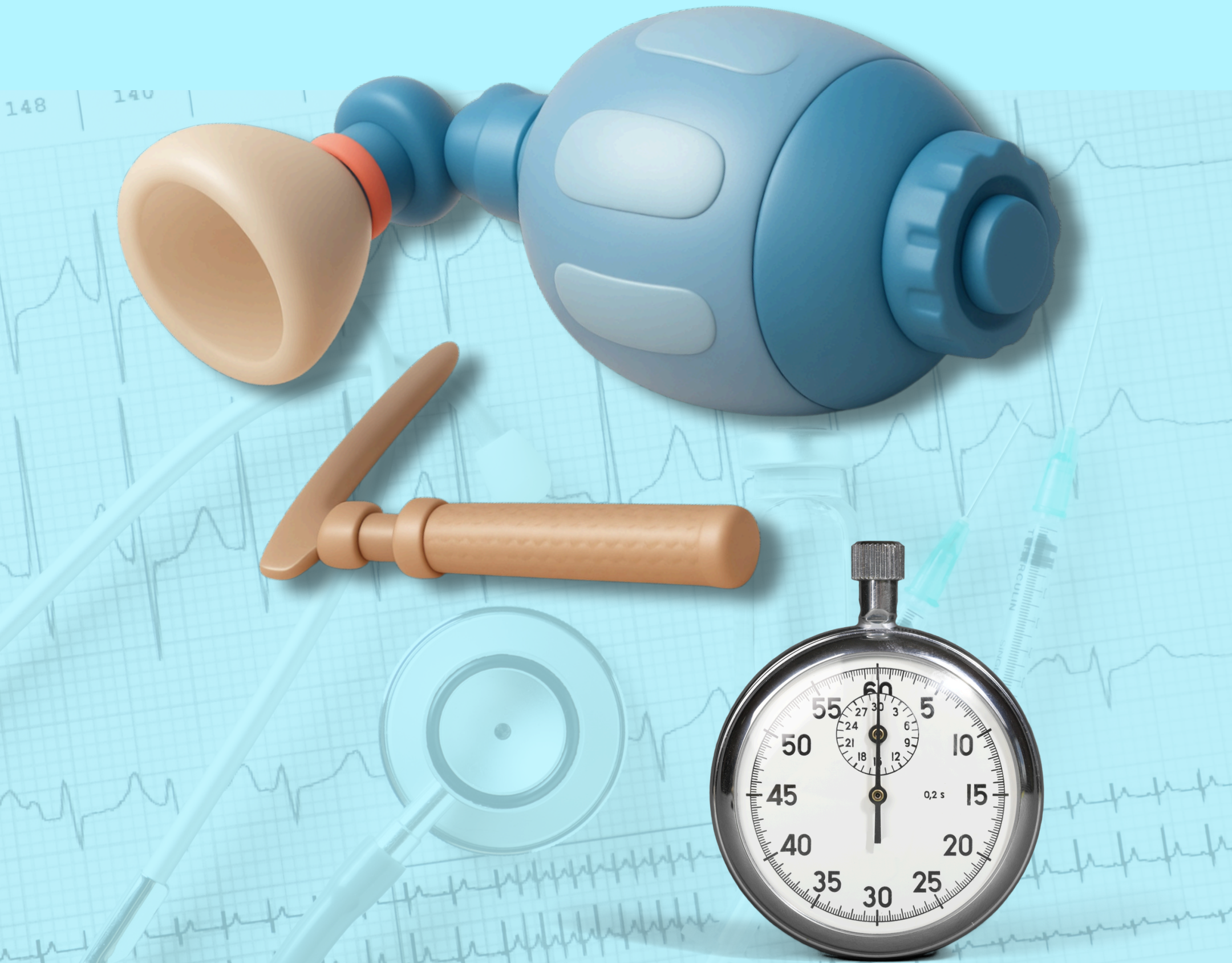


COGNITIVE AID & PHARMACOLOGY REFERENCE



Pediatric & Neonatal Rapid Sequence Intubation

*High-Yield Clinical Quick-Reference based on
The **Harriet Lane Handbook**, 24th Edition.*



Phase 1: Preparation

Equipment sizing &
Baseline parameters



Phase 2: Adjuncts

Pre-treatment to
mitigate physiologic
responses



Phase 3: Induction

Sedation and
amnesia



Phase 4: Paralysis

Neuromuscular
blockade



Follow this exact sequence to minimize patient stress, blunt intracranial responses, and secure the airway safely.

Blunting Reflexes



If indicated, give BEFORE induction and NMB.

Sedation & Amnesia



Administer rapidly to achieve unconsciousness.

Neuromuscular Blockade



Administer immediately following sedative.

Equipment	Premie (1-3 kg)	Newborn (2-4 kg)	1 yr (10 kg)	4-6 yr (20-25 kg)	>16 yr (>50 kg)
Blade 	MIL 0	MIL 0	MIL 1, MAC 2	MIL 2, MAC 2	MIL 2, MAC 3
ETT Size	2.5-3.0	3.0-3.5	4.0	5.5-6.0	7.0-8.0
LMA Size	1	1	2	2.5	4

Click on the "i" for more information!

