortality from overdose.

Naloxone treatment at home

The distribution of naloxone for administration in addicts' homes by their peers is a novel approach to reducing deaths from heroin overdose that has been discussed and piloted in recent years,^{6 7 23-26} but so far there is no documentary evidence of its effectiveness. Naloxone is a specific opiate antagonist with no agonist properties and no euphoriant potential.²⁷ It is an inexpensive, non-scheduled drug that readily reverses the respiratory depression and sedation caused by heroin and has been shown to be very effective in treating acute overdose.

Overdoses commonly occur in the user's home and in the company of others. Immediate death is rare, and because injecting users are—and likely to continue to be—reluctant to call the emergency services, there is a valuable opportunity for intervention.²⁸ Naloxone has been sold over the counter in Italy for more than 10 years and has been distributed through needle exchange programmes since 1995.²⁹ There is a preliminary report on two home naloxone programmes, one in Germany and one in England.³⁰ New Mexico recently adopted legislation allowing the distribution of home naloxone as well as expanding the categories of public safety personnel allowed to use it, and doctors in northern New Mexico have already begun to distribute it with state sanction. The Chicago Recovery Alliance has provided 550 drug users with naloxone and training in resuscitation in the past few years and has recorded 52 successful resuscitations.³¹

Any programme for home distribution of naloxone should make several educational points. How to recognise a patient with a heroin overdose needs to be agreed. The criteria most commonly taught are that the person cannot be roused, or is showing signs of inadequate ventilation (blue lips and decreased or absent breathing). Rescue breathing should be taught because respiratory support will be required until adequate breathing resumes. The importance of contacting emergency medical services and the need for hospital evaluation after an overdose must be emphasised because of the complications that can arise.

Methods of administration

Intramuscular or subcutaneous administration of naloxone probably has considerable advantages because of the limited skill required. A recent prehospital study reported that 0.4 mg of naloxone intravenously and 0.8 mg subcutaneously yield similar results.³² The intramuscular route, however, may give rise to fewer withdrawal symptoms than the intravenous route.³³

Other routes, such as the intranasal, and devices such as prefilled auto-injectable syringes should be studied to improve the ease of administration. The general recommendation is for an initial intramuscular or subcutaneous dose of 0.4 mg of naloxone, followed by 1-2 mg if no response occurs in three to five minutes. But initial doses of 1-2 mg are commonly used and it is not clear whether these have any advantages or any effect on the otherwise low complication rate.

In most countries, naloxone is available only by prescription, but there is considerable precedent for allowing doctors to provide patients or their families with other injectable preparations. It is reasonable to assume that it would similarly be legitimate to supply naloxone, an unscheduled drug, with instructions for use and appropriate record keeping.³⁴

Complications

Naloxone treatment of heroin overdose is associated with a small but consistent rate of complications such as seizures, arrhythmias, and severe agitation. A prospective study of its adverse effects when given in emergency departments has shown that 1.6% of patients developed severe complications, including asystole (1 patient), seizures (3), pulmonary oedema (1), and violent behaviour (1).³⁵ Any trial of giving naloxone at home should monitor these complications, and any risk analysis should compare actual and expected mortality in this population.

The half life of naloxone is shorter than that of heroin and there is a concern that sedation and respiratory depression may recur. Clinical experience has shown that moderate sedation occurs after 20-30 minutes but that dangerous hypoventilation is rare.^{32 33 36} It would generally be prudent, if providing naloxone for use at home, to give at least enough for two doses and to give training in resuscitation.

Other concerns

There are various other concerns about the use of naloxone in overdose of heroin accompanied by other drugs, especially cocaine or methamphetamine²⁶; about the likelihood that peers giving naloxone may be intoxicated²⁸; that an ambulance will not be called when an overdose seems to have been successfully treated³⁰; and about the long term stability of naloxone in the home environment.²⁶

It could be argued that distributing naloxone may be construed as implicitly condoning the use of heroin. Providing naloxone at home could make it seem safer to take heroin and therefore encourage people to start taking it.²⁶ All of these concerns should be evaluated in any research programme.

Another worry is that distributing naloxone may encourage the use of higher doses of heroin because the means of rapidly treating any overdose are at hand. When a sample of active injecting heroin users in Aus-

tralia was questioned on this point, the majority said that this would not be a problem because the effects of naloxone are so unpleasant.²⁵ The majority of another sample of users, in England, also did not see this as a problem, but 6% of them felt that it was.³⁷ Other Australian workers, however, do think that users may abuse naloxone, not as a euphoriant itself but to increase their tolerance of larger doses of heroin and so increase euphoria.²⁶

There may be some reluctance on the part of active users to administer naloxone to friends or acquaintances because of the universally detested withdrawal reaction that accompanies its use. Panicky use of unsterile needles may transmit HIV, hepatitis C, or other infections.³⁸

Other strategies for prevention of overdose

Education of drug users, formation of family support groups, and supervised injecting rooms have all been tried as strategies to decrease the incidence of heroin overdose. Because many myths about treatment of overdose circulate among drug users, it is hoped that appropriate education, especially in rescue breathing, will be effective. Family support groups may help families isolated by the stigma of a drug related death and may be able to advocate improved treatment options. Family Drug Support in Australia and the Starfish Foundation in the United States are examples of this type of organisation. Supervised injecting facilities—initially designed to reduce the nuisance and hazards associated with injection in public areas—have been established in about a dozen European cities for over a decade and more recently in Australia.^{39 40} They also provide sterile syringes and needles, as well as management of overdoses by medical personnel when necessary. No overdose deaths have occurred among hundreds of thousands of Swiss and German supervised injections. None of these various interventions has been evaluated for effectiveness, however.

Conclusion

Heroin overdose has become a common and preventable cause of death in recent years. Some combination of increasing treatment with opiate substitutes, community peer education, family support groups, supervised injecting facilities, and making naloxone available at home may be needed to have any practical effect on mortality from overdose. A number of pilot programmes involving education of users and distribution of naloxone have begun; their effects on mortality, on complications of use of naloxone, and on patterns of consumption of heroin by established users and by novices, should be carefully studied.

Contributors: KS is the sole contributor of this article.

Funding: None.

Competing interests: None declared.

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(Accepted 21 October 2002)