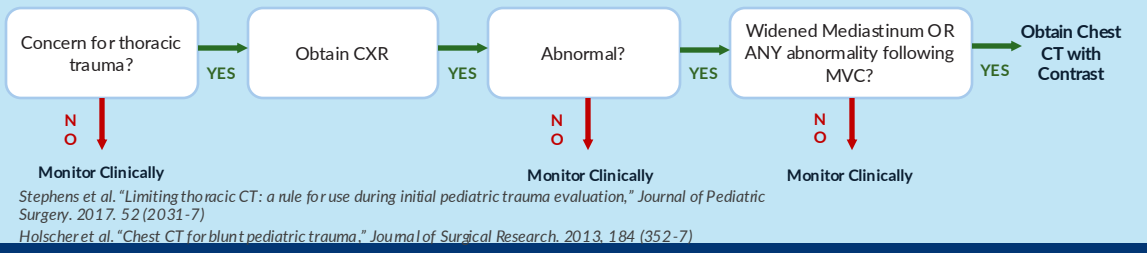
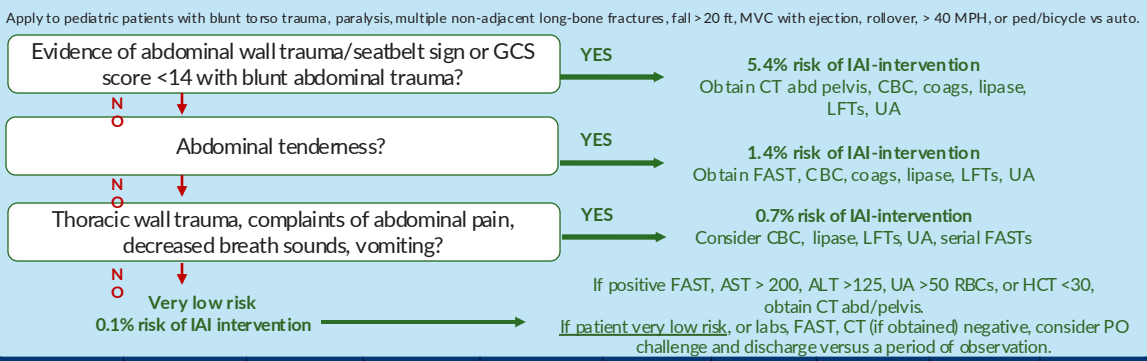


Pediatric Blunt Thoracic Trauma



Pediatric Blunt Abdominal Trauma



Age	Wt (kg)	ETT ID (mm)	Blade (straight or curved)	ETT insertion preferred (cm)	EZ-IO	CVC size (Fr)	Chest tubes and (Pigtails) (Fr)	NG/OG tube	Urinary catheter
Neonate	< 1	2.5	0s	7	Pink		8-12 (6-8)	5	5Fr feed
Neonate	1-2	3.0	0s	8	Pink		10-14 (6-8)	5	5Fr feed
Neonate	2-4	3.5	0-1s	9	Pink		10-14 (6-8)	5	5Fr feed
1-6 m	4-6	3.5-4.0	1s	12	Pink/Blue	3	10-14 (6-8)	8	6Fr
6 m-1 yr	6-10	3.5-4.0	1s	13	Pink/Blue	3-4	10-14 (6-8)	8	8Fr
1-2 yr	10-12	4.0	1s(1.5)	14	Blue	4-5	14-20 (6-8)	10	10Fr
2-3 yr	12-14	4.5	1s-2s	15	Blue	4-5	20-24 (8-14)	10	10Fr
4-5 yr	16-20	5.0	2s	16	Blue	4-5	20-24 (8-14)	12	10-12Fr
6-7 yr	23-28	5.0-5.5	2s or 2c	16	Blue	4-5	20-28 (8-14)	12	10-12Fr
8-9 yr	31-34	5.5-6.0	2-3s or 2-3c	17	Blue	5-8	20-28 (8-14)	12	12Fr
10-11 yr	37-40	6.0-6.5	2-3s or 3c	18	Blue/Yellow	5-8	28-40 (8-14)	14	12Fr
12-13 yr	43-46	6.5-7.0	2-3s or 3c	18	Blue/Yellow	5-8	28-40 (8-14)	14	12Fr
> 14 yr	> 50	7.0-8.0	2-3s or 3c	20-22	Blue/Yellow	5-8	32-40 (8-14)	18	12-16Fr



Pediatric Trauma Management Guide

For transfers, consultation, or to admit a patient, call 503-494-7000.