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Recent

Chest drainage

Exchange Transfusion
Single catheter push-pull technique

Intraosseous access

Tracheal Intubation

Umbilical catheterization
Umbilical catheterization

Procedures

Insertion depth and diameter of tracheal tube according to gestational age

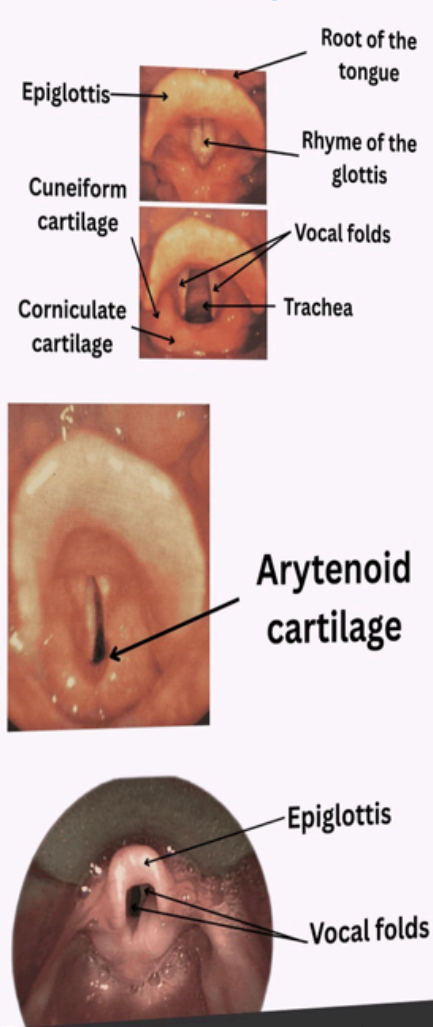
Lumbar puncture
Lumbar puncture

PICC
Prevention and management of

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Tracheal Intubation

Anatomy



Additional Information

Laryngoscope blade size

Age	Type	Number
Premature <1000g	Miller	00
Premature 1000-2000 g	Miller	00 or 0
Premature 2000-3000 g	Miller	0 or 1
Neonate	Miller	0 or 1
1 – 6 months	Miller	0
6 – 12 months	Miller	1
1 – 2 years	Miller	1 - 2
3 – 4 years	Miller or Macintosh	2
5 – 6 years	Miller or Macintosh	2

Phase 1: RSI Adjuncts (Pre-Medication)

Atropine



Benefit: Prevents bradycardia associated with laryngoscope insertion; decreases oral secretions.



Indication: Bradycardia in any patient; infants <1 year; children 1-5 yrs receiving succinylcholine.



Dosing: Varies by weight baseline.
0.02 mg/kg IV/IO/IM (max. 0.5 mg)



Side Effects: Tachycardia.



Medicines

Lethal dose (10mg)

Atropine

Intermittent IV - 1mg/mL Solution

Dose	0.04mg
Interval	10-15min
Dilution	
Remove from vial	1mL
Dilute the dose in mL with NS or D5W	19mL
Final concentration after dilution	0.05mg/mL
Dose after dilution	0.8mL
Infusion rate	1min
Maximum dose	
Maximum cumulative dose	0.08mg
Maximum cumulative dose	1.6mL

Atropine

With dilution

Endotracheal

IM

Intermittent IV

subcutaneous

0.1mg/mL Solution

0.3mg/1mL Solution

0.4mg/0.5mL Solution

0.4mg/mL Solution

0.5mg/5mL. Solution

0.6mg/mL Solution

0.8mg/mL Solution

1mg/5mL Solution

1mg/mL Solution

1mg/10mL Solution

3mg/10mL Solution

Weight (kg)

2

Desired dose (mg/kg/dose)

0.02

Phase 1: RSI Adjuncts (Pre-Medication)

Lidocaine



Benefit: Blunts rise in ICP associated with laryngoscopy.



Indication: Head trauma.



Dosing: Varies by weight baseline.
1 mg/kg IV/IO (max. 100 mg)



Side Effects: Hypotension risk; shock.

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Medicines	
Lidocaine	
Intermittent IV - 5mg/mL - 0.5%	
Dose	2mg
Interval	10/10min
Dose	0.4mL
Dilution	
Dilute the dose in mL with D5W, D10W, NS	1.6mL
Final concentration after dilution	1mg/mL
Total volume to be administered	2mL
Infusion rate	5min
Maximum dose	
Maximum daily dose	10mg

Note: initial bolus dose: intravenous dose of 0.5 to 1 mg/kg

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Medicines

Lidocaine

Intermittent IV

5mg/mL - 0.5% 10mg/mL - 1% 20mg/mL - 2%

No vasoconstrictor Neurological patients

Weight (kg) 2

Desired dose (mg/kg) 1

Suggested Loading dose: 0.5 to 1 mg/kg/day.

