

CASE REPORT

Role of Ketamine in Life Threatening Asthma Exacerbation

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ABSTRACT

Ketamine in life-threatening asthma exacerbation might be a novel approach to avoid the need for intubation and or invasive mechanical ventilation or asthma-related lethal outcomes. We present a case of a young man who presented with life-threatening asthma exacerbation who along with standard medications, improved with the addition of intravenous ketamine to his treatment regime. A 36 years old male farmer who was known to have asthma was referred from a Primary Health Centre Clinic with suspected life-threatening asthma. He was treated previously before arrival to our ED with nebulizers and IV Corticosteroids. In the ED, the patient received IV magnesium and IM Epinephrine. Intubation was anticipated,

and the induction agent of Ketamine was considered. However, given there were anecdotal cases of patients responding to Ketamine Infusion, a bolus dose of 0.5mg/kg was given, and an infusion at a similar dose per hour was started. The patient began to respond gradually and was later admitted to ICU. Ketamine may have a role in life-threatening asthma. In our case, we used a low dose of ketamine infusion to try and avoid the need for intubation and mechanical ventilation and were successful.

KEYWORDS

Ketamine, Asthma, bronchodilation, life-threatening exacerbation, Emergency

BACKGROUND

Asthma exacerbation is one of the standard medical emergencies presenting to an Emergency Department (ED) with varying severity from mild to life-threatening with associated morbidity and possible mortality. We offer a case of a young male patient who presented with life-threatening asthma exacerbation who along with standard medications, improved with the addition of intravenous ketamine to his treatment regime.

CASE PRESENTATION

A 36 years old male farmer who is known to have asthma, which was diagnosed six years prior but lost to follow-up was referred to our facility from a Primary Health Centre Clinic with suspected life-threatening asthma. He was treated previously to arrival to our ED with back to back nebulizers and IV Corticosteroids. On arrival to our emergency room, he was sweaty, unable to talk, hypoxic (SpO₂ 88% on oxygen with a Hudson mask), tachypneic (Respiratory Rate 40), and Tachycardic (Heart Rate 142/min). Auscultation revealed a nearly silent chest. His Arterial Blood Gases showed PH: 7.27, PaO₂: 53 mmHg, PCO₂: 55 mmHg. He was agitated due to air hunger on arrival and not tolerating his nebulizers.

In the ED, the patient received 2gm Magnesium and 0.5 mg IM Epinephrine. Intubation was anticipated, and the induction agent of Ketamine was considered. However, given there were anecdotal cases of patients responding to Ketamine Infusion, a bolus dose of 0.5mg/kg was given, and an infusion at a similar dose per hour was started. The patient began to respond gradually, and intubation was avoided.

Once the patient was able to provide history, he revealed previous ICU admissions. His lood and radiological workup were unremarkable. The patient was admitted to the ICU for ongoing care.

DISCUSSION

Ketamine may have a role in life-threatening asthma due to its bronchodilator effect via calcium channels within the smooth muscles and possible inhibition of the vagal nerve. Furthermore, Ketamine may have an anti-inflammatory role, thus reducing the severity of symptoms. In most literature reviews, Ketamine was considered as an induction agent in patients with life-threatening who may require rapid sequence intubation.

However, in our case, we used a low dose of ketamine infusion to try and avoid the need for intubation and mechanical ventilation and were successful.⁽¹⁾

On reviewing literature for any evidence- A randomized clinical trial in 2018 showed the effectiveness of low dose intravenous ketamine in mild to moderate asthmatic patients. Ninety-two asthmatic patients between the ages of 18 to 85 years were included in this study, and the response to treatment was evaluated by peak inspiratory flow rate (PEFR) before and after receiving intravenous ketamine. They received a dose of 0.3, 0.4, 0.5mg/kg, which was followed by an infusion of ketamine of the same dose. It concluded that higher bolus and infusion rate leads to better outcomes clinically hence we used the same dose in the study. The outcomes were based on PEFR and as well as decreasing the need for mechanical ventilation and mortality rate for m asthmatic patients.⁽²⁾

Another single case study documents good outcomes and avoidance of invasive mechanical ventilation on an asthmatic patient who received an intravenous ketamine bolus of 0.75 mg/kg with an infusion of 0.15 mg /kg/hr.⁽³⁾

Ketamine has been tried as a nebulizer, and there have been case reports, particularly in children with moderate to severe asthma exacerbation who seemed to have responded well to nebulized Ketamine where conventional therapy had failed. One case report in 2018 was reported about a 26 months old female child who presented with moderate to severe asthma exacerbation. She was given nebulized ketamine after the failure of standard treatment and responded well.⁽⁴⁾

CONCLUSION

Ketamine in life-threatening asthma exacerbation might be a novel approach to avoid the need for intubation and or invasive mechanical ventilation or asthma-related lethal outcomes, especially in patients who fail to respond to standard treatment. However, more studies are required before Ketamine becomes incorporated in the Asthma Guidelines.

ABBREVIATIONS

ED: Emergency department, IV: intravenous, ICU: intensive care unit.

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