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Adult Naloxone Administration Protocol

Samuel S Adhikari

Executive Summary

Introduction of the Problem

Opioids are among the most exploited prescription medications in the US and sales, as well as deaths due to overdose have increased significantly (Kolinsky, Keim, Cohn, Schwarz, & Yealy, 2016; Centers for Disease Control and Prevention (CDC), 2011). A tertiary care facility in central Illinois noticed an unusual increase in inpatient opioid adverse events. In one instance an opioid-dependent postsurgical patient experienced opioid overdose and was reversed using a higher than ~~the~~ necessary dose of naloxone. The patient subsequently went into acute opioid withdrawal syndrome and required intubation with a prolonged intensive care unit stay. A protocol encouraging cautious titration of naloxone could potentially decrease, if not entirely avoid similar mishaps.

Literature Review

Opioids are a class of medications that contain a form of opium or morphine-like ligands (Nagelhout, 2014). Physiologically, opioids can relieve severe pain with excellent efficiency. However, these drugs also cause respiratory depression, sedation, and facilitate tolerance and addiction (Lalley, 2008; Schumacher et al., 2008; & Whistler, 2012).

Yokell and colleagues (2014) reported 135,971 opioid overdoses related emergency department (ED) visits in 2010, 275 died in the ED, and 1,589 died in the hospital. Between 2000 and 2011, 2.9 million people visited ED due to opioid abuse, dependence, or overdose, and 11% of these visits required naloxone administration (Frank, Levy, Calcaterra, Hoppe, & Binswanger, 2016). Yokell and authors and Frank and authors highlighted the increase in ED

visits due to opioid overdose, but the problem has also spilled over within the inpatient population.

Herzig, Rothberg, Cheung, Ngo, and Marcantonio (2014) reported 576,373 (51%) of non-surgical inpatients in 286 U.S. hospitals received some form of opioid medications. And 72,670 (13%) of them received three or more different opioids during their stay between July 1, 2009, and June 30, 2010. The average daily dose of opioid received by a patient was equivalent to 68 mg of morphine, and 23% of the opioid-exposed patients received at least 100 mg morphine equivalent. Cauley and authors (2016) reported 9,458 patients in the U.S., who had undergone elective surgical procedures, overdosed in the postoperative period between 2002 and 2011.

Naloxone (Narcan®), a derivative of oxymorphone, is a non-selective competitive antagonist of all opioid receptors (Ogura & Egan, 2013). Naloxone has been successfully utilized in the emergency departments across the nation to reverse the respiratory depression caused by opioid overdose (Drainoni et al., 2016; Ogura & Egan, 2013). Naloxone could completely reverse all opioid effects, including analgesic properties, leading to intense pain and patient distress (Simmonds & Jamieson, 2015). The authors noted that opioid-dependent patients might even experience activation of the sympathetic nervous system due to acute withdrawal referred to as opioid withdrawal syndrome. Opioid withdrawal syndrome is a complex physiological phenomenon that occurs when an opioid-dependent person stops taking opioids abruptly or receives an opioid antagonist and could lead to sympathetic nervous system hyperactivity, as well as pulmonary edema and subsequent hypoxemia (Flood, Rathmell, & Shafer, 2015). Therefore, a step-by-step guide on appropriate administration of naloxone could help prevent opioid withdrawal syndrome.

Naloxone administration guidelines.

Simmonds and Jamieson (2015) and Nicholls, Taylor, and Marshall (2016) implemented naloxone guideline for use in adults suffering from respiratory depression and apnea due to opioid overdose in England's National Health Service hospitals and the Royal Cornwall hospitals, respectively. St. Joseph Health in Laguna Beach, California and University of Pittsburgh Medical Center-Presbyterian have similar protocols in the reversal of opioid-induced respiratory embarrassments (St Joseph Health, 2012 & University of Pittsburgh Medical Center-Presbyterian, 1999).

All protocols emphasized recognition and diagnosis of opioid overdose as the most crucial step. The chief symptoms of opioid overdose include somnolence, respiratory rate less than eight per minute, and pinpoint pupils. When a patient presents with opioid overdose symptoms airway management and securement, adequate oxygenation, hemodynamic support, and close monitoring to preserve physiological processes become vital in preventing potentially tragic outcomes. Due appreciation for the pharmacokinetics and pharmacodynamics of naloxone, particularly the elimination half-life, is essential.

Methodology

This project was a non-experimental. The summative purpose of the project was to research, design, and introduce a protocol to guide healthcare providers to administer the appropriate dose of naloxone by developing a step-wise protocol. The protocol needed to incorporate the pre-existing Pasero opioid sedation scale (POSS) scale already in use at the tertiary care center. On July 5th, 2017, a 30-minute PowerPoint presentation of the literature review and the developed protocol was unveiled to a 10-member group from the anesthesia, pharmacy, and ICU departments at the referenced facility. The attendees filled out a seven-question Likert scale

survey. The survey responses were analyzed to review the efficacy of the presentation and its content.

IRB approval

The project was deemed IRB exempt by the Institutional Review Board at Southern Illinois University Edwardsville and approval was obtained from the Hospital Research Review Committee before the presentation and implementation of the protocol.

Evaluation

Even though the opioid epidemic has become a standard knowledge, finding credible data on the vastness of its effect proved to be more challenging than expected. There are sparse data on inpatient opioid overdose, and most of the outpatient data is related to ED visits only. Obtaining enough data to support the necessity for a protocol was arduous. Secondly, there is scarce information available on existing hospital protocols for naloxone administration. Since the tertiary care facility had already implemented the POSS scale, incorporating it within the protocol required not only learning about POSS but also identifying ways to create a bridge between POSS and the protocol. Obtaining approval from the department of pharmacy on the naloxone dosage, as well as the protocol, required multiple communications. Eventually, after numerous email exchanges, telephone calls, and discussion, and several revisions to satisfy the project goal, as well as the needs of the facility, the protocol was completed and presented. Based on the post-presentation survey, all of the respondents agreed or strongly agreed that opioid overdose in a hospital setting poses a financial, as well as a resource burden, and the hospital should adopt the presented adult naloxone administration protocol.

Impact on Practice

The adult naloxone administration protocol could be immediately adopted to help reduce the adverse effects of opioid overdose. The project provided an opportunity for the hospital staff to enhance their knowledge on the opioid epidemic, as well as mortality and morbidity associated with the epidemic. The major weakness of the project is the non-experimental, nonrandomized project design. The efficacy of the protocol is based on literature review and stakeholder feedback rather than direct experiment on patients. A follow-up quality improvement study after the implementation of the protocol is recommended to evaluate the protocol's efficacy, and the findings should be incorporated to modify the protocol as necessary.

Conclusions

Opioids remain the primary choice for treatment of moderate to severe pain, but carry the potential for adverse effects, such as overdose. Naloxone, an opioid antagonist, has a remarkable safety profile; however, the drug also has the potential for a significant physiological response especially when administered to patients with a history of opioid dependence. Treatment with naloxone for opioid overdose must have clear and objective endpoints. This adult naloxone protocol was an evidence-based strategy in congruence with similar existing treatment guidelines. The protocol incorporated the existing opioid sedation scale, POSS, and precise objective endpoints to guide providers during the treatment of opioid overdose at the host facility.

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