Lidocaine

Intermittent IV - 5mg/mL - 0.5%

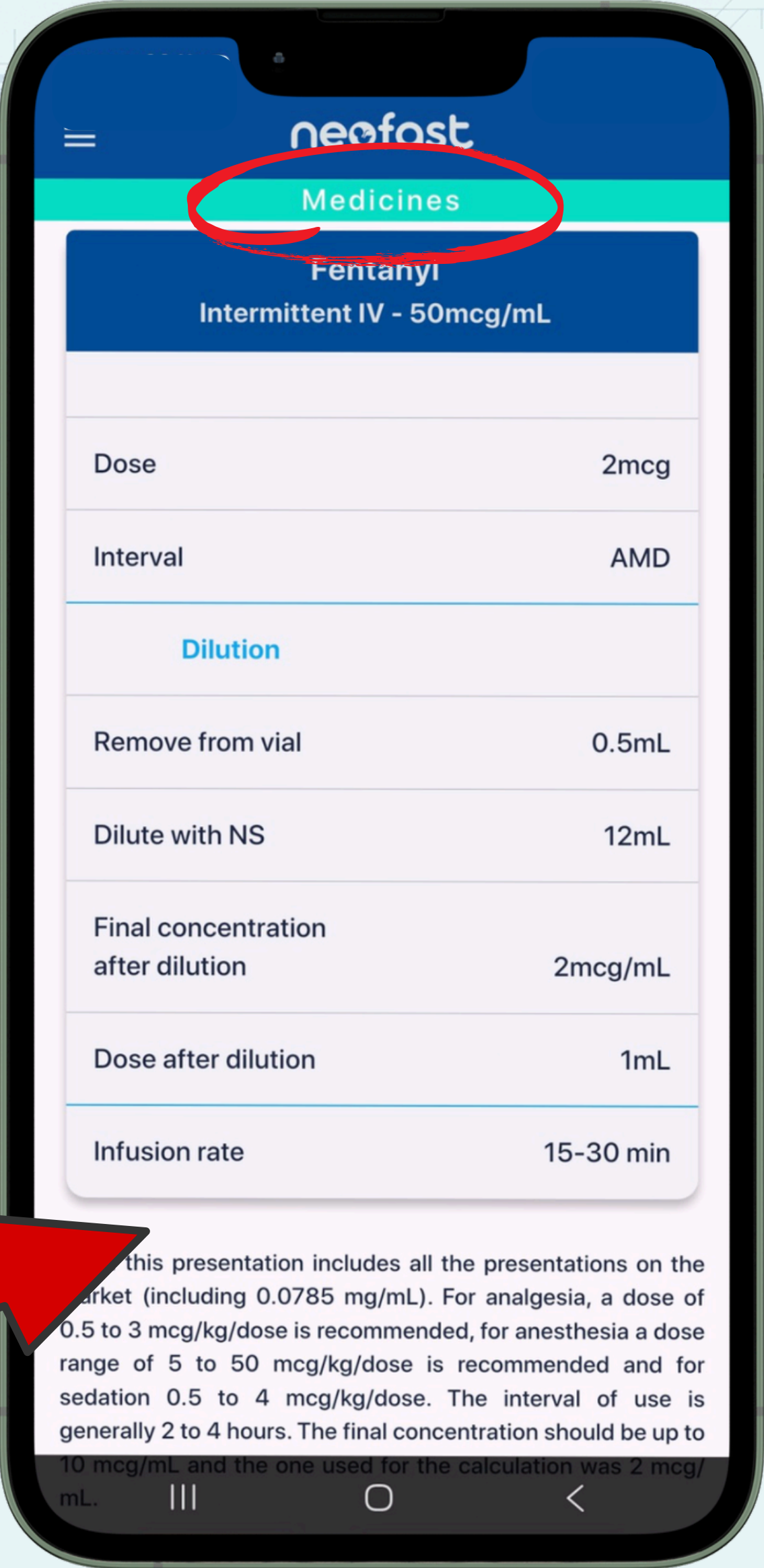
Dose

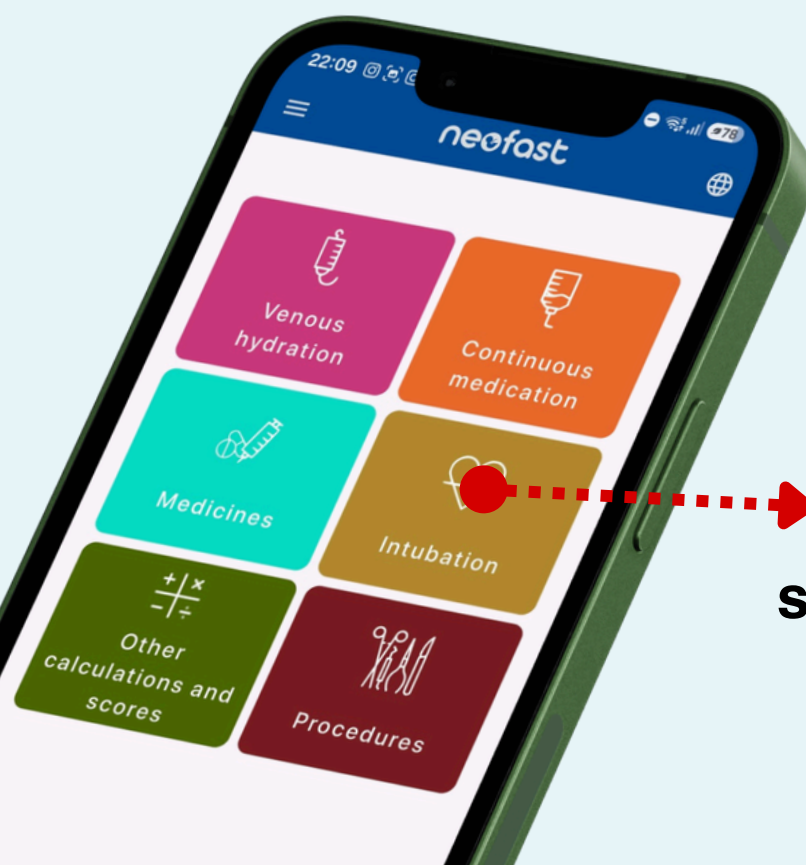
Phase 2: Induction Agents (Hemodynamic Profiles)

Fentanyl

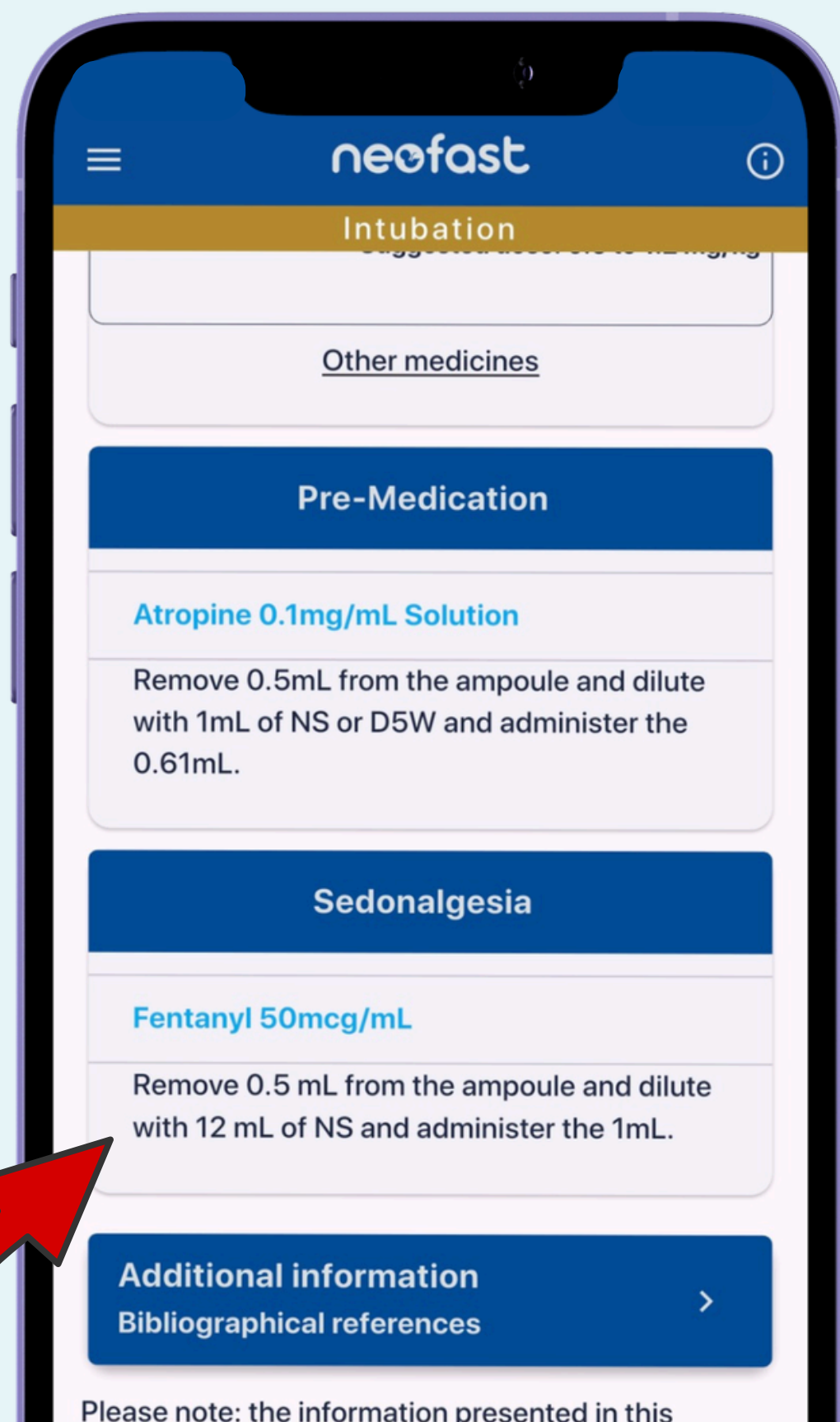
Analgesic / Sedative

- Benefit:** Minimal cardiovascular effect.
- Indication:** Shock.
- Dosing:** 1-5 mcg/kg slow IV/IM.
- Side Effects:** Respiratory depression, chest wall rigidity with rapid push.





