BCRP PEDIATRIC CODE CARD

BOSTON COMBINED RESIDENCY PROGRAM IN PEDIATRICS MAY 2011

NOTE: This card contains guidelines and recommendations based upon published information. Specific medications, doses, and techniques may be altered based upon patient condition. This card is to be used only by clinicians with appropriate experience and training, and is not meant to be a comprehensive guide to therapy. Email with corrections or questions to a current chief resident.

WEIGHT, EQUIPMENT, VITAL SIGNS

Age	0	6m	1y	2y	4y	6y	8y	10	12y	14	Adult
Wt (kg)	3.5	7	10	12	18	20	25	30	40	50	70
BSA (m2)	0.25	0.38	0.48	0.55	0.68	0.82	0.95	1.18	1.34	1.5	1.73
ETT (mm)	3 - 3.5	3.5 – 4	4	4.5	5	5.5	6	6.5	6.5 – 7	7	7.5 – 8
ETT at lip (cm)	9	11	12	13	14	15	16	17	18	20	22
Blade size	0-1	1	1	1 – 1.5	1.5 – 2	2	2 – 3	2 – 3	3	3	3 – 4
Blade type	Miller					Miller or Macintosh			Usually Macintosh		
Trach size	00	1	1	1-2	2-3	3	4	4	5	6	6
LMA	1	1.5	2	2	2	2.5	2.5	3	3	3-4	5
NG (Fr)	8	8	8 – 10	10	10 – 12	12	12 - 14	14	16	16	16 – 18
OPA	0	1	1 - 2	2	2 - 3	3	4 - 5	4 – 5	4 – 5	4 – 5	4 – 5
Foley (Fr)	5	5	8	8	10	10	10	12	12	12	12
CVL (Fr)	3	4	4	4 – 5.5	5.5	5.5 – 7	5.5 – 7	5.5 – 7	5.5 – 7	5.5 – 7	7
HR 2nd%	90	105	99	80	74	65	62	60	60	58	55
HR 98th%	160	160	151	140	130	115	110	110	110	108	100
SBP 5th%	60	70	72	74	78	82	86	90	90	90	90
BP 95th%			103 56	106 61	111 69	114 74	118 78	119 80	123 81	128 82	136 87

Nasopharyngeal airway length: distance from nares to tragus.
Oropharyngeal airway length: distance from central incisors to angle of jaw.

BASIC LIFE SUPPORT

		Infant < 1 year	Child	Adolescent & Up
1) Airway		Head tilt + Chin lift (Jaw thrust if trauma)		
2) Breathing	Initial	2 rescue breaths		
	Rescue Breathing	15 – 20 breaths/min	15 – 20 breaths/min	10 – 12 breaths/min
	Advanced Airway	8 – 10 breaths/min		
	Foreign Body	Back slaps and chest thrusts	Abdominal thrusts	
3) Circulation	Pulse Check	Brachial / Femoral	Carotid / Femoral	Carotid
	Compress	2 fingers or 2 thumb-encircling	1 or 2 hands w/ heel	2 hands w/ heel
	Depth	1/3 – 1/2 depth of chest		1.5 – 2 inches
	Rate	100/minute		
Compression/Ventilation		15:2 (2 rescuers), 30:2 (single rescuer)		30:2

RAPID SEQUENCE INTUBATION

**** ASSIGN ROLES TO THE TEAM ****

1) Monitors, SaO2, CO2. Verify all equipment ready and working (STATICS):
- Scope, Tube, Airway adjuncts, Tape, Introducer, Connector, Suction
- Estimate blade and tube size by chart

2a) PREOXYGENATE: with 100% oxygen x 2 minutes
2b) PREMEDICATE (2-5 minutes before laryngoscopy):
- Strongly consider NS bolus 20 mL/kg
- < 5yr: Atropine 0.02mg/kg/dose IV [min: 0.1mg, max: 0.5 mg]

Order of meds: Premed (if appropriate) → Sedative → Paralytic

3) SEDATE & PARALYZE: Cricoid pressure from time of sedating med until tube confirmed
- See chart below for choice of sedative and paralytic (i.e. Etomidate + Rocuronium)
- Wait until loss of tone/reflexes.

