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Severe Trauma

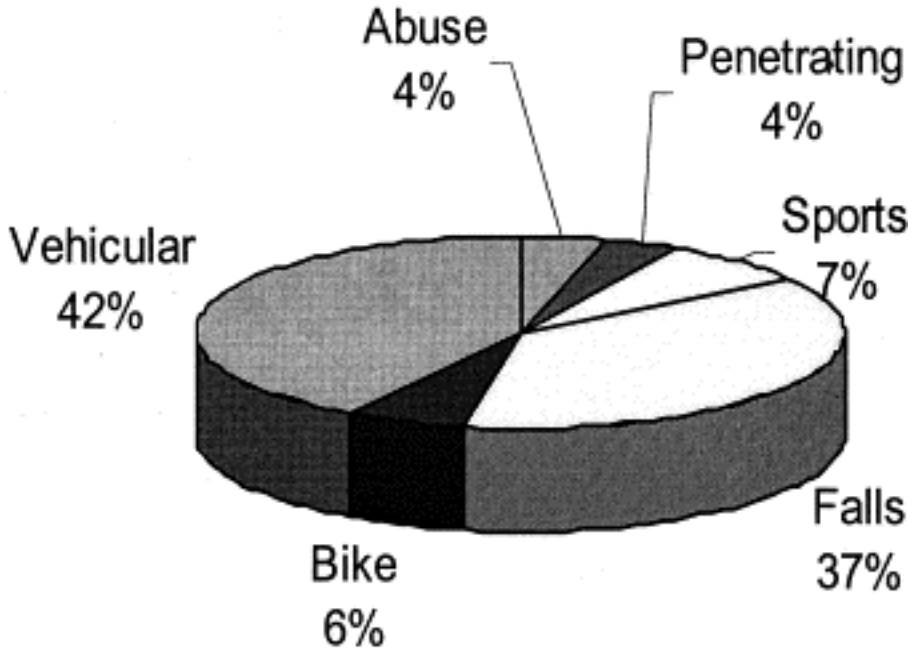
October 2025

Objectives

- Discuss the similarities and differences in the assessment and management of trauma in adults and children
- Recognize patterns of injury in pediatric trauma
- Outline the priorities for the management of the critically injured child
- Review indications for imaging in pediatric trauma
- Review the approach to initial stabilization and management of:
  - Hemorrhagic shock
  - Severe traumatic brain injury and cervical spine injury
  - Severe thoracic and abdominal injuries
  - NAI and burns

Epidemiology

- #1 cause of morbidity and mortality in children
- Bimodal distribution (toddler/teens)
- Blunt >>>>>>>>>> Penetrating
- Largely preventable
  - MVCs
  - Window falls
  - Non-accidental trauma (NAT)



Background

- Pediatric victims of severe trauma have a higher risk of injury and often a more severe pattern of injury than their adult counterparts
  - > 50% multi-system injuries (smaller body size + skeletal immaturity)
  - Most common injuries:
    - Head and neck
    - Abdomen (liver and spleen)
    - Lower extremities
- Vulnerable because of their anatomy/physiology, cognitive, emotional and developmental characteristics.
- Initial management and resuscitation follow ATLS principles

Assessment and Management

- Determine weight as early as possible
  - age based estimates allows for preparation of drugs/equipment in advance
- Primary survey = ATLS principles: **CABCDE or CABCDEFG** sequence
  - C is Catastrophic hemorrhage
  - Pediatric challenges:
    - Vascular access – early IO
    - Hypoglycemia (Disability) – POC glucose
    - Hypothermia (Exposure)
    - F = family presence
    - G = glucose (really falls under D above)
- Secondary survey

PEDIATRIC MAJOR TRAUMA

Call PTN **1-866-233-2337** to connect to BC Children's Hospital
Trauma Lead, Pediatric Transport Advisor for transfers and advice

