

Supplementary Information

Supplementary Table 1. Characteristics of new anesthetic drugs in emergency surgery for rapid induction and sedation

Drug name	Main pharmacological features	Monitoring indicators	Hemodynamic effects	Applicable population	Clinical advantages and limitations	References
Etomidate	Emergency endotracheal intubation	Blood pressure, heart rate, SOFA score	Less risk of hemodynamic collapse	Required intubation in critically ill patients	Hemodynamic stability, but associated with lower 7-day survival rate	[1]
Dexmedetomidine	Sedation for mechanical ventilation in sepsis; Early sedation in ICU patients with msTBI; Sedation during weaning from mechanical ventilation	RASS score, CPOT score; ICP monitoring; RASS score and target sedation range	Hypotension, bradycardia	Mechanical ventilation in adult sepsis; TBI patients requiring ICP monitoring; Critically ill patients on mechanical ventilation	Comparable to propofol in efficacy, similar safety profile; Improved outcomes in ICP subgroup, but with hemodynamic risks; Faster extubation, reduced fentanyl requirement, lower incidence of delirium	[2-4]
Propranolol	Sedative sparing in critically ill patients on mechanical ventilation	Changes in sedative dosage and RASS score	Fewer bradycardia events	Critically ill patients requiring high-dose sedatives	Reduced sedative dosage, lower costs; limitations due to open-label design	[5]
Alfentanil	Emergency rapid sequence induction	Systolic blood pressure, heart rate, oxygen saturation	No significant difference in blood pressure and heart rate, with narrower range of variability	Hemodynamic stability in emergency intubation patients	Advantage in reducing blood pressure variability, limitation of small sample size	[6]
Remimazolam	Induction of general anesthesia for surgery	Blood pressure, heart rate, BIS	Smaller decrease in blood pressure, low incidence of hypotension	Patients on angiotensin axis blockers	Low risk of hypotension, availability of antagonists; higher BIS values	[7]
Isoflurane	Sedation for mechanical ventilation in ICU; ICU sedation after cardiac arrest	End-expiratory concentration and sedation depth; Blood pressure and neurological signs monitoring	No significant differences in heart rate and MAP; Vasodilation requiring vasopressors	ICU patients on mechanical ventilation; Post-cardiac arrest resuscitation patients	Promotes spontaneous breathing but concerns about the environment; Opioid-sparing but increased need for vasopressors	[8, 9]
ciprofol	Sedation for mechanical ventilation in ICU	RASS score, plasma concentration	Minimal blood pressure and heart rate fluctuations	ICU intubated patients	Comparable efficacy at lower doses, limited by small sample size	[10]
Propofol sodium phosphate	Deep sedation for mechanical ventilation in ICU	RASS score, Narcotrend index	Hypotension is common but manageable	Patients requiring deep sedation in ICU	Good water solubility, minimal effect on lipids; small sample size	[11]
Ketofol	Rapid induction for emergency laparotomy	Mean arterial pressure, heart rate	Low incidence of hypotension at 1:1 ratio	Adult patients undergoing emergency surgery	Hemodynamic stability; single-center study	[12]
Fentanyl	Pre-treatment for emergency RSI	Blood pressure, heart rate monitoring	Increased risk of hypotension post-intubation	Emergency RSI in adult patients	Attenuates blood pressure increase but increases risk of hypotension	[13]
Rocuronium bromide	Emergency rapid sequence induction	GCS score and blood pressure monitoring	Blood pressure drop after intubation	Adult emergency patients	Risk of inadequate sedation can be mitigated	[14]

Note: SOFA, Sequential Organ Failure Assessment; ICU, intensive care unit; msTBI, mild-to-severe traumatic brain injury; RASS, Richmond Agitation–Sedation Scale; CPOT, Critical-Care Pain Observation Tool; ICP, intracranial pressure; TBI, traumatic brain injury; BIS, Bispectral Index; MAP, mean arterial pressure; RSI, rapid sequence induction; GCS, Glasgow Coma Scale.

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