

# Atrial Fibrillation after Naloxone Administration: A Rare Complication of Opioid Reversal

Maricel Dela Cruz<sup>1\*</sup>, Jay Slutsky<sup>2</sup>, Megan Gillespie<sup>1</sup> and Robert Danoff<sup>1</sup>

<sup>1</sup>Department of Family Medicine and Emergency Medicine Resident, Aria Jefferson Health, Pennsylvania, USA

<sup>2</sup>Department of Emergency Medicine Attending, Aria Jefferson Health, Pennsylvania, USA

## Abstract

Naloxone is a widely used antidote that is critical in reversing the lethal effects of central nervous system and respiratory depression after opioid overdose. Healthcare providers, as well as emergency first responders across the United States, are seeing a significant number of patients afflicted by the country-wide opioid epidemic, resulting in a dramatic increase in the use of this potentially life-saving treatment. That being said, it is important to be aware of the potential adverse effects Naloxone may have, including the triggering of acute opioid withdrawal. As an example of this concern, we present a 25-year-old male with no significant cardiac history who developed atrial fibrillation after the administration of naloxone by healthcare personnel for acute opioid overdose. This case emphasizes the importance of closely monitoring patients after naloxone administration for opioid overdose due to the possible effects of triggering acute opioid withdrawal.

**Keywords:** Atrial Fibrillation; Naloxone; Opioid; Opioid Withdrawal

**\*Corresponding author:** Maricel Dela Cruz, Department of Family Medicine and Emergency Medicine Resident, Aria Jefferson Health, Pennsylvania, USA, Tel: +1 7073197829; E-mail: mariceldc@sbcglobal.net

**Received Date:** July 14, 2017

**Accepted Date:** September 22, 2017

**Published Date:** September 28, 2017

**Citation:** Cruz MD, Slutsky J, Gillespie M, Danoff R (2017) Atrial Fibrillation after Naloxone Administration: A Rare Complication of Opioid Reversal. J Emerg Med Trauma Surg Care 1: 005.

Approximately 60 seconds after naloxone administration, the patient became responsive. He admitted to insufflating heroin and denied any other drug or alcohol use. He was monitored with cardiac telemetry and capnography. After five minutes, the patient experienced tachycardia at 120 beats per minute (bpm) and a subsequent 12-lead Electrocardiogram (ECG) revealed atrial fibrillation with rapid ventricular response. The patient was otherwise asymptomatic and was admitted for continued cardiac monitoring along with IV fluids and symptomatic care. Laboratory results were unremarkable and included a negative alcohol level, normal complete blood count with differential, normal basic metabolic panel, a magnesium level of 2.0 (normal 1.8-2.4 mg/dL), and Thyroid Stimulating Hormone (TSH) level of 2.60 (normal 0.36-3.74 uIU/mL).

Cardiology was consulted and the patient was hospitalized for twenty-three-hour telemetry observation. The initial plan was to administer full dose aspirin while deciding on subsequent care based upon the patient's risk factors for stroke and other sequelae associated with atrial fibrillation. Upon disposition to the observation unit, the patient's heart rate was down to 80 bpm, and within three hours of cardiac monitoring, spontaneously converted to normal sinus rhythm. The patient's echocardiogram was without structural abnormalities, and troponins resulted as < 0.02 (normal < 0.05 ng/mL) every six hours for 18 hours. Additional investigation into the patient's medical history revealed a hospital visit two years prior to this episode for an unrelated accident with record of an ECG displaying normal sinus rhythm with no other interval abnormalities. Once the patient was deemed medically cleared, he was discharged without cardiac medications or anticoagulation, counseled on his illicit drug use, and scheduled to follow-up with cardiology as an outpatient.

## Background

Naloxone is a frequently used antidote critical in reversing the lethal effects of Central Nervous System (CNS) and respiratory depression after opioid overdose. Particularly in the United States, where healthcare professionals are combating a country-wide opioid epidemic, the use of Naloxone has increased significantly [1]. Though usually benign with recommended use, it is important to be aware of the possible adverse effects of this life-saving drug, such as the risk of precipitating acute opiate withdrawal syndrome which can lead to detrimental cardiac dysrhythmias and hypertensive crisis [1-3].