4) INTUBATE: Tube depth at lip based on chart or 3 x ETT size.
- Confirm placement with auscultation, capnography, then CXR
- Decompress stomach with NGT or OGT

**** Note on RSI Medications:** ***Etomidate + Rocuronium*** **can be used safely for most RSI situations.**

Tips for Medication Selection:
Hypotension → Etomidate + Rocuronium
Head injury without hypotension → Thiopental + Rocuronium + Lidocaine
Severe status asthmaticus → Ketamine + Rocuronium + Atropine

Medication	Dose	Kinetics	Notes
Sedation, Analgesia, Amnesia			
Etomidate	0.3 mg/kg IV	Onset 1 min Duration 5-10 min	Pro: Hemodynamically neutral, decreases ICP Con: Short duration of action
Ketamine	1-3 mg/kg IV 4-5 mg/kg IM	Onset 1-2 min Duration 10-30min	Pro: Bronchodilator, preserves airway reflexes Con: Dissociative, ↑ secretions, ↑ ICP
Thiopental	4 - 5 mg/kg IV	Rapid onset Duration 10-30min	Pro: ↓ ICP, Anticonvulsant Con: significant ↓ BP, bronchospasm
Midazolam	0.1 – 0.2 mg/kg IV / IM	Onset 1-2 min Duration 30-60min	Pro: minimal ICP changes Con: ↓ BP, may need titration
Fentanyl	2 – 5 mCg/kg IV	Onset 1 min Duration 30-60min	Pro: minimal ICP & BP changes (at lower doses) Con: chest wall rigidity
Neuromuscular Blockade			
Rocuronium	1 – 1.2 mg/kg IV	Onset 30-60sec Duration 30-60min	Nondepolarizing blockade Pro: quick onset, no contraindications Con: longer duration
Vecuronium	0.1 - 0.2 mg/kg IV	Onset 30-120sec Duration 20-60min	Nondepolarizing blockade Con: NOT RSI, b/c slower onset
Succinyl-choline	1-2 mg/kg IV 2-4 mg/kg IM	Onset 30-60sec Duration 5-10min	Pro: Quick onset, Short duration Con: ↑K+, ↑ICP, risk of malignant hyperthermia Avoid use in: burns, crush injury, myopathies, denervating dz, spinal cord injury

PULSELESS ARREST

1) BLS Algorithm: Start/Continue CPR
2) Monitors, IV access, O2
3) Attach to defibrillator

Check Rhythm

VFib or Pulseless VTach: Shockable

A
CPR while charging. Give 1 shock.
- Manual: 2 J/kg
- AED > 1 year of age
Then resume CPR immediately

Give 5 Cycles of CPR

C
Check Rhythm: Shockable? — No

Shockable

Continue CPR while charging.
1. Give 1 shock
- Manual: 4 J/kg
- AED > 1 year of age
Resume CPR immediately
-AND-
2. Give Epinephrine
- 0.01 mg/kg IV/IO [max = 1 mg] (= 0.1 mL/kg of 1:10,000) OR
- 0.1 mg/kg ET (= 0.1mL/kg of 1:1,000)
** Repeat Epinephrine every 3-5 min

Give 5 Cycles of CPR

Check Rhythm: Shockable? — No

Shockable

Continue CPR while charging.
1. Give 1 shock
- Manual: 4J/kg
- AED > 1 year of age
Resume CPR immediately
2. Consider antiarrhythmics
Lidocaine 1mg/kg IV/IO [max 100mg]
Amiodarone 5mg/kg IV/IO [max 300mg]
MgSulfate 25-50mg/kg IV/IO [max 2gm] over several minutes for torsades de pointes
After 5 cycles of CPR go to box C above.

Asystole or PEA: Not Shockable

B
Resume CPR immediately
Give Epinephrine
- 0.01mg/kg IV/IO [max 1 mg] (= 0.1ml/kg of 1:10,000) OR
- 0.1mg/kg ET (= 0.1mL/kg of 1:1,000)
Repeat Epinephrine every 3 - 5 minutes

Give 5 Cycles of CPR

Check Rhythm: Shockable?

Shockable → Go to Box A

Not Shockable

- If asystole, resume CPR and go to Box B
- If electrical activity, check pulse. If no pulse, go to Box B. Remember H's and T's below.
- If pulse present, begin post-resuscitation care

Search for and treat possible causes (6 H's & 5 T's):
Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypo-/hyperkalemia
Hypoglycemia
Hypothermia
Toxins
Tamponade, cardiac
Tension pneumothorax
Thrombosis
Trauma

During CPR refer to BLS algorithm:
- Push hard and fast (100/min)
- Ensure full chest recoil
- Minimize interruptions in chest compressions
- Rotate compressors every 2 min w/ rhythm checks
- Avoid hyperventilation
- After an advanced airway is placed, rescuers deliver "cycles" of CPR. Give continuous chest compressions with 8-10 breaths per minute.
- Check rhythm every 2 minutes.

