



*The Organization for Transplant Professionals*

# Pediatric Donor Management Guidelines

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*The following provides standard pediatric dosages for various drugs. Doses provided are guidelines only and are not intended to substitute for the medical judgment of the treating physician or transplant coordinator. Actual doses may vary depending on the child's condition and other relevant circumstances.*

## **Formulas for Weight, ETT Size, Depth ETT, IV Fluids, and Vital Signs**

**Estimated Wt in kg:** 2 (age in years) + 8

**Estimated body surface area:**  $\frac{4 \times \text{wt}(\text{kg}) + 7}{90 + \text{wt}(\text{kg})}$

**ETT size:**  $\frac{16 + \text{age in years}}{4}$

**Depth of ETT (cm)** = 3 x size of the ETT or 10 + age in years (children 1-12 years of age)

**Lowest Acceptable Systolic Blood Pressure** = (2 x age in years) + 70

<b>Abnormal Vital Signs</b>	<b>RR</b>	<b>Pulse</b>	<b>SBP</b>
Infant	> 40	> 160	< 60
Toddler	> 30	> 140	< 75
School age	> 25	> 120	< 85
Adolescent	> 20	> 110	< 90

**Hypoglycemia:** 2 cc/kg IV of 25% Dextrose

**Hourly maintenance fluids:** 1st 10 kg = 4 cc/kg  
2nd 10 kg = 2 cc/kg  
>20 kg = wt(kg) + 40

**Fluid Resuscitation:** 20 cc's/kg of Lactated Ringers, Normal Saline or 5% Albumin  
Reassess, repeat x 2 as needed

*\*(Hypotonic and dextrose containing IVF's should **never** be used for fluid resuscitation)*

Hetastarch (Hespan) or other artificial plasma expanders should be avoided for fluid resuscitation  
*(Note: Large amounts of Hepsan or artificial plasma expanders can result in a coagulopathy and should be avoided in patients with severe bleeding disorders)*

## **PEDIATRIC CODE MEDICATIONS**

<b>AGE</b>	<b>NB</b>	<b>3-9 mo</b>		<b>1 yr</b>	<b>2-3 yr</b>	<b>4 yr</b>	<b>5-6 yr</b>	<b>7-8 yr</b>	<b>9 yr</b>	<b>10 yr</b>	<b>11 yr</b>
<b>Weight (kg)</b>	<b>3</b>	<b>5</b>	<b>7</b>	<b>10</b>	<b>12</b>	<b>15</b>	<b>20</b>	<b>25</b>	<b>30</b>	<b>35</b>	<b>40</b>
<b>EPINEPHRINE 1:10,000</b> Conc: 0.1 mg/cc IV, IO, ET Dose: 0.01 mg/kg	0.3 cc	0.5 cc	0.7 cc	1 cc	1.2 cc	1.5 cc	2 cc	2.5 cc	3 cc	3.5 cc	4 cc
<b>ATROPINE</b> Conc: 0.1 mg/cc IV, IO, ET Dose: 0.02 mg/kg	1 cc	1 cc	1.4 cc	2 cc	2.4 cc	3 cc	4 cc	5 cc	6 cc	7 cc	8 cc
<b>8.4% Na BICARBONATE</b> Conc: 1 meq/cc IV, IO Dose: 1 meq/kg	3 cc	5 cc	7 cc	10 cc	12 cc	15 cc	20 cc	25 cc	30 cc	35 cc	40 cc
<b>10% Ca CHLORIDE</b> Conc: 100 mg/cc IV, IO Dose: 20 mg/kg	0.6 cc	1 cc	1.4 cc	2 cc	2.4 cc	3 cc	4 cc	5 cc	6 cc	7 cc	8 cc
<b>ETT SIZE</b>	3.0	3.5 – 4.0		4.0 – 4.5		5.0	5.0-5.5	5.5-6.0	6.0-6.5	6.5-7.0	7.0-7.5
	<i>Uncuffed ETT</i>						<i>Cuffed ETT</i>				
<b>Depth of ETT (cm)</b>	9.0	10	10	11	12-13	14	15-16	18	20	21	22