Two ways to do: More practical: select "intubation" on the input screen and select the medications for the procedure; Or go to "medicines" and take one medications at a time.



Please note: the information presented in this

Phase 2: Induction Agents (Short-Acting Profile)

Midazolam Short-Acting Benzodiazepine



Benefit: Rapid and predictable onset of action, short recovery time, causes amnesia.



Dosing: 0.1-0.2 mg/kg IV.



Side Effects: Results in mild depression of hypoxic ventilatory drive.



Onset: 1-3 mins (IV)

Onset: 5-10 mins (IM/IN)

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Medicines

Midazolam

IV bolus or IM

Nasal or SL

Oral

1mg/mL Solution

5mg/mL Solution

Weight (kg)

2

Desired dose (mg/kg)

0.1

Suggested dose: 0.05 to 0.15 mg/kg

Midazolam

IV bolus or IM - 1mg/mL Solution

Dose

0.2mg

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Medicines

Midazolam

IV bolus or IM - 1mg/mL Solution

Dose

0.2mg

Interval

2 - 4h

Dose

0.2mL

Dilution

Dilute the dose in mL with NS , D5W

0.2mL

Final concentration after dilution

0.5mg/mL

Dose after dilution

0.2mL

Infusion rate

10 min

Phase 3: Neuromuscular Blockade (Depolarizing)



CONTRAINDICATIONS



- Neuromuscular disease / Myopathies



- Spinal cord injury



- Crush injury



- Burns



- Renal insufficiency

Succinylcholine

Depolarizing Agent



Benefit: Rapid, profound paralysis (Onset 30-60 sec).



Dosing:

- ≤ 2 years: 2 mg/kg IV
- > 2 years: 1 mg/kg IV

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Intubation

Muscle blockers

Succinylcholine

100mg Powder

500mg Powder

10mg/mL Solution

20mg/ml Solution

40mg/mL Solution

50mg/mL Solution

100mg/mL Solution

Succinylcholine 100mg Powder

Succinylcholine 100mg Powder

Suggested dose: 1 to 2 mg/kg

Other medicines

Rocuronio



Vecuronium



Pancuronium



Succinylcholine



Benefit: Minimal cardiovascular effect; rapid onset at RSI doses.

Indication: Caution in patients with a difficult airway.

Side Effects: Prolonged paralysis if airway fails and reversal is unavailable.

Reversal: Fully reversible with Sugammadex.



PRECISE RSI DOSING:

1.2 mg/kg IV/IM/IO



Intubation

Rocuronio



Rocuronio 10mg/mL Solution

Suggested dose: 0.5 to 1.2 mg/kg

Vecuronium

4mg Powder

5mg Powder

10mg Powder

20mg Powder



Vecuronium 4mg Powder

Suggested dose: 0.03 to 0.15 mg/kg

Other medicines

Rocuronio



Vecuronium



Pancuronium



Succinylcholine



Phase 3: Neuromuscular Blockade (Non-Depolarizing Alternative)

Vecuronium

Non-depolarizing Agent



Benefit: Minimal cardiovascular effect, reversible with sugammadex.



Indication: Caution in patients with difficult airway.



Dosing: 0.1 mg/kg IV.

Comparison Callout



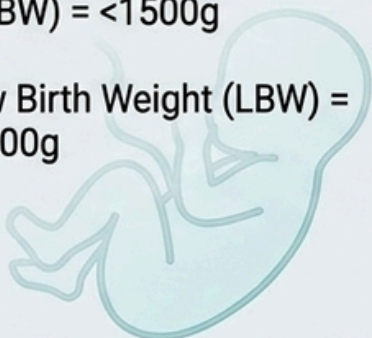
⚠ Limitations vs. Rocuronium:

- Longer time to paralysis than rocuronium.
- Prolonged duration in hepatic failure.

Neonatal Context: Special Considerations

Weight Baselines

- Extremely Low Birth Weight (ELBW) = <1000g
- Very Low Birth Weight (VLBW) = <1500g
- Low Birth Weight (LBW) = <2500g



Resuscitation Energy



Dextrose administration during active resuscitation:

- Newborn: 5-10 mL/kg D10W
- Monitor carefully for rebound hypoglycemia.

ETT Meds (NAVEL)

- N** - Naloxone
- A** - Atropine
- V** - Vasopressin
- E** - Epinephrine
- L** - Lidocaine

Dilute medications to 5 mL with NS, follow with positive-pressure ventilation.