TACHYCARDIA WITH PULSE

1) BLS Algorithm: support ABC's
2) Monitors, IV access, O2
3) Attach to defibrillator
4) 12 Lead EKG if practical

Evaluate QRS Duration

Narrow QRS (≤ 0.08 sec) → Evaluate rhythm with 12-lead ECG or monitor

Wide QRS (> 0.08 sec) → Possible Ventricular Tachycardia

Probable Sinus
- Compatible history
- Known cause
- P waves present and normal
- Variable HR
- Infant: < 220 bpm
- Child: < 180 bpm

Treat Cause

Probable SVT
- History incompatible
- Hx of abrupt HR Δs
- P waves absent
- HR not variable
- Infant: ≥ 220 bpm
- Child: ≥ 180 bpm

Assess Perfusion

Probable Supraventricular Tachycardia

1. Consider Vagal Maneuvers

POOR PERFUSION

Synchronized Cardioversion
- 0.5 – 1 Joule/kg
- Repeat at up to 2 Joule/kg if not effective
- Use sedation if possible, but do not delay therapy

- OR-

If IV access is readily available:
- Adenosine
  - 0.1mg/kg IV/IO rapid bolus [max 6mg]
  - Follow immediately with NS flush
  - May repeat twice w/ 0.2 mg/kg [max: 12mg]
  - *Use w/ caution in asthmatics*
- Consider alternative mediations
  - Verapamil 0.1mg/kg IV max: 5mg
  Do not use in infants < 1 year old
  - Procainamide 15mg/kg IV over 30 – 60 min
  - Amiodarone 5mg/kg IV over 20 – 60 minutes

Do not use both amiodarone & procainamide.

ADEQUATE PERFUSION
- See "Poor Perfusion" for details of therapies
- Continue to support ABC's
- 12 Lead EKG and Consult cardiologist
- Consider vagal maneuvers
- Establish IV access as close to the heart as possible. Consider adenosine.
- Put pads on the patient and consider synchronized cardioversion
- Consider alternative medications

POOR PERFUSION

Synchronized Cardioversion
- 0.5 – 1 Joule/kg
- Increase to 2J/kg if not effective
- Sedate if possible, do not delay cardioversion

Consider Medications
- Procainamide 15mg/kg over 30 – 60 minutes
- Amiodarone 5mg/kg IV over over 20 – 60 minutes [max = 300mg]

** Do not use both amiodarone and procainamide*

ADEQUATE PERFUSION
- Keep pads on patient
- Consult cardiologist
- Consider amiodarone or procainamide
- Consider lidocaine
- Consider synchronized cardioversion

During evaluation and treatment:
- Secure, verify airway and establish vascular access
- Prepare for cardioversion
- Consider cardiology consult

Search for and treat possible causes (6 H's & 5 T's):
Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypo-/hyperkalemia
Hypoglycemia
Hypothermia
Toxins
Tamponade, cardiac
Tension pneumothorax
Thrombosis
Trauma

BRADYCARDIA WITH PULSE

1) BLS Algorithm: assess & support ABC's
2) Monitors, IV access, O2
3) Attach to pacer
4) 12 Lead EKG if practical

Bradycardia causing cardiorespiratory compromise?

No → - Observe - Support ABC's

Yes →

During CPR:

Attempt/Verify
- Secure airway and vascular access

Check
- Electrode, paddle placement
- Pacer position and contact

Give
- Epinephrine every 3-5 minutes
- Consider epi/dopa infusion

Identify and Treat Causes (H's/T's)
- Hypokalemia
- Hypothermia
- Head injury / Elevated ICP
- Hypovolemia
- Heart block
- Heart transplant
- Hydrogen ions (acidosis)
- Hypoglycemia
- Toxins, poisons
- Tamponade, cardiac
- Tension pneumothorax
- Thrombosis (coronary/pulmonary)
- Trauma

Cardiac Pacing
- May be useful for bradycardia from heart block or sinus node dysfunction.
- Switch defibrillator to "Pacing" mode.