## Case Report

A 25-year-old male with a history of heroin abuse and no further significant past medical history was brought in by ambulance after being found down and unresponsive in a parking lot. Pre-hospital personnel administered 2 milligrams (mg) of Intramuscular (IM) Naloxone to the patient with minimal response and provided oxygen to the patient with immediate transport to the nearest emergency department, which was less than minutes away. Upon arrival, the patient had agonal breathing and appeared cyanotic. The patient was immediately oxygenated with bag valve mask and was administered 0.4 mg of IV Naloxone once Intravenous (IV) access was obtained. The patient had an initial blood pressure of 102/76 mmHg while maintaining an oxygenation saturation of 100% during bagging with 15 liters of supplemental oxygen.

## Case Discussion

Naloxone is an antagonist that reverses the sedating effects of opiate overdose. In our patient, reversal of heroin likely led to an increase in sympathetic response, elevated catecholamine level, and precipitation of atrial fibrillation. Shortly after the onset of atrial fibrillation with a rapid ventricular rate, the patient was administered IV fluids and full dose aspirin. Before rate-controlling medications were given, the patient's heart rate normalized to less than 100 bpm and soon thereafter, he spontaneously returned to normal sinus rhythm.

Though rare, side effects of naloxone do occur; these include a relapse into CNS and respiratory depression due to its 30-60 minutes of short duration, pulmonary edema, and precipitation of opiate withdrawal syndrome [1,4]. In particular, cardiac arrhythmias such as ventricular tachycardia have been demonstrated in human as well as animal studies [5-7]. Our patient experienced atrial fibrillation and a dysrhythmia associated with increased adrenergic tone.

## Conclusion

This case report serves as a reminder to actively monitor patients after the administration of naloxone for opiate withdrawal syndrome and cardiac dysrhythmias. Naloxone use for opioid overdose is widespread, and is witnessed by many emergency department physicians. It is necessary to understand the possible adverse reactions and effects that may occur after administration, including awareness and preparation by the managing physician for a potential sympathetic surge [8,9]. Our case presentation demonstrated the rare, but real complication of atrial fibrillation after opioid reversal with naloxone. The

patient successfully recovered after attentive monitoring and supportive care.

## References

1. Kim HK, Nelson LS (2015) Reducing the harm of opioid overdose with the safe use of naloxone: a pharmacologic review. *Expert Opin Drug Saf* 14: 1137-1146.
2. Andree RA (1980) Sudden Death Following Naloxone Administration. *Anesthesia & Analgesia* 59: 782-784.
3. Cuss FM, Colaco CB, Baron JH (1984) Cardiac Arrest After Reversal Of Effects Of Opiates With Naloxone. *BMJ* 288: 363-364.
4. del Arco C, Martín A, Laguna P, Gargantilla P; Investigators in the Spanish Atrial Fibrillation in Emergency Medicine Study Group (GEFAUR) (2005) Analysis Of Current Management Of Atrial Fibrillation In The Acute Setting: GEFAUR-1 Study. *Ann Emerg Med* 46: 424-430.
5. Michaelis LL, Hickey PR, Clark TA, Dixon WM (1974) Ventricular irritability associated with the use of naloxone hydrochloride. Two case reports and laboratory assessment of the effect of the drug on cardiac excitability. *Ann Thorac Surg* 18: 608-614.
6. Kugasia IR, Shabarek N (2014) Opiate Withdrawal Complicated By Tetany and Cardiac Arrest. *Case Reports in Critical Care* 2014: 1-4.
7. Lameijer H, Azizi N, Ligtenberg JJM, Maaten JCT (2014) Ventricular Tachycardia after Naloxone Administration: A Drug Related Complication? *Case Report and Literature Review. Drug Safety - Case Reports* 1: 2.
8. Congeni A, Alex F, Andrew K (2015) The Case Files: serious and unusual reaction to naloxone administration. *Emergency Medicine News* 37: 1.
9. Azar I, Turndorf H (1979) Severe Hypertension and Multiple Atrial Premature Contractions Following Naloxone Administration. *Anesth Analg* 58: 524-525.