Master Synthesis: RSI Pharmacologic Cheat Sheet

Phase 	Medication	Dose 	Primary Benefit 	Key Caution 
Adjunct	Atropine	Varies	Prevents bradycardia	Tachycardia
Adjunct	Lidocaine	1 mg/kg	Blunts ICP rise	Hypotension
Induction	Fentanyl	1-5 mcg/kg	Minimal CV effect	Chest wall rigidity
Induction	Ketamine	1-2 mg/kg	Bronchodilation	Increases HR
Induction	Midazolam	0.1-0.2 mg/kg	Amnesia / Rapid onset	Depresses vent drive
Paralytic	Succinylcholine	1-2 mg/kg	Rapid onset (30s)	Hyperkalemia / Myopathy
Paralytic	Rocuronium	1.2 mg/kg	Reversible w/ Sugammadex	Difficult airway risk
Paralytic	Vecuronium	0.1 mg/kg	Minimal CV effect	Prolonged in hepatic failure



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Phase 1: Adjuncts

Medication	Benefit	Indication	Dosing	Side Effects
Atropine	Prevents bradycardia associated with laryngoscope insertion; decreases oral secretions.	Bradycardia in any patient; infants <1 year; children 1–5 years receiving succinylcholine; children >5 years receiving a second dose of succinylcholine.	[Refer to institutional protocol]	Tachycardia.
Lidocaine	Blunts rise in Intracranial Pressure (ICP) associated with laryngoscopy.	Head trauma.	[Refer to institutional protocol]	[Refer to institutional protocol]

- blade tip within the vallecula.
- (e) If able to visualize the vocal cords, place the ETT to the right of the blade and advance until the cuff is past the vocal cords.
- (f) Routine use of cricoid pressure is not recommended during endotracheal intubation of pediatric patients, but can be considered along with readjustment of laryngoscope if

TABLE 1.2 RAPID SEQUENCE INTUBATION MEDICATIONS^{1,2,16,17,21}

Medication	Benefit	Indication	Dosing	Side Effects
1. INDUCTION AGENTS				
Etomidate (sedative)	Minimal cardiovascular side effects, minimally decreases ICP	Multitrauma patient at risk for increased ICP and hypotension Caution in patients at risk for adrenal suppression (septic shock)	0.3 mg/kg IV/IO (max. 20 mg)	Suppresses adrenal corticosteroid synthesis, vomiting, myoclonus; lowers seizure threshold
Fentanyl (analgesic, sedative)	Minimal cardiovascular effect	Shock	1–5 mcg/kg slow IV/IM push (max. 100 mcg)	Chest wall rigidity, bradycardia, respiratory depression
Ketamine (sedative, analgesic)	Catecholamine release causes bronchodilation, abates bradycardia associated with laryngoscope insertion, increases HR and SVR, produces a “dissociative amnesia”	Status asthmaticus, shock and hypotensive patients Caution in patients at risk for elevated ICP or with glaucoma history	1–2 mg/kg IV/IO (max. 150 mg) 4–6 mg/kg IM	Vomiting, laryngospasm, hypersalivation, emergence reactions (hallucinations)
Midazolam (sedative, amnestic, anxiolytic)	Minimal cardiovascular effect	Mild shock	0.05–0.1 mg/kg IV/IM/IO (max. single dose 6–10 mg depending on age (see Formulary))	Dose-dependent respiratory depression, hypotension
Propofol (sedative)	Ultra-short acting	Avoid in shock or patients who require maintenance of CPP	2 mg/kg IV	Hypotension, myocardial depression, metabolic acidosis; may cause paradoxical hypertension in children
2. NEUROMUSCULAR BLOCKADE				
Succinylcholine (depolarizing)	Rapid-onset, short-acting neuromuscular blockade agent, reversible with acetylcholinesterase inhibitor	Role limited due to adverse events Contraindicated in neuromuscular disease, myopathies, spinal cord injury, crush injury, burns, renal insufficiency	IV: <2 years: 2 mg/kg >2 years: 1 mg/kg (30–60-sec onset, 4–6-min duration) IM: 3–4 mg/kg (3–4-min onset, 10–30-min duration) Max. dose: 150 mg/dose IM	Hyperkalemia; trigger of malignant hyperthermia; masseter spasm, bradycardia; muscle fasciculations; increased intracranial, intraocular, and intragastric pressure

Side Effects

20 mg)	Suppresses adrenal corticosteroid synthesis, vomiting, myoclonus; lowers seizure threshold
push (max. 150 mg)	Chest wall rigidity, bradycardia, respiratory depression
150 mg)	Vomiting, laryngospasm, hypersalivation, emergence reactions (hallucinations)

