Addiction & Health

https://ahj.kmu.ac.ir
doi:10.34172/ahj.1629
Addict Health 2026;18:1629

Case Report

Acute Respiratory Distress Syndrome in a 28-Year-Old Male Subsequent to Inappropriate Naloxone Administration

Foroozan Faress[1], Zeynab Nasri Nasrabadi[2], Motahare Aghajani Delavar[2], Kurosh Jodaki[3], Sayed Mahdi Marashi[1*]

[1]Department of Forensic Medicine, School of Medicine, Iran University of Medical Sciences, Tehran, Iran
[2]Department of pediatrics, School of Medicine, Iran University of Medical Sciences, Aliasghar Children Hospital, Tehran, Iran
[3]School of Nursing and Midwifery, Shohadaye Haft-e Tir Hospital, Iran University of Medical Sciences, Tehran, Iran

***Corresponding Author:** Sayed Mahdi Marashi, Email: marashi.mh@iums.ac.ir

Abstract

Tramadol, a centrally-acting analgesic, is widely used for the management of moderate to severe pain. It is preferred in clinical settings due to its superior effectiveness and safety profile compared to other opioids. However, recent research has indicated a potential risk of tramadol-induced seizures, especially when consumed in high dosages or in combination with other substances. We present a case of a 28-year-old male who was brought to the Emergency Department approximately 30 minutes after administering 0.4 mg of naloxone intravenously by Emergency Medical Services (EMS) personnel. The administration was necessitated by a decline in the patient's level of consciousness, the onset of lip cyanosis, and suspected tramadol poisoning. The patient was intubated on-site before being transported to the Emergency Department. Upon arrival, despite receiving 40% FiO2, his O2 saturation was at 88%. Bibasilar crackles were detected during chest auscultation. A CT scan of his chest revealed the presence of bilateral alveolar infiltrates, primarily in the lower lobes. As a result, the patient was diagnosed with acute respiratory distress syndrome and was transferred to the intensive care unit for further care.

Keywords: Tramadol, Poisoning, Naloxone, Respiratory insufficiency

Citation: Faress F, Nasri Nasrabadi Z, Aghajani Delavar M, Jodaki K, Marashi SM. Acute respiratory distress syndrome in a 28-year-old male subsequent to inappropriate naloxone administration. Addict Health 2026;18:1629. doi:10.34172/ahj.1629

Received: November 3, 2024, **Revised:** October 27, 2025, **Accepted:** November 1, 2025, **ePublished:** June 6, 2026

Introduction

Tramadol, a centrally-acting opioid analgesic, is commonly administered for the relief of moderate to severe pain. Tramadol's analgesic action is primarily due to its inhibition of monoamine (norepinephrine, 5-hydroxytryptamine) reuptake, as it has a relatively low affinity for μ-opiate receptors.[1] The current body of evidence affirms the effectiveness and safety of tramadol. However, there is a growing body of evidence that points to its potential adverse effects and fatal complications, even in the absence of drug interactions. The most frequently reported adverse effects include central nervous system depression, seizures, dizziness, agitation, headaches, nausea, vomiting, tachycardia, hypertension, itching, pruritus and rash and skin eruptions.[2] Currently, there is no scientific evidence to suggest that tramadol has a direct impact on the lungs. However, there has been a single case report of acute respiratory distress syndrome (ARDS) and pulmonary edema potentially associated with tramadol use.[3]

Here, we discuss an instance where tramadol-induced seizures led to apnea and central cyanosis. These conditions were managed with the administration of naloxone. However, following this treatment, the patient developed acute respiratory distress syndrome; the objective was to raise awareness about this particular condition as a potentially overlooked consequence following the administration of naloxone.

Case presentation

A male individual, aged 28 years, was admitted to the Emergency Department approximately 30 minutes after administering 0.4 mg of naloxone intravenously by Emergency Medical Services (EMS) personnel. This intervention was necessitated by a decrease in the patient's level of consciousness, the presence of cyanosis on his lips, and a suspicion of tramadol poisoning. The patient was intubated on-site before being transported to the Emergency Department. He has a known history of tramadol and alcohol misuse. However, according to the information provided by his brother, he has been abstinent for the past two months. His medical history, as well as his family history, did not indicate the presence of any diseases. Over the past two months the patient had experienced no illnesses and was in good physical health.

Upon arrival, the patient was conscious, despite having an endotracheal tube in place. His vital signs were as follows: blood pressure = 95/40 mmHg, heart rate = 119 beats per minute, and oxygen saturation at 88% while receiving

40% fraction of inspired oxygen (FiO_2). Auscultation of the chest revealed bibasilar crackles.

