THE UNIVERSITY OF TENNESSEE HEALTH SCIENCE CENTER

Anesthesiology Resident's Pocket Reference Guide

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1. RESUSCITATION

	ADULT	PEDIATRIC
Adenosine	6mg IV then 12mg IV q1 min x 2 prn	100ug/kg IV(max dose 6 mg) then 200ug/kg IV(max dose 12mg)
Atropine	0.5 mg IV q3-5mins; max 3mg	20ug/kg IV q3-5 min; max: child 1mg, adolescent 2mg
Amiodarone	150-300 mg IV followed by 1 mg/min for 6 hrs	5 mg/kg IV(max 300mg) over 30 mins
Bicarbonate	1-2 mEq/kg IV to be guided by blood gas analysis for <5kg, base excess x Wt/4; for child, base excess x Wt/6; for adult, base excess x Wt/10	
Calcium Chloride	1-2 gm IV slowly q10mins PRN	10-20 mg/kg IV slowly q10 mins prn
Calcium Gluconate	1-3 gm IV	30-60 mg/kg IV
Epinephrine	Hypotension: 0.05 - 0.1 mg IV Arrest: 1mg q3-5 mins prn Racemic: 0.5ml of 2.25% solution in 3ml NS over 15 mins	Hypotension: 1ug/kg IV Arrest: 10ug/kg q3-5 mins Racemic: 0.05ml/kg of 2.25% sol in 3ml NS over 15 mins
Esmolol	0.5 mg/kg IV prn	0.5 mg/kg IV prn
Lidocaine	1-1.5 mg/kg IV followed by 1-4 mg/min	1mg/kg IV followed by 20-50 ug/kg/min
Magnesium	1-2 mg IV for Torsades	25-50 mg/kg IV for Torsades
Glucose	20-50ml of D50 IV 40-100ml of D25 IV	0.5 ml/kg of D50 2.5 ml/kg of D10

2. VASOACTIVE DRUGS

Dopamine	1-20 ug/kg/min; titrate to effect
Dobutamine	1-20 μg/kg/min; titrate to effect
Epinephrine	0.02-1 μg/kg/min; titrate to effect, 1-10 μg/kg bolus
Esmolol	50-300 mcg/kg/min; titrate to effect
Isoproterenol	0.02-1 μg/kg/min; titrate to effect
Norepinephrine	0.02-1 μg/kg/min; titrate to effect
Phenylephrine	0.5-10 μg/kg/min; titrate to effect, 0.5-10 μg/kg bolus
Milrinone	50-100 μg/kg loading dose followed by 0.25-1 μg/kg/min infusion
Nitroprusside	0.5-10 μg/kg/min; titrate to effect; observe for signs of cyanide toxicity
Nitroglycerine	1-10 μg/kg/min; titrate to effect
Prostaglandin E1	0.01-0.1 μg/kg/min (Note that apnea may occur and intubation is oten required with doses >0.05 μg/kg/min)
Vasopressin	Adult: 0.03 - 0.05 units/min Peds: 0.0001 - 0.002 units/kg/min

3. ANTIHYPERTENSIVES/DIURETICS

	Adrenergic Receptor	Dose
Furosemide		0.5-2 mg/kg/dose PO/IM/IV
Mannitol		0.25-0.5 g/kg IV (slowly to avoid hypotension)
Hydralazine		0.1-0.2 mg/kg IM/IV q4-6h
Esmolol	β 1	100-500 μg/kg IV over 1-5 min; 50-300 μg/kg by infusion
Labetalol	α 1, β 1, and β 2	0.1-0.4 mg/kg IV q10 min until desired effect
Atenolol	β 1	1-2 mg/kg/day PO up to 3 mg/kg
Propranolol	β 1 and β 2	0.05-0.1 mg/kg/dose IV every 10 min; titrate to effect; max single dose 10 mg
Nitroprusside & Nitroglycerin		0.5-10 μg/kg/min by infusion pump; titrate to effect

4. CARDIOVERSION/DEFIBRILLATION (EXTERNAL)

Cardioversion (synchronous)	**Peds:** 0.5 joules/kg; repeat up to 2 joules/kg **Adult:** Narrow + Regular: 50-100 joules Narrow + Irregular: 120-200 joules Wide + Regular: 100 joules Wide + Irregular: Defibrillate
Defibrillation (asynchronous)	**Peds:** 1st Shock: 2 joules/kg, 2nd Shock: 4 joules/kg increase to max dose of 10 joules/kg **Adult:** 120 - 200 joules Biphasic or 360 joules monophasic