Sign	Glasgow Coma Scale	Pediatric GCS	Score
Eye opening	Spontaneous	Spontaneous	4
	To voice	To sound	3
	To pain	To pain	2
	None	None	1
Verbal response	Oriented	Age-appropriate vocalization, follows objects, interacts (coos, babbles)	5
	Disoriented	Cries, irritable	4
	Inappropriate words	Cries to pain	3
	Incomprehensible sounds	Moans to pain	2
Motor response	Obeyes commands	Spontaneous movements	6
	Localizes pain	Withdraws to touch	5
	Withdraws from pain	Withdraws to pain	4
	Abnormal flexion	Abnormal flexion	3
	Abnormal extension	Abnormal extension	2
	None	None	1
Best score			15

Glasgow Coma Scale

Age	RR	HR	Minimum BP (sys mmHg)
Neonate	< 60	145	52-60
1-6 mo	24-30	120	70
6 mo-1 yr	24-30	130	70
1-2 yr	20-24	130	72-74
2-4 yr	20-24	120	74-82
4-6 yr	20-24	100	78-82
6-8 yr	12-20	100	82-84
10-12 yr	12-20	75	90
> 14 yr	10-14	70	90

Age-Adjusted Vital Average

Trauma Medication*

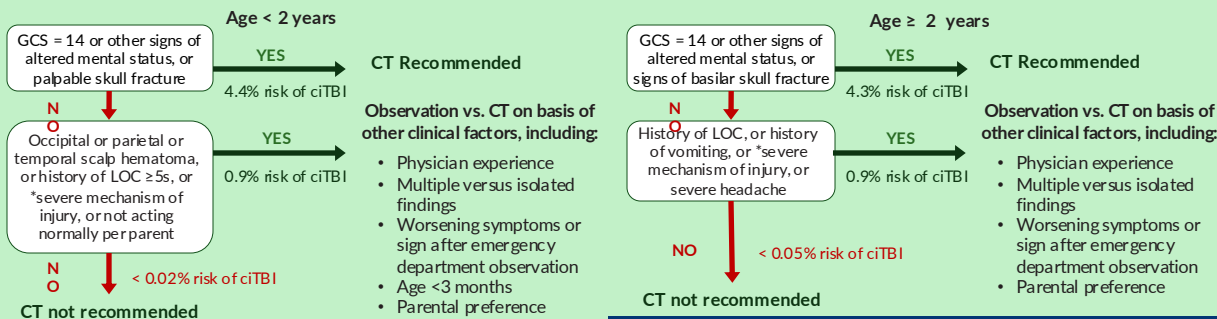
- All IV meds can be administered via IO
- Hemorrhagic shock (prioritize blood transfusion before meds):**
- Norepinephrine: 0.05-1mcg/kg/min
 - Vasopressin 0.01-0.48 units/kg/hour
 - Epinephrine 0.02-1mcg/kg/min, peripheral IV okay up to 0.1mcg/kg/min
- Spinal shock:**
- Norepinephrine: 0.05-1mcg/kg/min
- Sedation and Analgesia:**
- Fentanyl: 0.5-1 mcg/kg/dose IV (max 50 mcg), 1-2 mcg/kg/dose IN (max 100mcg), q30 minutes prn
 - Morphine: 0.05-0.1mg/kg/dose IV (max 2-5mg), q2 hours prn
 - Midazolam: 0.05-0.1mg/kg/dose IV (max 6-10mg), 0.1-0.4mg/kg/dose IN (max 10mg), q30 minutes prn
 - Lorazepam: 0.05mg/kg/dose IV (max 2-4mg), repeat once q 10 min prn
 - Propofol: 25-100 mcg/kg/min OR bolus 0.5-2 mg/kg q5 minutes prn
- Rapid Sequence Intubation:**
- Induction: Etomidate 0.3mg/kg IV OR Ketamine 1mg/kg IV
 - Paralysis: Rocuronium 1mg/kg IV

Pediatric Burns: Oregon Bum Center: 503-413-4232

- Fluid resuscitation (Parkland formula):** In addition to maintenance:
- 4 ml X kg X % BSA, ½ over 1st 8 hrs, ½ over next 16 hrs
 - Lactated ringers for resuscitation
- Consider labs for major burns:**
- CBC, BMP, UA, creatinin kinase, VBG with co-ox for CO-Hgb
- Consider intubation if:**
- Soot in mouth, singed nasal hairs, facial burns, stridor, hoarseness, drooling, dysphagia, altered mental status
- Hazardous in halations (fires in enclosed spaces):**
- Carbon monoxide: headache, nausea, seizures, arrhythmias, etc.
 - 100% O2 if mild symptoms, 100% hyperbaric oxygen if altered mental status, pH < 7.1, arrhythmias, CO-Hgb > 25%
 - Cyanide: lactic acidosis, headache, coma, seizures, arrhythmia, vomiting, cherry-red skin
 - Hydroxocobalamin (70mg/kg, max 5g) IV,
 - If hydroxocobalamin not available, Na Thiosulfate 25% (1.65ml/kg, max 50ml of 25% solution)
- Criteria for Bum Center referral:**
- Partial thickness burns of > 5-10% TBSA
 - Full thickness burns > 2% TBSA
 - Burns > 1% face, perineum, hands, feet
 - Circumferential burns, burns overlying joints
 - Inhalational injury