Start CPR
- For HR < 60 with poor systemic perfusion despite oxygenation and ventilation

Epinephrine
- 0.01 mg/kg IV/IO [max = 1mg] (0.1 mL/kg of 1:10,000)
- 0.1 mg/kg ETT (0.1 mL/kg of 1:1,000)
- Repeat dose q3-5 minutes

Atropine
- 0.02 mg/kg IV/IO/ET [min = 0.1mg; max = 1mg]
- May repeat in 3-5 minutes x 1
- Give 1st if increased vagal tone or AV block

Consider Cardiac Pacing

Ongoing Bradycardia
- Continue CPR
- Continue epinephrine q3-5min
- Epi or Dopa Infusion
- Monitor for pulseless arrest

MODIFIED GLASGOW COMA SCALE

	Infant	Child	Score
Eye opening	Spontaneous	Spontaneous	4
	To speech	To speech	3
	To pain	To pain	2
	No response	No response	1
Verbal response	Coos and babbles	Oriented, appropriate	5
	Irritable cries	Confused	4
	Cries to pain	Inappropriate words	3
	Moans to pain	Incomprehensible	2
	No response	No response	1
Motor response	Moves spontaneously	Obeys commands	6
	Withdraws to touch	Localizes to pain	5
	Withdraws to pain	Withdraws from pain	4
	Flexion posturing	Flexion posturing	3
	Extension posturing	Extension posturing	2
	No response	No response	1

EMERGENCY MEDICATIONS

Drug	Indication	Dose/Route/Forms	Comments
Atropine	Symptomatic Bradycardia	0.02 mg/kg IV/IO [min 0.1mg] [max child: 0.5mg] [max adult: 1mg]	• May repeat x 1 after 5 min • 0.04 – 0.2 mg/kg ETT [max = 10 mg/dose]
Bicarbonate	1. Metabolic Acidosis 2. Arrest 3. ↑ K^+ 4. ↑ Mg^+ 5. TCA toxicity 6. ASA toxicity (> 30 mg/dL)	1mEq/kg IV/IO = 1 mL/kg of 8.4% solution (1 mEq/mL) = 2 mL/kg of 4.2% solution (0.5 mEq/mL)	• Infuse slowly • Do not mix line w/ Ca^{++} or catecholamines • Only give w/ effective ventilation • TCA toxicity: QRS >100ms or R in AVR • ASA: dialyze for acute level > 100, chronic > 60 or symptomatic
Blood Products	Albumin 5%: 10-20 mL/kg = 0.5 – 1g/kg IV/IO Albumin 25%: 2mL/kg = 1g/kg IV/IO Cryoprecipitate: 1 unit/10kg | Factor VIIa: 90 mcg/kg/dose; rpt q2h Fresh Frozen Plasma: 10-15mL/kg | Factor VIII: 15 – 50 units/kg pRBCs: 10mL/kg will raise HCT ~10% Platelets: 1 Unit/10kg will raise count ~50,000		
Calcium	↓ Ca^{++} ↑ K^+ ↑ Mg^+ CCB overdose	CaChloride 10% solution 20 mg/kg IV/IO = 0.2 mL/kg CaGluconate 10% solution 60-100 mg/kg IV/IO = 0.6 – 1 mL/kg	• Slow IV push: 10-20 sec for cardiac arrest, otherwise give over 5-10 minutes • Can repeat every 10 min in cardiac arrest • Preferably via CVL
Dextrose	Hypoglycemia	0.5-1 g/kg IV/IO = 2-4 mL/kg D25 = 5 -10 mL/kg D10	• Obtain blood and urine for critical labs if possible before correction
Epinephrine	1. Symptomatic Bradycardia 2. Cardiac arrest 3. Toxins (eg: β-blocker, Ca-channel blocker)	0.01 mg/kg IV/IO [max 1mg] = 0.1 mL/kg of 1:10,000 0.1 mg/kg ETT = 0.1mL/kg of 1:1,000 . 0.1 – 1 mCg/kg/min IV	• Arrest: can repeat every 3 – 5 minutes • May use infusion after initial dose for bradycardia or after spontaneous circulation is restored
	Anaphylaxis	0.01 mg/kg IM [max = 0.5mg] = 0.01 mL/kg of 1:1,000	• May also give antihistamine, H2 blocker, steroids
Furosemide	Fluid overload	1 mg/kg IV/IM/PO [max = 20mg]	• Consider infusion: 0.05 – 0.1 mg/kg/hr IV
Hydro-cortisone	Adrenal Insufficiency	Emergent: 1-2 mg/kg IV x 1 Stress: 50 mg/m^2 IV x1, then 50 mg/m^2/day/q6-8h IV	• Maintenance dosing: 10 – 20 mg/ m^2/day divided q6-8h IV/PO
Lidocaine	VT, VF	1 mg/kg IV/IO [max = 100mg] 2 – 3 mg/kg via ETT Drip 20 - 50 mcg/kg/min IV	• Rapid bolus for VF, pulseless VT. • Infuse over 2-3 minutes for VT with pulse
Narcotics	Fentanyl: 1-2 mCg/kg/dose q1h prn pain Hydromorphone: 0.015 mg/kg/dose IV q4-6h prn pain Morphine: 0.05 - 0.1 mg/kg/dose IV q2h prn pain		
Sedatives	Chloral Hydrate: 50 mg/kg/dose (MAX 1000mg) PO/PR x 1 Diphrenhydramine: 0.5-1 mg/kg/dose (MAX 50mg) PO/IV q6h Fentanyl: 1-10 mCg/kg/hr IV, titrate as necessary Midazolam: 0.05 – 0.1 mg/kg/hr IV, titrate as necessary Morphine: 0.05 – 0.1 mg/kg/hr IV, titrate as necessary		
Sodium Chloride	Symptomatic Hyponstremia	3% NaCl 1 mL/kg IV over 30 minutes	• Will ↑ [Na] ~1mEq/L
Vasopressin	DI	0.5 mU/kg/hr IV [max 10 mU/kg/hr] titrate to effect	• Double the dose q30 min prn until capture (< 2mL/kg/hr UOP)
	GI Bleed	2 - 5 mU/kg/min Titrate to effect.	• Once no bleeding x 12h, taper off over 1 – 2 day
	Pulseless VT/VF - adults	40 units IV x 1	• Give in place of 1st dose of epinephrine