5. ANAPHYLAXIS /ANTIHISTAMINE

Epinephrine	1 μg/kg IV to treat hypotension/bronchospasm; repeat with increasing doses every 3-5 minutes as needed; may need continuous infusion
Fluid bolus	20 mL/kg balanced salt solution; repeat as necessary
Phenylephrine	0.1 μg/kg/min IV; titrate to effect if inadequate response to epinephrine
Hydrocortisone	Peds: 2-3 mg/kg IV ; Adult: 100 mg
Diphenhydramine	Peds: 1-2 mg/kg IV ; Adult: 25-50 mg IV
Ranitidine	Peds: 1.5 mg/kg IV ; Adult: 50mg IV
Famotidine	Peds: 0.5 mg/kg IV; Adult: 50mg IV

6. HYPERKALEMIA TREATMENT

Intervention	Dose
Calcium chloride	5-10 mg/kg/dose IV; repeat until normal sinus rhythm
Calcium gluconate	15-30 mg/kg/dose IV; repeat until normal sinus rhythm
Hyperventilation	
Albuterol	By inhalation administered with a spacer
Salbutamol	5 μg/kg IV over 15 min
Glucose + insulin	Glucose (0.5-1 g/kg) with insulin (0.1 U/kg) given IV over 30-60 min
Kayexalate	1 g/kg (up to 40 g) q4h (PO, PR, per gastric tube)

7. Malignant Hyperthermia (Hotline: 1-800-MH-Hyper)

Dantrolene	2.5 mg/kg IV q5 mins (max dose 10 mg/kg)
Hyperkalemia	See box 6 for Hyperkalemia treatment
Cooling	Ice packs + 20-30 ml/kg cold IV fluids
Arrhythmia	Amidoare, Esmolol or Magnesium Sulfate; see box 1 for dosing

8. LARYNGEAL MASK AIRWAY (CLASSIC)

Weight (kg)	Size	Cuff Volume (mL)	Largest ETT that will fit through LMA
<5	1	4	3.5 uncuffed
5-10	1.5	7	4 uncuffed
10-20	2	10	4.5 uncuffed
20-30	2.5	14	5 uncuffed
30-50	3	20	6 cuffed
50-70	4	30	6 cuffed
70-100	5	40	7 cuffed
>100	6	50	7 cuffed

9. ETT SIZE (mm ID)

	Uncuffed	Cuffed
Preterm(<28 weeks) (<1.5 kg)	2.5	
Preterm(28-38 weeks) (1.5-3 kg)	3	
38 weeks to 5 mo	3	3
5 mo to 12-18 mo	4	3.5
12-18 mo to 20-24 mo	4.5	4
>2 years	Age/4 + 4	Age/4 + 3.5

Distance of Insertion (cm): Size of ETT x 3

10. LARYNGOSCOPE BLADES (APPROXIMATE SIZE)

Age	Miler	Wis-Hipple	Macintosh
Preterm	0		
Full-term neonate	0		
Term-2 years	1	1	
2-6 years		1.5	1-2
6-10 years	2	N/A	2
>10 years	2 or 3	N/A	2 or 3

11. INDUCTION AGENTS Propofol (Diprivan)

	IV (mg/kg)	IM (mg/kg)
Propofol	Peds: 2-3 Adult: 1-2	
Ketamine	1-2	3-12
Etomidate	0.2-0.3	
Thiopental	4-6	
Methohexital	1-3	

12. TIVA

Drug	Bolus	Infusion
Propofol	1-3 mg/kg	100-200 mcg/kg/min
Ketamine	0.1-0.3 mg/kg	5-10 mcg/kg/min
Dexmedetomidine	0.5-1.5 mcg/kg over 5-10 minutes	0.3-1.2 mcg/kg/hr
Fentanyl	.5-1 mcg/kg	0.5-4 mcg/kg/hr
Sufentanil	0.05-0.1 mcg/kg	0.05-0.4 mcg/kg/hr
Remifentanil	1-2 mcg/kg	0.05-0.3 mcg/kg/min

13. NEUROMUSCULAR BLOCKING DRUGS

Succinylcholine	1-2 mg/kg IV 3-4 mg/kg IM
Rocuronium	0.6-1.2 mg/kg IV
Vecuronium	0.1 mg/kg IV *Infusion: 0.8 - 1.7 mcg/kg min*
Pancuronium	0.05-0.1 mg/kg IV
Cisatricurium	0.1-0.2 mg/kg IV
Atracurium	0.5 mg/kg IV