TBI Imaging: Head CT in Children w/ GCS 14-15

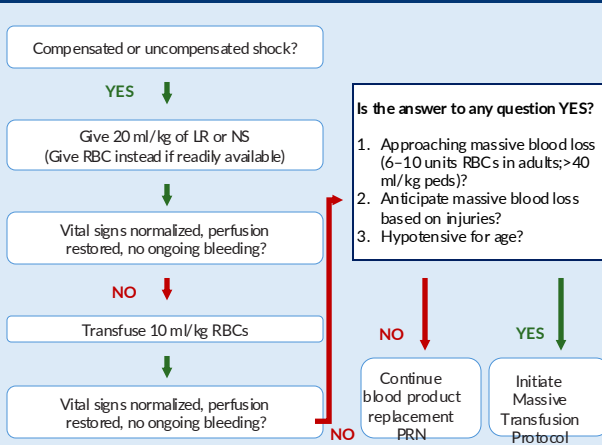


* Severe Injury Mechanism

- MVC with rollover, patient ejection, or death of another passenger
- Ped or bicycle w/o helmet struck by motorized vehicle
- Fall > 3 ft if age > 2 yrs, fall > 5 ft if age ≥ 2 yrs
- Head struck by high-impact object

Kupperman N et al., "ID of children at very low-risk of clinically-important brain injuries after head trauma: a prospective cohort study," *Lancet*. 2009 Oct 3;374 (9696):1160-70

Fluid Resuscitation in Trauma



- Is the answer to any question YES?
- Approaching massive blood loss (6-10 units RBCs in adults; >40 ml/kg peds)?
 - Anticipate massive blood loss based on injuries?
 - Hypotensive for age?

TBI Management

Management of Mild to Moderate TBI

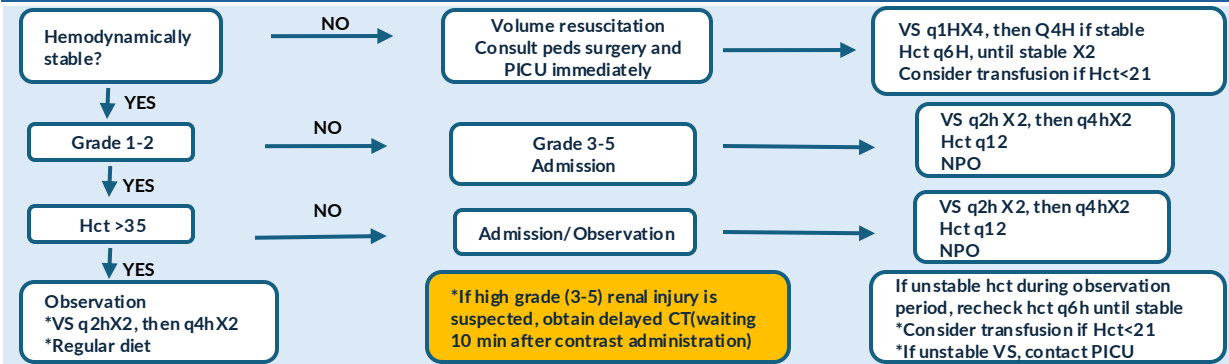
For children with GCS 14-15, if mental status has normalized, there has been no deterioration after a period of observation, and, if obtained, CT head is negative, may discharge home with strict return precautions. If neuroimaging indicated, consider quick brain MRI with GRE if available. For children with GCS 9-13, transfer to pediatric trauma center as a trauma activation. As with severe TBI, avoid hypoxia, hypotension, hypoventilation, or hyperventilation. Maintain cervical spine immobilization regardless of clinical or imaging findings.