EMERGENCY MEDICATIONS (TOX)

Activated Charcoal	Ingestion	1 g/kg [max 50g] Note: Poor absorption with: alcohols, heavy metals, inorganic ions, hydrocarbon	• Do not give if: risk of aspiration or caustic ingestion • Most effective w/in 1 hr
Flumazenil	Benzodiazepine Overdose	0.01 mg/kg IV q1 minute Max = 0.2 mg/dose , 1mg total dose	• Observe closely following reversal • Do not use if dependent on benzodiazepines for seizure control
Naloxone	1. Narcotic overdose 2. Consider for clonidine toxicity	≤ 5 yrs or ≤ 20kg: 0.1 mg/kg IV/IO/IM/ET > 5 yrs or > 20kg: 2mg IV/IO/IM/ET	• Repeat q30-60 min prn • Small rpt doses for partial reversal of resp depression = 1 mCg/kg/dose
APAP Toxicity	1. Acute: toxic on nomogram 2. Chronic or unknown time of ingestion: APAP > 10 or elevated LFTs	NAC (IV): 150mg/kg IV over 1 hr 50mg/kg IV over 4 hr 100mg/kg IV over 16 hr	• Follow LFT's, Coags • Repeat 100mg/kg x 16h until: feeling well, APAP < 10, LFT's Improving
Serotonin Syndrome	Tremor, ↑DTR's, ↑HR, ↑BP, ↑Temp, Clonus, MS Δ's	Cyproheptadine: < 2y: 0.06 mg/kg PO q6h 2 – 6y: 2mg PO q6h 7 – 14y: 4mg PO q6h Benzodiazepines	• IVF, O2, Monitoring • D/C all serotonergic agents • Consider w/ overdose of Dextromethorphan

PRESSORS

Drug	Dose (mCg/kg/min)	Site of action	Notes
Dopamine	2 – 20	Dose dependent: β to α > β	- Medium dose (5 – 10): inotrope, ↑ stroke volume, cardiac output - High dose (11 – 20): vasoconstrictor, ↑ afterload
Dobutamine	2 – 20	$\beta_1 >> \beta_2$	Almost pure cardiac inotrope with weak vasodilation
Epinephrine	0.05 – 2	β > α	Inotrope, vasoconstrictor
NORepinephrine	0.05 – 2	α > β	Potent vasoconstrictor
Milrinone	0.25 – 1	PDE3 inhibitor	- Bolus 50mcg/kg IV x 1 over minutes - Inotrope, vasodilator, Lusotrope

INCREASED INTRACRANIAL PRESSURE

Initial Management: A – B – C. O2, IV, Monitors. Note: CPP = MAP – ICP.
- Protect airway, D-stick, C-spine protection if comatose or trauma, Neurosurgery Consult
- Rapid treatment of ↓O_2, ↑CO_2, ↓BP, and ↑Temp (correct to < 37°C).
  - Maintain blood pressure to keep CPP ≥ 50 – 60mmHg
  - Consider Intubation with Etomidate (or Thiopental) + Roc (see section on RSI). Consider Lidocaine (1mg/kg [max 100mg]) as premed to blunt ICP spike.
  - Control ventilation with goal pCO2 35-40mmHg.
- Treat seizure w/ lorazepam (0.1 mg/kg IV [max 4 mg/dose]) followed by fosphenytoin (20mg PE/kg IV [max 1500 mg PE] x 1 – give over 5-7min)
- Noncontrast Head CT if unknown etiology