14. ANTAGONISTS

Neostigmine	0.02-0.05 mg/kg + atropine/glycopyrrolate
Edrophonium	0.3-1 mg/kg + atropine/glycopyrrolate
Atropine	0.02 mg/kg or 20 ug/kg
Glycopyrrolate	0.01 mg/kg or 10 ug/kg
Sugammadex ***Only for reversal of Rocuronium or Vecuronium*	TOF count 2: 2 mg/kg, Post Tetanic 1-2: 4 mg/kg, RSI Reversal: 16 mg/kg
Physostigmine	0.01-0.03 mg/kg followed by infusion 0.03 mg/kg/hr to treat cholinergic syndrome
Naloxone	Peds: Sedation: 0.25-0.5 ug/kg IV q2 mins Overdose: 10 ug/kg IV/IM q3 mins Adult: Sedation: 0.02 - 0.2 mg IV q5 mins Overdose: 0.1 - 2 mg q3 mins
Flumazenil	Peds: 10 μg/kg (max 0.2mg) q2 mins Adult: 0.2 mg q2 mins

15. ANALGESICS

Non-opioids	
Acetaminophen	Neonate: 7.5 mg/kg IV q6h Peds: 10-15 mg/kg IV/PO q6h Adult: 500-1000 mg/kg IV/PO q6h
Ibuprofen	Peds: 10 mg/kg PO q6h (max 800 mg) Adult: 600-800 mg q6h
Ketorolac	<50kg: 0.5 mg/kg up to 15 mg; >50kg: 0.5 mg/kg up to 30 mg, IV, IM, PO every 6 hours
Ketamine	0.1-1 mg/kg q10-15 mins IV as needed
Opioids	
Fentanyl	0.5-2 μg/kg; higher doses may be required for cardiac cases
Hydromorphone	0.015 mg/kg IV every 3-4 hours
Morphine	0.05-0.1 mg/kg IV every 3-4 hours
Remifentanil	See TIVA
Tramadol	1-2 mg/kg q6h (max 100 mg); **Black box warning in peds & breastfeeding mothers****
Methadone	0.05-0.1 mg/kg q8h (max 10 mg)

16. OPIOID CONVERSTION APPROXIMATIONS Morphine (1 mg) is equivalent to:

	IV (mg)	PO (mg)
Tramadol	~10	~15
Oxycodone (OxyContin)		~2-3
Methadone	~1	~1.5
Hydromorphone	~0.15	~0.75
Fentanyl	~0.01 (10 μg)	~0.02 (20 μg)
Sufentanil	~0.001 (1 μg)	

17. SEDATIVES

Midazolam (Peds only)	PO: 0.25-0.75 mg/kg, Rectal: 0.75-1 mg/kg, IV: 0.05-0.15 mg/kg, Max dose of 20mg by any route
Dexmedetomidine	PO: 1-4 μg/kg; takes 45 mins for full effect, Intranasal: 1-2 μg/kg; takes 30 mins for full effect, IV: 0-2 μg/kg over 10 minutes
Pentobarbital	2 mg/kg IV every 10 minutes up to 6 mg/kg
Ketamine	IM: 2-10 mg/kg IV: 1-2 mg/kg

18. ANTIEMETICS

	IV	PO
Dexamethasone	0.0625-0.15 mg/kg (max 15 mg)	
Metoclopramide	0.15 mg/kg	0.15 mg/kg
Ondansetron	0.05-0.1 mg/kg; max dose of 4 mg	0.1 mg/kg up to 4 mg
Tropisetron	0.1-0.2 mg/kg	
Palonosetron	1.5-20 μg/kg (max 1.5 mg) (limited data in children)	
Aprepitant	Adult Only: 130mg	>6mo child to Adults: 3 mg/kg (max 125 mg)

