

A Review of Induction Agents Used in Rapid Sequence Intubation

Rapid Sequence Intubation (**RSI**) has become the standard of care for the emergent management of the acutely decompensated airway. It is the virtually simultaneous administration of a sedative and a neuromuscular blocking (paralytic) agent to render a patient rapidly unconscious and flaccid in order to facilitate emergent endotracheal intubation and to minimize the risk of aspiration. The **"7 P's" of RSI are 1) Preparation, 2) Preoxygenation, 3) Pretreatment, 4) Paralysis with induction, 5) Protection and positioning, 6) Placement with proof, and 7) Post-intubation management.** There is some variability in how each of these steps is performed, mostly based on provider preference. However, the most variability lies within steps (3) and (4) given the large number of pharmacologic agents available. So, how should a provider determine which is the most appropriate agent to use in each of the large variety of clinical situations they may encounter? Below is a summary of the available induction agents along with some of their pharmacologic characteristics that may make them a more or less attractive option for a particular patient.

<u>Drug</u>	<u>Dose</u>	<u>Onset</u>	<u>Duratio n</u>	<u>Indications or Advantages</u>	<u>Contraindications or Adverse Effects</u>
Etomidate	0.3mg/kg	15-45 sec	3-12 min	- Most hemodynamically neutral of all the agents - Drug of choice in hypotensive pts or pts with increased ICP where hypotension should be avoided	- May cause slight increase in airway resistance, but still okay to use with asthmatics - May cause neuroexcitation and myoclonus , but the paired use with a benzo may limit this effect, as well as a paralytic afterwards to inhibit the myoclonus - May cause adrenal suppression in septic patients, decreasing the circulating cortisol for 12-24 hours with a single dose, but research indicates cortisol remains above physiological normal values and this should not exclude its use in septic pts, especially given the hypotensive effect of the alternative agents to use
Midazolam	0.2mg/kg	30-60 sec	15-30 min	- Anticonvulsant properties make it attractive option in status epilepticus - May be used as post-intubation sedative infusion at 0.05 to 0.4mg/kg, titrating to effect	- May reduce MAP by 10-25% - May cause respiratory depression - May cause paradoxical agitation - Variable pt response
Lorazepam, Diazepam				- Not recommended for RSI , but may be used for long-term sedation	- In long-term sedation, may cause propylene glycol toxicity since this is used as a diluent for administration

Thiopental	3-5mg/kg	<30 sec	5-10 min	- Useful in hemodynamically stable patients with conditions that increase ICP , such as seizures, intracranial bleeding, or trauma	- Will cause venodilation and negative cardiac inotropic effects, inducing profound hypotension - Will cause histamine release and induce or exacerbate bronchospasm - Suppresses WBC recruitment and activity, making it a poor choice for sepsis
Ketamine	1-2mg/kg	45-60 sec	10-20 min	- Provides analgesic effect in addition to sedative and amnestic effects - Good choice for “awake” intubation - Hemodynamically stable - Catecholamine release may cause increased cerebral perfusion or cardiac inotropy	- Weak evidence to suggest slight elevations in ICP , and even weaker evidence to suggest clinical harm, especially when used with a benzo - Use cautiously in pt with cardiovascular disease due to increases in contractility and risk of myocardial ischemia - Use cautiously in hypertensive pts
Propofol	1.5-3mg/kg	15-45 sec	5-10 min	- Reduces airway resistance - Neuroinhibitory , leading to lower ICP in head injury	- Will cause sympathetic suppression, leading to venodilation, myocardial depression, decreased MAP by 10 mmHg, and decreased cerebral perfusion pressure which may possibly exacerbate neurological injury

References:

1. Bair A, Walls R, Grayzell J. Rapid sequence intubation in adults. Up To Date. July 25, 2014. http://www.uptodate.com.foyer.swmed.edu/contents/rapid-sequence-intubation-in-adults?source=search_result&search=rapid+sequence+intubation+in+adults&selectedTitle=1%7E90
2. Caro D, Walls R, Grayzell J. Sedation or induction agents for rapid sequence intubation in adults. Up To Date. July 2, 2014. <http://www.uptodate.com.foyer.swmed.edu/contents/sedation-or-induction-agents-for-rapid-sequence-intubation-in-adults?source=machineLearning&search=induction+agents+in+rsi&selectedTitle=1%7E150§ionRank=1&anchor=H14#H>