General Management:
- Elevate head of bed to 30 degrees
- Hypertonic Saline (3% NaCl) 2-6 mL/kg bolus over 30 minutes x 1. Then infusion 0.1 - 1 mL/kg per hr. Goal serum [Na] = 155 – 165mg/dL.
- Consider Dexamethasone load 1-2 mg/kg IV [max 10mg]. Only works for vasogenic edema (e.g. tumor) and not for cytogenic edema (e.g. stroke) or diffuse injury (e.g. blunt trauma).
- Consider AEDs if high risk for sz (depressed fx, parenchymal abnormality, severe injury)
- Consider paralysis (vec/roc) to prevent shivering in intubated patient. Adequate sedation!!
- Consider barbiturate induced coma (pentobarbital). Will likely require pressor support.

If signs of herniation:
- Hyperventilate → goal pCO2 = 25-30 mmHg. Transient effect as pH equilibrates in hours.
- Mannitol 0.5 – 1 gm/kg IV [max 50-100g]. Follow w/ Mannitol 0.25 – 0.5 gm/kg IV q6h if needed. Do NOT give continuous infusion. Hold for serum Na > 150 or serum Osm > 310.

STATUS EPILEPTICUS

A – B – C – Dstick. IV, O2, Monitors.

No IV access (you may attempt IO if IV access is not obtainable):
- Diazepam 0.3 – 0.5mg/kg PR [max 20mg].
  Note: rapid redistribution -> ↑ rate of sz recurrence
- Midazolam 0.2mg/kg IM or buccal
- Fosphenytoin 20mg PE/kg IM

IV access established:
- Lorazepam (Ativan) 0.1 mg/kg IV/IM over 3 min. [max 4mg] May repeat q5 min prn.

Seizure persists 10-15 minutes: Repeat Lorazepam and give:
- Fosphenytoin 20mg PE/kg IV/IM [max 1000mg PE]. Infuse over 7 mins. Side effect: ↓BP.

Seizure persists 15-20 minutes:
- Phenobarbital 20 mg/kg IV. Give over 15-20 min. Note: Will ↓RR (especially after benzo's)

Seizure persists 20-30 minutes:
- Fosphenytoin 10mg PE/kg IV/IM [max 500mg PE]. Infuse over 3 minutes.

Persistent seizures (consult Neurology):
- Pentobarbital coma: 5mg/kg IV load. Then 1-3mg/kg/hr IV infusion. Will likely need pressor
- Alternative IV antiepileptic agents:
  - Keppra (levetiracetam) 30 mg/kg IV x 1 over 15 minutes
  - Valproic acid 20 mg/kg IV x 1 over 5 minutes

- Labs: D-stick, CBC, Chem 10, LFT, ABG, β-HCG, Tox screens, AED levels
- Fever: treat with antipyretics. Consider LP.
- Hypoglycemia: IV dextrose bolus (see: EM Meds). If adult, Thiamine 100mg IM first.
- Hyponstremia: 3% Sodium Chloride 2 – 4 mL/kg IV slow push until seizure stops, then run the remainder over 30 – 60 minutes.
- If head trauma: get empiric Head CT

STATUS ASTHMATICUS

A – B – C
- Epinephrine 0.01 mg/kg IM = 0.01 mL/kg [max 0.5mL] prn extremis

Initial treatment: Back-to-back albuterol + ipratropium combination nebs x 3, Steroids
- Albuterol 0.5% solution nebulized: <10kg = 0.25mL, 10-30kg = 0.5mL, ≥ 30kg = 1mL
- Ipratropium neb: <10kg = 0.25 mg/dose, ≥ 10kg = 0.5 mg/dose
- Methylprednisolone 2 mg/kg IV [max 125mg] x 1 (may consider Prednisolone 2 mg/kg PO [max = 80mg] if tolerating PO)

If poor response, add:
- Magnesium Sulfate 40 mg/kg IV [max 2gm] over 20 minutes – monitor for hypotension and consider NS bolus
- Continuous Nebulized Albuterol 0.5 mg/kg/hr [max total β-agonist = 20mg/hr]. Titrate to HR.