19. OBSTETRICS

	Labor	C-section
Epidural Infusion	0.125% Bupivacaine or 0.2% ropivacaine at 6-12 mL/hr +/- 2 mcg/mL fentanyl PCEA: 3-6 mL q30min	-
Epidural Bolus	Lidocaine 1%: 5-10 mL Bupivacaine 0.125%: 8-10mL Bupivacaine 0.25%: 8-10mL Fentanyl: 50-100 mcg Sulfentanil: 5-10 mcg	Lidocaine 2% +/- Epinephrine 5mcg/mL +/- NaHCO3: (20 mL Lidocaine 2%) +/- (100 mcg Epinephrine) +/- 1 mL NaHCO3: 20-30 mL 3% Chlorprocaine 20mL + 1 mL NaHCO3: 20-30mL
DPE/CSE	Bupivacaine 0.25%: 0.5 mL-0.75 mL or Ropivacaine 0.2%: 0.5 mL - 0.75 mL Fentanyl: 15-25 mcg + infusion of epidural above	Bupivacaine 0.75%: 1-1.6 mL + Fentanyl: 15-25 mcg + Duromorph: 150-250 mcg + Epidural
Continuous Spinal	*Only do if unable to get an epidural or if wet tap occurs Bupi 0.125% or Ropi 0.2%: 1 mL/hr; can titrate up but extremely carefully	*Only do if unable to get an epidural or wet tap 0.5% Bupi or 0.5% Ropi 1-1.5 mL bolus; titrate 0.1 mL at a time

20. POSTPARTUM HEMORRHAGE

Oxytocin (Pitocin)	10-40 units in 1L bag after baby is delivered, 1-3 unit bolus if low risk of hypotension
Methylergonovine (Methergine)	0.2 mg **IM** q5-10min; max 2 doses Contraindications: severe HTN, gHTN, preeclampsia
Hemabate/Carboprost (15-methyl $PGF_{2\alpha}$)	0.25 mg **IM** q15min; max dose 2,000mg Contraindications: asthma
Misoprostol(PGE1)	600-1000 mcg **buccal or rectal** administration
Tranexamic Acid/TXA	1g over 10 mins

21. LOCAL ANESTHETICS (VOLUME ADJUSTED FOR NERVE BLOCKS)

Conversion from percent to mg/mL: concentration (percent) x 10 = mg/mL

Maximum doses	Plain mg/kg	With epinephrine (1:200,000) mg/kg
Lidocaine/Mepivacaine	4.5	7
Chlorprocaine	10	15
Bupivacaine	2.5	3
Levobupivacaine	2.5	3
Ropivacaine	2.5	3

22. Local Anesthetic Toxicity(LAST)

Treatment	Lipid Emulsion(20%): Bolus: 1.5 ml/kg Infusion: 0.25 ml/kg over 20 mins If unstable; repeat bolus and double infusion until stable Max lipid emulsion: 12 ml/kg
Seizures	Midazolam: 0.05-0.15 mg/kg bolus; max dose 4mg Propofol(If hemodynamically stable): 0.2 mg/kg bolus
Arrhythmia	Avoid beta blockers, calcium channel blockers, local anesthetics and negative ionotropes. Follow ACLS or PALS protocol after starting treatment
Hypotension	Avoid Vasopressin; Consider Epinephrine 0.2-1 mcg/kg IV

23. TRANSFUSION SHORT CUTS

Whole blood	6 mL/kg	Increases hemoglobin 1g/dL
PRBCs	4 mL/kg	Increases hemoglobin by 1g/dL
Platelets	5-10 mL/kg	Increases platelet count by 50,000-100,000/mm3
Fresh frozen plasma	10-15 mL/kg	Factor levels increse by ~15-20 percent
Cryoprecipitate	1-2 units/kg	Increases fibrinogen by ~60-100 mg/dL

24. FLUID AND BLOOD Maintenance Fluids (balanced salt solution)

For neonates and infants <6 months: 4mL/kg/h first 10 kg, 2 mL/kg/h 10-20 kg, 1mL/h for each kg above 20 (consider adding glucose to infusion)

Perioperatively for infants and children >6 months: 10-40 mL/kg over 1-4 hours

25. SPECIAL PROBLEMS

Diabetes insipidus
Dilute polyuria (urine osmolality <250 mOsml/L, >2 mL/kg/h), hypernatremia (sodium >145 mEq/L) with serum hyperosmolality (>300 mOsm/L)
DDAVP (desmopressin) 1-10 mU/kg/h (0.0025-0.025 μg/kg/h), titrate to effect (4 μg = 16 IU)

von Willebrand Disease (VWD) (Treatment depends on the type)
Desmopressin (DDAVP) 0.3 μg/kg IV once 30 minutes preoperatively (avoid in type 2B)
Amicar 100 mg/kg IV or PO 1 hour preoperatively, then q4-6h depending on the type of VWD