Laboratory tests and arterial blood gas analysis showed: white blood cell count = 18 × 10^9/l, hemoglobin = 14.6 g/dl, platelets = 377 × 10^9/l, blood sugar = 244 mg/dl, pH 7.043, pCO_2 = 56.2 mmHg, bicarbonate (HCO3-) = 15.4 mmol/l, and partial pressure of oxygen (PaO_2) = 55 mmHg (PaO_2/FiO_2 = 137.5 mmHg). A computed tomography (CT) scan of the chest was performed, which revealed bilateral alveolar infiltrates, predominantly in the lower lobes (Figure 1).

The patient was administered midazolam for sedation, and subsequently, transferred to the Intensive Care Unit (ICU). Here, he was placed on lung protective ventilation, which involved the use of high positive end-expiratory pressure (PEEP) and low tidal volume (VT). This intervention led to an improvement in his oxygen saturation levels. In consultation with an infectious disease specialist, empiric antibiotic therapy was initiated, comprising cefepime and clindamycin. However, in subsequent assessment, the microbial culture of the patient's pulmonary secretions yielded no positive results. Furthermore, there was no prior history of cardiac problems, and the patient had a normal cardiac examination and electrocardiogram. Four days later, the patient's lung function returned to normal, and he was successfully extubated. The following day, he was transitioned from the ICU to a general ward. After a consultation with a psychiatrist, he was deemed ready for discharge.

Discussion

Acute respiratory distress syndrome (ARDS) is a descriptive term for severe impairment in diffusing capacity of the lungs in association with clinical findings of hypoxemia, crackles on chest auscultation, and bilateral infiltrates on imaging without any evidence of heart failure.[4] There are many causes of ARDS, including exposure to toxins, severe trauma, cardiogenic edema, aspiration of gastric contents, and sepsis.[5] Both opioid overdose and opioid antagonist administration have been reported to be the cause of acute pulmonary abnormalities. Several theories are presented regarding the mechanism of opioid or opioid antagonist-associated ARDS.[6]

The metabolite of Tramadol, known as O-desmethyl-tramadol, exhibits a strong binding affinity towards μ-receptors.[1] It is primarily responsible for opioid-induced respiratory depression.[7] Moreover, relaxation of the laryngeal muscles in the setting of opioid poisoning may interfere with normal inspiration.[6] While respiratory depression is a concern with the misuse of tramadol, it is not the primary issue; in fact, seizures pose a more significant problem in cases of tramadol misuse.[1,2]

It appears that the observed decrease in the patient's level of consciousness and the cyanosis of his lips could be more reasonably attributed to a seizure. It might not have been the best course of action to immediately administer naloxone to this patient who is suspected of misusing tramadol. The initial step should have been to secure the patient's airway. Following the preliminary assessment, if apnea or respiratory depression was observed, intubation of the patient would be the appropriate course of action.

During EMS assessment, the patient did not vomit. After naloxone administration, vomiting remained absent, and the patient was intubated by the EMS prior to transport. There was no prior cardiac history, and the patient had a normal cardiac examination and electrocardiogram. Microbial culture of pulmonary secretions was negative; however, empiric antibiotic therapy was started before culture results were available. Taken together, these factors diminish the diagnostic weight of other differential diagnoses for ARDS in this patient.

Post-administration of naloxone, the onset of opioid withdrawal can trigger a significant sympathetic response from the central nervous system and the release of catecholamines.[8] This can lead to the development of pulmonary edema due to the immediate impact on myocardial cells. Additionally, naloxone administration activates the respiratory center, increasing ventilation. However, if the performance of the upper airway muscles is compromised due to the action of opioid receptors, it could lead to an attempt to inhale against a closed glottis. This can create a high negative intrathoracic pressure and a pressure gradient across the alveoli, leading to fluid filtration into the alveolar space.[6,9]

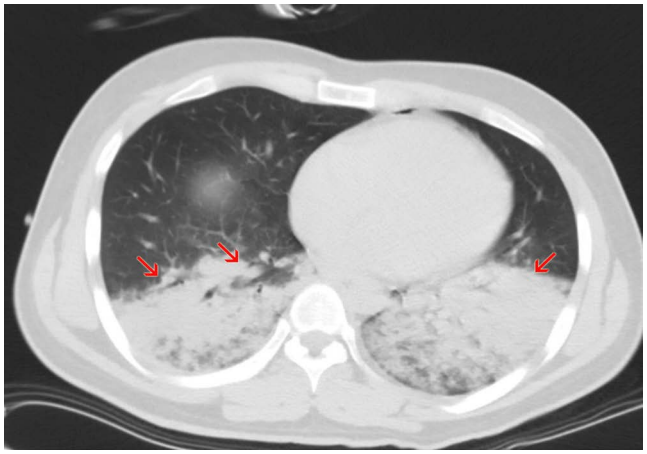

Figure 1. Chest computed tomography (CT) scan showing bilateral alveolar infiltrates in the lower lobes

Bilateral alveolar infiltrates, with normal cardiac size suggestive for ARDS was seen on the chest CT scan of our patient. The severity of ARDS is determined by the PaO_2/FiO_2 ratio.[5] In our case, this ratio was found to be 137.5 mmHg, which supports the diagnosis of moderate ARDS.