If poor response, add:
- Terbutaline: Loading dose 5-10 mCg/kg IV/SC over 10 minutes. Infusion 0.4 mCg/kg/min IV. Note: ↑ by 0.1 mCg/kg/min to 1 mCg/kg/min, then ↑ by 0.5 mCg/kg/min, titrating to ↑HR
- Consider Heliox 70:30 heliumoxygen mixture

If impending respiratory failure w/o response:
- Did you consider: Foreign body obstruction, vocal cord paralysis, congenital malformation (rings, slings, laryngomalacia)
- **Intubation:** consider Ketamine + Atropine + Rocuronium (See section on RSI)
- **Mechanical ventilation:** Sedation with midazolam, ketamine, and isoflurane as needed. Avoid prolonged neuromuscular blockade. Volume cycled ventilation with permissive hypercapnia. Minimize PEEP, long E time. Check for auto-PEEP frequently. Anticipate air leak, pneumothorax, and PEA. Administering ketamine and/or lidocaine before suctioning may reduce bronchospasm.
  - Ketamine 1 mg/kg IV q1h PRN suctioning
  - Lidocaine 1 mg/kg ETT q4h PRN suctioning

NOTES:
- Follow EKG, troponin, CK q12h if on terbutaline. Caution that β-agonist ≥ 20 mg/hr significantly increases the risk of arrhythmia.
- Monitor for hypokalemia, hyperglycemia, and arrhythmias with high-dose β-agonist.
- Avoid Adenosine in patients who develop SVT. Alternatively, in patients ≥ 1 yr old use **Verapamil 0.1mg/kg IV [max 5mg].** May repeat in 30 minutes if adequate response not achieved [max 10mg]. Vagal maneuvers should be attempted in patients < 1 year old.
- As patient improves, remember that treatment algorithm is guided by: "Last on, First off"

HYPERKALEMIA

A – B – C – Discontinue all IVF (including TPN)
- Labs – ABG/VBG w/ lytes, CBC, Chem 10, serial 12-lead EKG's
- If possible, hyperventilate patient to raise pH

Initial management: CHOOSE 1 of following:
- Calcium Chloride (10% solution) 20 mg/kg IV/IO [max 2gm] over 5 minutes = 0.2 mL/kg
- Calcium Gluconate(10% solution) 100 mg/kg IV/IO x 1 [max 3gm] = 1 mL/kg
  Note: CaGluconate is the preferred form if patient is well perfused.

Then:
- Sodium Bicarbonate (8.4% solution) 1 mEq/kg = 1mL/kg IV/IO [max 50 mEq].
  **Flush the line well between giving Calcium.

Also consider:
- Regular Insulin 0.1 units/kg [max 10 units] + Dextrose 1 g/kg IV/IO [max 50g] = 4 mL/kg D25. Infuse simultaneously over 30-60 minutes. Follow blood sugars.
- Albuterol 0.5% solution nebulized: <10kg = 0.25mL, 10-30kg = 0.5mL, ≥ 30kg = 1mL

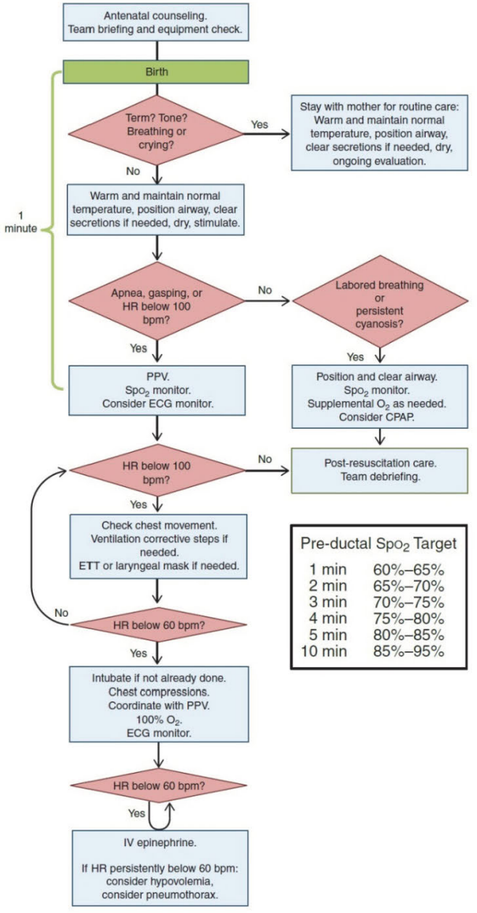
If persistent hyperkalemia or symptoms:
- Kayexalate 1 gm/kg PO/PR [max 50gm] q6h
- Furosemide 1 mg/kg IV [max = 20 mg/dose]
- Hemodialysis