26. BLOOD PRODUCTS / TRANSFUSION

$$MABL = \frac{EBV \times (\text{starting hematocrit} - \text{minimum accepted hematocrit})}{\text{starting hematocrit}}$$

$$\text{Volume of PRBCs} = \frac{(\text{desired Hct} - \text{present Hct}) \times \text{estimated blood volume} \times \text{Weight}}{\text{Hematocrit of PRBCs}}$$

MABL = Maximum Allowable Blood Loss

27. Estimated Blood Volume (ml/kg)

Premie	100
Term	90
<1 year	80
1-6 years	75
Male	70
Female	65
Obese	60

28. NPO Guideline

2 hours	Clears
4 hours	Breast Milk
6 hours	Formula / Light Meal
8 hours	Full Meal

29. ANTIBIOTICS (Pediatric Dosing Only**)

Antibiotic#	AGE			Repeat intraoperative dosing (h)
	1st wk (>2 kg) (mg/kg)	1-4 wk (mg/kg)	>4 wk (mg/kg)	
Ampicillin/Sulbactam	#	50 (ampicillin)	50 (ampicillin) max 3g	2
Ampicillin	50 q8h	25-50 q6h	50 q6h max 3g	2
Aztreonam	30 q12h	30 q8-12h	30 q8h max 2g	4
Cefazolin	20 q24h	20 18h	30 q8h max 2g (<120 kg, 3g)	4
Cefuroxime	25-50 q12h	25-50 q12h	25-50 q8h max 1.5g	4
Cefotaxime	50 q8-12h	50 q6-8h	50 q6-8h max 1g	3
Cefoxitin	30 q8h	30-33 q8h	40 q8h max 2g	2
Cefotetan	#	30 q12h	40 q12h max 2g	6
Ceftriaxone	50 q24h	50-75 q24h	50-75 q12-24 max 2g	
Cefuroxime	25-50 q12h	25-50 q12h	25-50 q8h max 1g	4
Ciprofloxacin	10 q12h	10 q12h	10 q8h max 0.4g	
Clindamycin	5 q12h	5 q8h	10 q6-8h max 900 mg	6
Ertapenem	#	15 q12h	15 q12h max 1g	
Fluconazole	3 q72h	3 q24h	6-12 max 0.4g	
Gentamicin (over 60 min)	4 q24h	3.5 q24h	2-2.5 q8h Single dose 5 mg/kg	
Levofloxacin	#	#	10 q12h max 0.5g	
Metronidazole	7.5 q12h	15 q12h	7.5-15 q6h max 0.5g	
Moxifloxacin	5 q24h	10 q24h	10 q24h max 0.4g	
Nafcillin	25 q8h	25 q6h	25-50 q4-6h max 12g/day	
Piperacillin/Tazobactam	100 (piperacillin) q12h	100 (piperacillin) q8h	infants 2-9 mon (piperacillin) 80 mg/kg; >9 mon and ≤40 kg (piperacillin) 100 mg/kg; >40 kg (piperacillin) max 3.375g	2
Ticarcillin	75 q12h	50-75 q8h	33-50 q4-6h max 3.1g	
Vancomycin (over 60 min)	15 q12h	15 q8h	10-15 q8h max 2g	

30. NORMAL HEMODYNAMIC INDICES AND WEIGHT

Mean systolic blood pressure (mmHg) in preterm and term infants

Gestational age at birth	Day 1 of life	Day 10 of life
24	2-9	52
28	44	62
32	50	69
36	56	76
40	63	83

Age	Normal blood pressure (mmHg)		Mean heart rate (beats/min)	Weight range 10-90th percentile
	Mean systolic	Mean diastolic		
Preterm	55-75	35-45	120-170	
0-3 months	65-85	45-55	100-150	2.5-7.5
3-6 months	70-90	50-65	90-120	4.8-9.5
6-12 months	80-100	55-65	80-120	6.5-12.5
1-3 years	90-105	55-70	70-110	8.75-17
3-6 years	95-110	60-75	65-110	15.5-25
6-12 years	100-120	60-75	60-95	17-55
12-20 years	110-135	60-75	55-85	30-86

Simple formula to predict weight from age:
Infants 1-11 mo: Wt (kg) = (Age [months] + 9)/2
Children 1-4 yr: Wt (kg) = 2 x (Age [yr] + 5)
Children 5-14 yr: Wt (kg) = 4 x Age (yr)