**Defibrillation: 2 joules/kg. May double and repeat X 2, and then as necessary**

**Synchronized Cardioversion: 1 joule/kg or ½ the defibrillation dose.**

**May double and repeat X 2, and then as necessary**

## Pharmacologic Agents Used for Hormonal Resuscitation

<b>Drug</b>	<b>Dose</b>	<b>Route</b>	<b>Comments</b>
<b>DDAVP</b> ( <i>Desmopressin</i> ®)	0.5 mcg/hour	IV	½ life 75-120 mins Titrate to effect to control urine output
<b>Vasopressin</b> ( <i>Pitressin</i> ®)	0.5 milli-units/kg/hour	IV	½ life 10-35 mins Titrate to effect to control urine output Hypertension can occur
<b>Levothyroxine</b> ( <i>Synthroid</i> ®)	0.8 – 1.4 mcg/kg/hour	IV	Titrate to effect Bolus dose 1-5 mcg/kg can be administered. Smaller infants and children require a higher bolus and infusion dose.
<b>Triiodothyronine</b> ( <i>T<sub>3</sub></i> )	0.05 – 0.2 mcg/kg/hour	IV	Titrate to effect
<b>Hydrocortisone</b> ( <i>Solucortef</i> ®)	1mg/kg	IV	Fluid retention Glucose intolerance
<b>Insulin</b>	0.05 – 0.1 units/kg/hour	IV	Titrate to effect to control blood glucose levels Monitor for hypoglycemia

## **Antiarrhythmic Agents**

<b>Drug</b>	<b>Dose</b>	<b>Route</b>	<b>Comments</b>
<b>Adenosine</b> (Adenocard IV®)	100 mcg/kg Max dose 12mg	Rapid IV push	Repeat dose 200 mcg/kg Max single dose: 12 mg
<b>Amiodarone</b> (Cordarone®)	5 mg/kg	IV	Repeat dose = 5 mg/kg infused over 30 mins Infusion: 5-10 mcg/kg/min Hypotension
<b>Atropine</b>	0.02 mg/kg	IV	Min. dose: 0.1 mg Max. dose: 0.5-1.0 mg
<b>Lidocaine</b>	1 – 2 mg/kg	IV	Infusion: 10-50 mcg/kg/min
<b>Magnesium Sulfate</b>	30 mg/kg infused over 10 minutes	IV	Max. dose: 2.5 grams Repeat dose: 10 mg/kg

### **Correction of Metabolic Acidosis**

<b>Sodium bicarbonate</b>	1 meq/kg	IV	Can increase plasma osmolarity Hyponatremia can occur or be aggravated with repeated dosing
<b>THAM</b> (Tromethamine®)	Base deficit x wt(kg) = cc's of 0.3 molar solution of THAM	IV	Does not increase osmolarity or CO <sub>2</sub> production Hypoglycemia can occur Contraindicated in renal failure May increase coagulation time

## *Inotropic Infusions*

<i>Drug</i>	<i>Dose</i>	<i>Comments</i>
<b>Milrinone</b> (Primacor®)	0.25 – 0.5 mcg/kg/min	Loading dose: 50 mcg/kg Hypotension can occur
<b>Dopamine</b>	2 – 20 mcg/kg/min	Titrate to desired effect
<b>Dobutamine</b> (Dobutrex®)	2 – 20 mcg/kg/min	Titrate to desired effect
<b>Epinephrine</b>	0.1 – 2 mcg/kg/min	Titrate to desired effect
<b>Norepinephrine</b> (Levophed®)	0.05 – 1 mcg/kg/min	Titrate to desired effect
<b>Phenylephrine</b> (Neo-Synephrine®)	0.1 – 0.5 mcg/kg/min	Bolus: 5 – 20 mcg/kg Titrate to desired effect
<b>Vasopressin</b> (Pitressin®)	0.0003 – 0.002 units/kg/min	Limited data in children. Not recommended as first line therapy.

## Antihypertensives

<b>Drug</b>	<b>Dose</b>	<b>Comments</b>
<b>Sodium Nitroprusside</b> (Nipride®)	0.5 – 10 mcg/kg/min	Thiocyanate and cyanide toxicity. Mix 10 mg thiosulfate for every 1mg of nitroprusside Titrate to effect Monitor for hypotension
<b>Esmolol</b> (Brevibloc®)	50 – 250 mcg/kg/min	Loading dose: 500 mcg/kg Bronchospasm can occur Titrate to effect Monitor for hypotension
<b>Labetalol</b> (Normodyne®) (Trandate®)	Bolus: 0.5 – 1 mg/kg Infusion: 0.4 – 3 mg/kg/hour	Titrate to effect Monitor for hypotension
<b>Nicardipine</b> (Cardene IV®)	1 – 3 mcg/kg/min	Titrate to effect Monitor for Hypotension
<b>Hydralazine</b> (Apresoline®)	0.1 – 0.2 mg/kg up to 20 mg	Dose may be repeated every 20-30 minutes Monitor for hypotension