TABLE 1.2 RAPID SEQUENCE INTUBATION MEDICATIONS^{1,2,16,17,21}—CONT'D

Medication	Benefit	Indication	Dosing	Side Effects
Rocuronium (nondepolarizing)	Minimal cardiovascular effect, reversible with sugammadex	Caution in patients with difficult airway	1.2 mg/kg IV/IM/IO (30–90-sec onset, 30–45-min duration) Max. dose: 100 mg	Prolonged duration in hepatic failure
Vecuronium (nondepolarizing)	Minimal cardiovascular effect, reversible with sugammadex	Caution in patients with difficult airway	0.15–0.2 mg/kg IV/IO (1–3-min onset, 30–40-min duration) Max. dose: 10 mg	Prolonged duration in hepatic failure, longer time to paralysis than rocuronium
3. ADJUNCTS (IF INDICATED, SHOULD BE GIVEN BEFORE INDUCTION AND NMB MEDICATIONS)				
Atropine	Prevents bradycardia associated with laryngoscope insertion, decrease oral secretions	Bradycardia in any patient, infants <1 year, children 1–5 years receiving succinylcholine, children >5 years receiving a second dose of succinylcholine	0.02 mg/kg IV/IO/IM (max. 0.5 mg)	Tachycardia, pupil dilation
Glycopyrrolate	Decreases oral secretions, prevent bradycardia; may cause less tachycardia than atropine, preserves pupillary exam in trauma	Hypersalivation	0.004–0.01 mg/kg IV/IM/IO (max. 0.1 mg)	Tachycardia
Lidocaine	Blunt rise in ICP associated with laryngoscopy	Elevated ICP, shock, arrhythmia, and status asthmaticus	1 mg/kg IV/IO (max. 100 mg)	Myocardial depression, altered mental status, seizures, muscle twitching

CPP, Cerebral perfusion pressure; HR, heart rate; ICP, intracranial pressure; IM, intramuscular; IO, intraosseous; IV, intravenous; mcg, microgram; NMB, neuromuscular blockade; SVR, systemic vascular resistance.

0 (max. ; depending y)	Dose-dependent respiratory depression, hypotension
	Hypotension, myocardial depression, metabolic acidosis; may cause paradoxical hypertension in children
	Hyperkalemia; trigger of malignant hyperthermia; masseter spasm, bradycardia; muscle fasciculations; increased intracranial, intraocular, and intragastric pressure

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CPP, Cerebral perfusion pressure; HR, heart rate; ICP, intracranial pressure; IM, intramuscular; IO, intraosseous; IV, intravenous; mcg, microgram; NMB, neuromuscular blockade; SVR, systemic vascular resistance.

Phase 2: Induction

Fentanyl

Analgesic, Sedative



Shock (Minimal cardiovascular effect)

1–5 mcg/kg slow IV/IM

Ketamine

Sedative, Analgesic



Benefit: Catecholamine release causes bronchodilation, abates bradycardia, increases HR.

Indication: Asthma, Shock

Midazolam

Sedative, Amnestic



Check for hypotensive risks. Ideal for procedural sedation. (Onset 1-3 min)

Propofol

Sedative, Hypnotic



Monitor for hypotension, respiratory depression, cardiac failure.

Succinylcholine (Depolarizing)

Dose: ≤2 years: 2 mg/kg IV | >2 years: 1 mg/kg IV

Benefit: Ultra-rapid onset (30–60 sec).

Phase 3: Neuromuscular Blockade



CONTRAINDICATED in neuromuscular disease, myopathies, spinal cord injury, crush injury, burns, renal insufficiency.

Vecuronium (Nondepolarizing)

Benefit: Minimal cardiovascular effect; reversible with sugammadex.

Indication: Caution in patients with difficult airways.

Side Effects: Prolonged duration in hepatic failure; longer time to paralysis than rocuronium.

Gold
Standard

ROCURONIUM: The Agent of Choice

Class: Nondepolarizing NMB

Route: IV / IM / IO

1.2 mg/kg



Hemodynamically Stable.

Minimal cardiovascular effect.



Indication.

