Heroin intoxication in a dog

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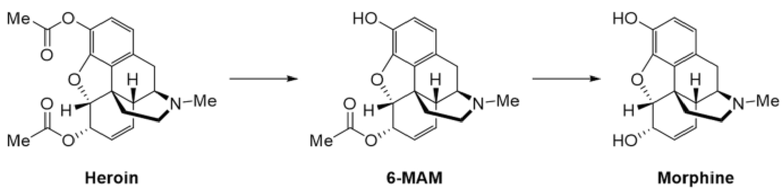

Figure 1: The metabolic pathway of heroin to morphine[1].

Background

The opioid crisis continues[2]and it is not an exclusively human problem. Reports of accidental opioid intoxication in dogs were determined to be higher in areas of higher opioid prescription[3]. The lethal heroin dose for dogs is reported to be 25 mg/kg[4]. This report describes the successful treatment of 40 mg/kg heroin intoxication in a dog and outlines insights in opioid intoxication.

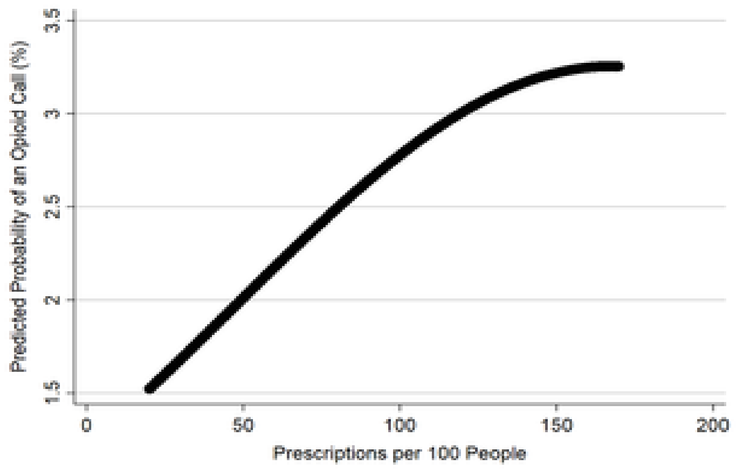

Fig 2. Predicted probability of opioid poisoning calls to the ASPCA poison control hotline plotted against county-level prescription rate (2006–2014)[2]

Case Presentation

An 11-month-old, intact male boxer cross was presented having become unconscious shortly after it consumed 1g of powdered heroin. On physical examination the dog was comatose and laterally recumbent. There was bilateral pupillary miosis and marked ptyalism. The heart-rate was 60 bpm and respiratory-rate was 20 bpm. The dog was normothermic (37.4 °C) and normotensive (163/103 (123) mmHg) with a 96% SpO2.

Treatment

Intravenous naloxone (0.02 mg/kg) quickly (<1 min) reversed clinical signs. The owners were unable to afford hospitalization. They purchased naloxone which they were instructed to administer intranasally (IN) should signs of toxicity recur. The animal was discharged against medical advice (AMA) with no rebound opioid toxicity signs reported at 2-month follow-up.

Clinical Relevance

The classic toxidrome of opioid intoxication consists of respiratory and central nervous system depression and pupillary miosis[5]. Many substances (ethanol, antipsychotics, etc.) cause miosis and coma, without respiratory depression[5].

Heroin is commonly mixed with other drugs, such as the increasingly consumed fentanyl[2]. Delayed gastric emptying, enzyme saturation and the resulting zero-order elimination cause oral opioid intoxications to be unpredictable. The different pharmacokinetics of various opioid agents are rarely relevant in the event of oral overdose[5]. Therefore, the management of opioid intoxication, regardless of which opioid is involved, is founded on naloxone administration and respiratory support if necessary.

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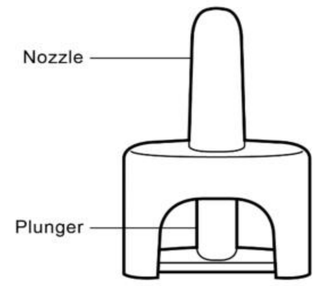

Figure 3: Pre-made IN naloxone devices. Injectable naloxone can be effective with unpredictable pharmacokinetics[7].

Clinical Relevance (continued)

Naloxone is a safe drug and should be given if opioid intoxication is ever suspected. If clinical signs do not improve, opioid intoxication is unlikely. It is effective when given IN[6]. Atomized formulas are ideal, but the injectable formula is effective IN with less predictable results[7]. A suggested IN dose is 2-4 mg/25 kg[8]. If unavailable, butorphanol at 0.4 mg/kg may be useful[9]. The short duration of intravenous naloxone (90 minutes) in relation to the opioids involved in overdose means rebound opioid toxicities occur[10]. Large-scale human studies suggest a low risk in discharging a heroin intoxication patient AMA 1 hour post reversal, provided the patient has normal vital parameters and is neurologically appropriate[11].

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