Management of Severe TBI

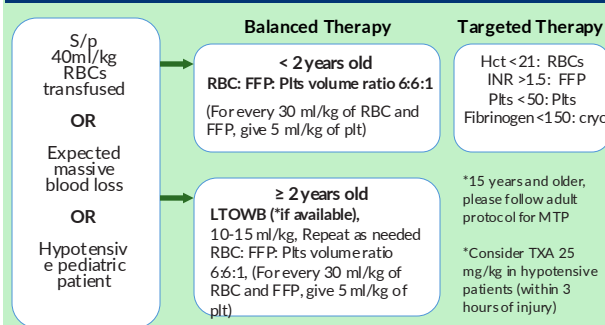
Pediatric Severe TBI protocol (GCS ≤ 8): Hypoxia, hypotension, and hypoventilation are major determinants of poor outcome and should be avoided at all costs.

Safely Position Head/Neck	Apply cervical collar, elevate HOB > 30 degrees
Secure Airway – Intubate	Use Etomidate (0.3mg/kg IV) or Ketamine (1-2mg/kg IV) Rocuronium (1mg/kg IV) at MD discretion
Avoid Hypoxia (SpO2 < 90%)	Give supplemental oxygen with Goal SpO2 92-97%
Avoid Hypoventilation (hypercarbia)	Obtain Stat Blood Gas, with Goal pvcO2 40-45, (ETCO2 30-35) Hyperventilation is NOT recommended except in herniation
Avoid Hypotension	1-10 years: Maintain SBP >70mmHg + (2 x age) > 10 years: Maintain SBP >90mmHg
Treat Impending Herniation—signaled by Unequal Pupils, Posturing, Decreasing GCS with hypertension/bradycardia	Hyperosmolar therapy: 1st Line: Give 3% hypertonic saline, 5 ml/kg IV bolus (over 5-30 minutes) 2nd Line: In Euvolemic patients only: Give Mannitol 1 g/ kg IV over 5 minutes. Hyperventilate to ETCO2 28-32 (pvcO2 37-42)
Sedate adequately	Propofol infusion (starting dose 25mcg/kg/min; titrate to effect) Rocuronium doses prn for refractory ICH
Obtain Head CT	Please transfer images to accepting facility

Solid Organ Injury Management (Liver, Spleen, Kidney)



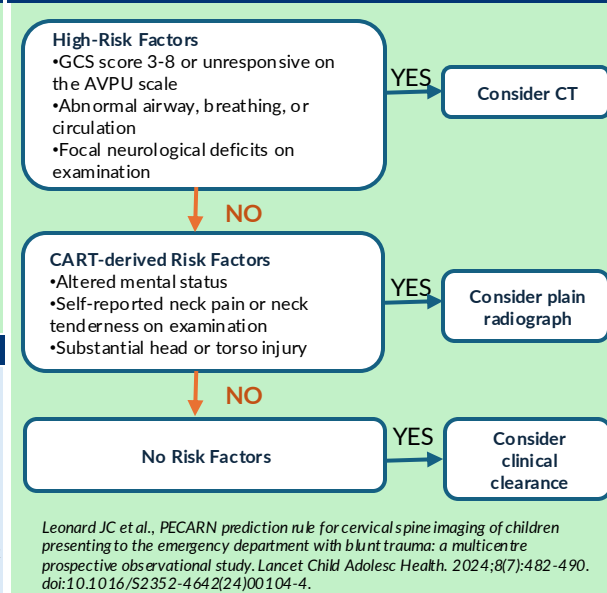
For Massive Hemorrhage



General Management Principles for Pediatric Hemorrhage

- Hypotension is a late sign of shock. Treat shock early. Signs of shock include change in mental status, pale or mottled skin, delayed capillary refill, thready peripheral pulses, decreased UOP (<1 ml/kg/hr), tachycardia.
- Avoid hypothermia! Use warmed IV fluids/blood, warm blankets, heating lamps, Bair hugger if available.
- Limit crystalloid infusions to avoid dilutional coagulopathy and hypothermia. Prepare for blood transfusion as soon as able when hemorrhagic shock is suspected.
- Consider tranexamic acid (TXA) if less than 3 hours from injury if signs of shock persist despite blood/fluid.
 - Loading dose: 15mg/kg up to 1g as a single dose, infused over 10 minutes
 - Subsequent dose: 2mg/kg/hr, up to 1g, infused over 8 hours

Pediatric Cervical Spine Clearance



Leonard JC et al., PECARN prediction rule for cervical spine imaging of children presenting to the emergency department with blunt trauma: a multicentre prospective observational study. *Lancet Child Adolesc Health*. 2024;8(7):482-490. doi:10.1016/S2352-4642(24)00104-4.

Authors: S Chung, M.D., B Burns, M.D., L McDuffie M.D., M Hansen M.D., Pediatric Trauma Management Pocket Guide 2025, 2nd Edition