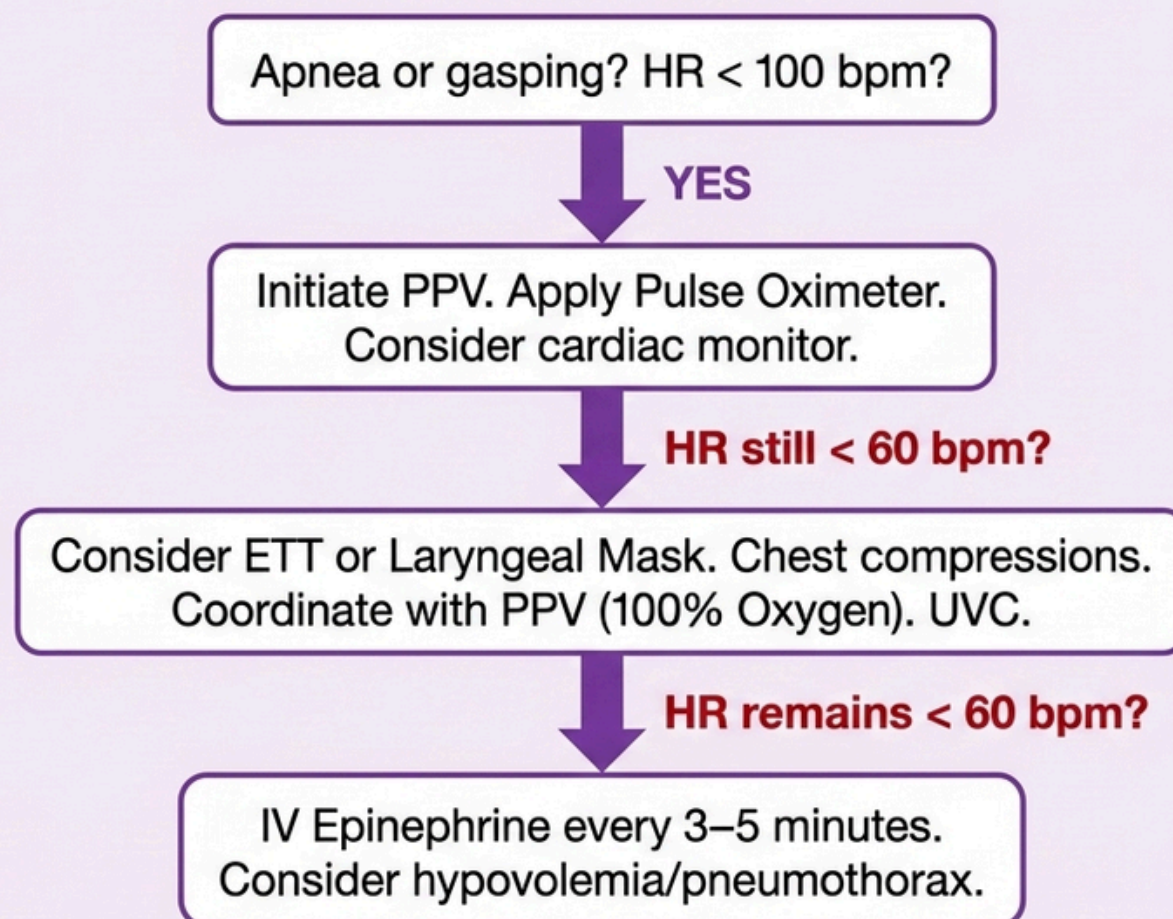
Caution in patients with a difficult airway.



Reversible.

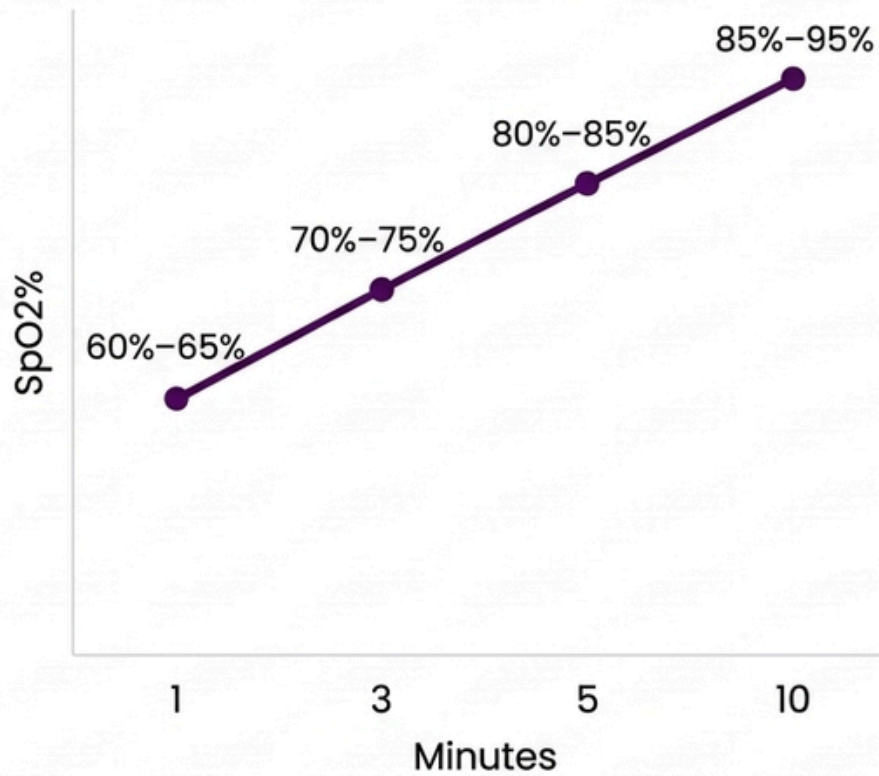
Fully reversible with Sugammadex, avoiding the contraindication risks of Succinylcholine.

Neonatal Airway Algorithm



Neonatal Target Metrics

Target Oxygen Saturation Curve



Initial Oxygen Concentration (PPV)



≥ 35 weeks' Gestational Age

21% Oxygen



< 35 weeks' Gestational Age

21%–30% Oxygen

Rescue Pathway: Opioid Reversal

Indications

- ✓ Shallow respirations or RR < 8 breaths/min
- ✓ Pinpoint pupils
- ✓ Unresponsive to physical stimulation

NALOXONE (Narcan)

Dose: 1–2 mcg/kg/dose IV

Administration: Give slowly over 2 minutes.

Titration: Titrate to effect up to a total dose of 10 mcg/kg. If no response, evaluate other causes.



Action shorter than most opioids. Monitor closely; another dose may be required within 30 minutes.

