

A comparison of the safety of ketamine versus etomidate in rapid sequence intubation in the community hospital emergency department setting



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Background

Rapid sequence intubation (RSI) is a technique in which an induction agent and neuromuscular blocker are administered simultaneously to quickly enable mechanical ventilation. Compared to other methods of intubation, RSI has a higher first attempt success rate and minimizes complications such as prolonged hypoxemia and aspiration. Etomidate has frequently been cited as the gold standard for RSI induction. However, recent drug shortages and potential associations with adrenal axis suppression have renewed interests in alternative induction agents for RSI.

Ketamine can be used for induction and has also been used as an alternative agent in pediatric patients, those undergoing trauma, or in the hemodynamically unstable. Through a catecholamine response, ketamine can increase cardiac output, heart rate, and blood pressure giving it a favorable hemodynamic profile. With negligible effect on the adrenal axis, ketamine can be used as an alternative to etomidate in patients with adrenal deficiency. However, there is some evidence to suggest that in a catecholamine depleted patient, ketamine may have the opposite effect on them. This occurs through a negative inotropic and chronotropic effect.

It is important for clinicians to understand a drug's safety profile and how it might affect the patient during RSI so they can prepare accordingly. The objective of this study aims to evaluate the safety of ketamine versus etomidate in a community hospital emergency room setting.

Methods

Study Design

- Single center, retrospective chart review
- January 2017-December 2020

Inclusion Criteria

- ≥ 18 years old
- Ketamine or etomidate for induction during RSI
- RSI occurs in ED

Exclusion Criteria

- Pregnancy
- Cardiac arrest

Objectives and Purpose

- Compare the safety of ketamine versus etomidate in patients undergoing RSI in the emergency department
- Highlight role of ketamine in RSI in a community hospital

Outcomes

Primary

- Composite outcome of ketamine versus etomidate including incidence of hypertension, hypotension, tachycardia, or hypoxia after intubation

Secondary

- Percentage of successful first pass intubation
- Additional ketamine or etomidate required
- Ketamine and etomidate dose appropriateness
- Vasopressor requirements
- Witnessed aspiration during intubation

Baseline Characteristics

Characteristics (Mean)	Ketamine (N = 100)	Etomidate (N=100)
Age (Years)	62	70
Weight (kg)	87	83
MAP (mmHg)	89	87
SpO ₂	89	92
HR (bpm)	104	98

Primary Outcome

Outcome*	Ketamine (N=100)	Etomidate (N=100)	HR (95% CI)	P-Value
Composite:	15.5	23.8	0.77 (0.51-1.17)	0.22
Hypertension	9	9	1.0 (0.62-1.62)	1.0
Hypotension	9	31	0.45 (0.25-0.81)	0.008
Tachycardia	33	42	0.88 (0.66-1.18)	0.39
Hypoxia	11	13	0.92 (0.58-1.45)	0.71

Secondary Outcomes

Outcomes	Ketamine (N=100)	Etomidate (N=100)	RR/HR (95% CI)	P-Value
Successful 1 st Pass	91	90	1.01 (0.82-1.23)	0.96
Additional Doses Given	3	0	2.0 (1.74-2.30)	< 0.0001
Dose Appropriateness	74	78	0.97 (0.79-1.21)	0.81
Vasopressor after Intubation	39	51	0.87 (0.66-1.40)	0.31
Witnessed Aspiration	8	7	1.07 (0.65-1.75)	0.80
Mortality	13	28	0.63 (0.40-1.01)	0.058