# Antibiotics

## **Ampicillin**

100 – 200 mg/kg/day IV divided every 6 hours  
Meningitis: 200 – 400 mg/kg/day IV divided every 6 hours

## **Gentamicin**

< 30 days of age: 4 mg/kg/dose IV every 24 hours  
>30 days of age: 2.5 mg/kg/dose IV every 8 hours  
*\*Dosing adjusted based upon serum levels*

## **Cefazolin**

(Ancef®, Kefzol®)

25 mg/kg/dose IV every 8 hours

## **Ceftriaxone**

(Rocephin®)

50 – 75 mg/kg/day IV/IM daily or divided every 12 hours  
Meningitis: 100 mg/kg/day IV daily or divided every 12 hours  
*\*Use with caution in neonates because of risk for hyperbilirubemia*

## **Cefotaxime**

(Claforan®)

< 7 days of age: 100 mg/kg/day IV/IM divided every 12 hours  
> 7 days of age: 100 – 200 mg/kg/day IV/IM divided every 8 hours  
Meningitis: 200 mg/kg/day IV divided every 6 hours

## **Cefuroxime**

(Zinacef®)

100 – 150 mg/kg/day IV/IM divided every 8 hours

## **Ceftazidime**

(Fortaz®)

100 – 150 mg/kg/day IV divided every 8 hours

## **Clindamycin**

(Cleocin®)

10 mg/kg/dose IV every 6 hours

## **Oxacillin**

50 mg/kg/dose IV every 6 hours

## **Vancomycin**

< 30 days of age: 15 mg/kg/dose IV every 12 hours  
> 30 days of age: 40 mg/kg/day IV divided every 6 hours  
Meningitis: 60 mg/kg/day IV divided every 6 hours  
*\*Dosing adjusted based upon serum levels*



## ***Bronchodilator Therapy***

<b><i>Drug</i></b>	<b><i>Dose</i></b>	<b><i>Route</i></b>	<b><i>Comments</i></b>
<b><u>Aerosolized Agents</u></b>			
<b><i>Albuterol</i></b>	2.5 – 5 mg	Aerosolized	Repeat as needed
<b><i>Continuous Albuterol</i></b>	10 – 20 mg/hour	Aerosolized	
<b><i>Ipratropium Bromide</i></b> ( <i>Atrovent</i> <sup>®</sup> )	0.5 – 1 mg	Aerosolized q 4 – 6 hours	
<b><u>Steroids</u></b>			
<b><i>Solumedrol</i></b>	1 mg/kg	IV	
<b><u>IV Agents</u></b>			
<b><i>Magnesium Sulfate</i></b>	50 – 75 mg/kg	IV over 20 mins	Max. 2.5 grams
<b><i>Terbutaline</i></b> ( <i>Brethine</i> <sup>®</sup> )	0.5 – 3 mcg/kg/min		Loading dose: 10 – 20 mcg/kg

# ***Maintaining Mean Arterial Pressure in the Pediatric Organ Donor***

## **Hemodynamically Stable**

- Steroids (soluortef)
- Diabetes Insipidus
  - a. DDAVP
    - 1. Intermittent dose
    - 2. Continuous infusion
  - OR*
  - b. Vasopressin

## **Hemodynamically Unstable**

- Volume loading
- Inotropic support
  - Dopamine
  - Dobutamine
  - Epinephrine
  - Phenylephrine
  - Norepinephrine
- Steroids (soluortef)
- Levothyroxine
- Diabetes Insipidus
  - a. Vasopressin

*DDAVP has a longer ½ life. This agent can be discontinued 2-3 hours prior to going to the operating suite for organ recovery.  
Consultation with transplant surgeons should occur to discuss preferences in pharmacologic agents used to maintain hemodynamic stability*

# Goals of Treatment

## ***Prevention and/or correction of:***

Hypoxemia

Hypo or hypertension

Hypo or hyperthermia

Hypo or hypercarbia

Hypo or hyperglycemia

Hypo or hypernatremia

- The management of the pediatric organ donor will be dictated by regional standards of care and the physicians caring for the child.
- Consultation with a pediatric intensive care specialist and your regional medical director is paramount to ensure the best possible outcome for organ recovery
- Become familiar with the intensivists and transplant surgery guidelines in the institutions that you serve.

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