Management is supportive and includes providing lung protective ventilation with high positive end-expiratory pressure (PEEP) and low tidal volume (VT) to avoid airway collapse and improve gas exchange.[4,5] Since aspiration of gastric contents and pulmonary infection is one of the important differential diagnoses of ARDS, empiric antibiotic therapy seems rational.[10]

Conclusion

In conclusion, ARDS, a condition characterized by acute onset hypoxic respiratory failure and new bilateral pulmonary infiltrates, is one of the most common reasons for admission to the Intensive Care Unit, particularly in the absence of cardiac failure. The prompt diagnosis and treatment of this condition are vital to reduce the high mortality rate associated with it. We have chronicled a case involving a patient with ARDS, which is likely due to the improper administration of naloxone. The patient's recovery was not delayed, thus eliminating the need for prolonged mechanical ventilation. The aim of this case report was to emphasize the importance of prudence when contemplating the use of naloxone for reduced consciousness levels, especially when there are no clinical signs of respiratory depression resulting from opioid poisoning.

Authors' Contribution

Conceptualization: Zeynab Nasri Nasrabadi, Sayed Mahdi Marashi.
Data Curation: Foroozan Faress.
Formal Analysis: Kurosh Jodaki, Motahare Aghajani Delavar.
Investigation: Sayed Mahdi Marashi, Foroozan Faress.
Methodology: Sayed Mahdi Marashi.
Project Administration: Zeynab Nasri Nasrabadi.
Resources: Sayed Mahdi Marashi.
Software: Sayed Mahdi Marashi.
Supervision: Sayed Mahdi Marashi, Foroozan Faress.
Validation: Sayed Mahdi Marashi, Foroozan Faress, Motahare Aghajani Delavar.
Visualization: Motahare Aghajani Delavar.
Writing–Original Draft: Zeynab Nasri Nasrabadi, Sayed Mahdi Marashi.

Competing Interests

The authors declare that they have no conflict of interest.

Data Availability Statement

Further information pertaining to this case is available in the hospital's medical records section and will be supplied by the responsible author upon request.

Ethical Approval

Not applicable.

Funding

This work did not receive any funding.

References

1. Gioia S, Lancia M, Bacci M, Suadoni F. Two fatal intoxications due to tramadol alone: autopsy case reports and review of the literature. Am J Forensic Med Pathol 2017;38(4):345-8. doi:10.1097/paf.0000000000000338
2. Nakhaee S, Hoyte C, Dart RC, Askari M, Lamarine RJ, Mehrpour O. A review on tramadol toxicity: mechanism of action, clinical presentation, and treatment. Forensic Toxicol 2021;39(2):293-310. doi:10.1007/s11419-020-00569-0
3. Wang SQ, Li CS, Song YG. Multiply organ dysfunction syndrome due to tramadol intoxication alone. Am J Emerg Med 2009;27(7):903.e5-7. doi:10.1016/j.ajem.2008.11.013
4. Meyer NJ, Gattinoni L, Calfee CS. Acute respiratory distress syndrome. Lancet 2021;398(10300):622-37. doi:10.1016/s0140-6736(21)00439-6
5. Matthay MA, Zemans RL, Zimmerman GA, Arabi YM, Beitler JR, Mercat A, et al. Acute respiratory distress syndrome. Nat Rev Dis Primers 2019;5(1):18. doi:10.1038/s41572-019-0069-0
6. Hoffman RS, Howland MA, Levin NA, Nelson LS, Goldfrank LR. Goldfrank's Toxicologic Emergencies. 10th ed. New York: McGraw Hill; 2014.
7. Dahan A, van der Schrier R, Smith T, Aarts L, van Velzen M, Niesters M. Averting opioid-induced respiratory depression without affecting analgesia. Anesthesiology 2018;128(5):1027-37. doi:10.1097/aln.0000000000002184
8. Al-Azzawi M, Alshami A, Douedi S, Al-Taei M, Alsaoudi G, Costanzo E. Naloxone-induced acute pulmonary edema is dose-dependent: a case series. Am J Case Rep 2021;22:e929412. doi:10.12659/ajcr.929412
9. Lemyze M, Mallat J. Understanding negative pressure pulmonary edema. Intensive Care Med 2014;40(8):1140-3. doi:10.1007/s00134-014-3307-7
10. Magazine R, Rao S, Chogtu B. Prescribing patterns of drugs in acute respiratory distress syndrome (ARDS): an observational study. J Clin Diagn Res 2015;9(2): FC01-4. doi:10.7860/jcdr/2015/10411.5519