Notes: Consider as possible causes: lab error, hemolyzed sample, exogenous (IVF, TPN, ingestion), renal failure, adrenal insufficiency, cell death (rhabdo, burn, tumor lysis), drug (digitalis, ACE-I), hematoma
- EKG changes: Peaked T wave → PR + QRS prolongation → Loss of p-wave → Sine wave

CRITICAL SCENARIOS

Condition	Treatment	Notes
Acute Coronary Syndrome	• A-B-C, 12-Lead EKG, IV, O2 • Aspirin 324 mg PO x 1 (chew) • Nitroglycerin 0.2-0.4 mg SL q5 min x 3 doses. Assess BP and pain relief. • Metoprolol 5 mg IV q5 min, titrate to BP and HR • Morphine 0.05-1 mg/kg IV [max 2-4mg] to relieve pain and anxiety	• Nitro: use w/ caution in inferior MI b/c may ↓↓ BP • Nitro: if incomplete pain relief, consider IV infusion 10 mCg/min. Titrate up 10 mCg/min q10 minutes • Metroprolol: give if ↑BP or ↑ HR • After initial stabilization, make preparations for transfer
Anaphylaxis	• Epinephrine IM: 1:1000 0.01 mL/kg [max 0.5mL] IV: 1:10,000 0.1 mL/kg over 1-2 min • Diphenhydramine 1-2mg/kg IV [max 50mg] • Methylpred 1-2mg/kg IV [max 125mg] • Ranitidine 1-2mg/kg IV [max 50mg]	• IV epinephrine if no perfusion • Epinephrine is the only medication with proven outcomes benefit. • Consider racemic epi 2.25% nebs (0.25 – 0.5mL) • Consider epinephrine infusion (see Pressors section)
Croup	• Racemic Epinephrine 2.25%: 0.25-0.5 mL/dose • Dexamethasone 0.6 mg/kg PO/IV/IM [max 12mg]	• Can repeat Epi nebs q5-10min • Methylprednisolone 2 mg/kg IV if dexamethasone isn't available
DKA	VBG, Chem 10, UA, Osm, HbA1C, CBC 1) NS bolus 10 mL/kg IV over 1 hour 2) Then, Insulin 0.1 Units/kg/h IV AND IVF at 1.5-2X maintenance (see references for IVF selection)	• Definition: Glucose > 200mg/dL Moderate-Large Ketonuria pH < 7.3 or HCO3 < 15 –Monitor mental status, Na, K+, Phos, and Osm closely during correction
Duct-dependent Heart Disease	• Prostaglandin E1 (Alprostadil) 0.05 – 0.1 mcg/kg/min IV/IO • Dopamine for persistent hypotension (see Pressors) • NaBicarbonate 1 mEq/kg IV for pH < 7.25	• Side effects of PGE1: hypotension and apnea. Secure airway! • Consider in cases of shock + acidosis in 1st month of life. • Must have adequate ventilation when using NaBicarbonate
Hypertensive Emergency	• Hydralazine 0.1 – 0.5 mg/kg IV [max 20mg] q4-6h • Labetalol 0.25 – 1 mg/kg IV [max 20mg] q4-6h • Nitroprusside 0.5 – 10 mcg/kg/min (usual dose: 3 mCg/kg/min). Follow cyanide levels. Do not use in renal insufficiency. • Esmolol 500 mCg/kg x 1 over 1 min, then 50 mCg/kg/min. [max 200 mCg/kg/min]	• Defined as life or organ threatening HTN (encephalopathy, sz, stroke, heart failure, pulmonary edema, renal failure) • Goal of tx: initial reduction of BP by only 25%, then reduce slowly over 3-4 days. • Esmolol: If no response in 4 min, give repeat 500 mCg/kg IV x 1 and increase infusion to 200 mCg/kg/min.
Tetralogy Spell	• ABC's, minimize anxiety, knees to chest, NS bolus, 100%O2 • Morphine 0.1 mg/kg SC/IV/IM • Phenylephrine 0.1-0.5 mCg/kg/min IV • Propanolol 0.01-0.1 mg/kg IV over 10min [max 3 mg/dose]	• Goal of tx: increase SVR, reduce infundibular spasm and peripheral vascular resistance. • Correct acidosis, anemia

NEONATAL RESUSCITATION



Pre-ductal Spo_2 Target	
1 min	60%–65%
2 min	65%–70%
3 min	70%–75%
4 min	75%–80%
5 min	80%–85%
10 min	85%–95%