**Pre-determine Age and Estimated Weight
Calculate AND Prepare
Medications and Equipment**

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primary survey

	ASSESS	TREAT
C	**ADDRESS CATASTROPHIC BLEEDING FIRST**	• Apply Tourniquet or direct pressure as needed, document time. Consider giving PRBC
A	• Increased risk for ETT dislodgement and endobronchial intubation • Cuffed ETT size = (age in years/4) + 3.5 • Intubate for unstable airway OR declining GCS • Consider Spinal Motion Restriction	**RSI medications:** • **Ketamine 1-2 mg/kg IV direct** (lower end of dose range if hypotension/ hypovolemia is a concern) • **Rocuronium 1 mg/kg IV direct** **Post Intubation Medications:** • **Morphine IV direct 0.1mg/kg for pt greater than 5kg (max 5mg) and Midazolam IV direct (Suggest dose range: Midazolam IV direct 0.05-0.1mg/kg max 8mg)** • **Ketamine IV direct (0.5-1mg/kg)**
B	• Keep O_2 saturations greater than 95% • Check work of breathing, grunting, distress • If breathing inadequate, first exclude tension pneumothorax	• 100% O_2 by non-rebreather mask • Consider immediate needle decompression or finger thoracostomy • Consider chest tube
C	• Assess signs of perfusion: HR, BP, pulse quality, cap refill time, skin temperature • Consider abnormal resp rate or declining GCS a marker of inadequate circulation	• **Fluid Resuscitation (consider warming):** ◦ Normal Saline 20ml/kg x 1 ◦ PRBC 10-20ml/kg for active bleeding, or ongoing signs of poor perfusion ◦ consider Tranexamic Acid within 3 hours of event and consider Massive Transfusion Protocol • **Pelvic binder should be centered over the greater trochanter** • **Splint long bone fractures** Note: isolated femur fracture unlikely cause of shock in young children
D	• Neuroprotection: HOB up 30°, ensure spinal collar is not causing blood flow restriction • Assess signs of impending herniation (HR↓, BP↑, irregular resps, asymmetric pupils), target $EtCO_2$ 35-40 mmHg • Obtain blood glucose • Ensure moving all four limbs	**IV osmotics:** • **3% Saline: 5 mL/kg/dose (max 250 mL) IV intermittent. Start therapy early with sluggish pupils** Note: will take 15 - 20 min before effects begin • **Give D10W 5ml/kg/dose for glucose less than 2.6mmol/L, IV intermittent**
E	• Maintain normothermia with protective warming measures • Assess pain using age appropriate pain scale • Log Roll	• Consider active re-warming (i.e. Bair Hugger, warm blankets, IV warming device) • Treat pain: Fentanyl 1mcg/kg/dose IV direct (max 50mcg) OR Ketamine 0.15-0.3mg/kg/dose IV direct **Post-intubation Infusions:** • **Midazolam IV 20-270 mcg/kg/hr IV continuous infusion AND Morphine greater than 3 months old 5-40mcg/kg/hr IV continuous** Note: both infusions must be used in conjunction for adequate sedation and pain management

View the
PedMed Online Formulary

Visit PHSA
shop.healthcarebc.ca/phsa
For Clinical Guidelines

Refer to BC Provincial Pediatric Trauma Team Activation Criteria

More resources at TREKK: Translating Emergency Knowledge for Kids (trekk.ca)

TAKE NOTE

- → 2 large IV's or Intraosseous if unable to obtain IV within 2 attempts
- → Obtain labs with Group and Screen
- → Do not delay transfer for CT & "Push" imaging to PACS with report
- → Phone receiving facility ED with report
- → Send copy of nursing, physician notes, labs, med record, EHS report
- → Concerns for Child Maltreatment; follow Duty to Report Legislation - call MCFD 1-800-663-9122

CONCERNING PEDIATRIC VITAL SIGNS

AGE	HR	RR	SBP
1-12 months	<90 or >180	<30 or >53	≤70
1-2 years	<80 or >140	<22 or >37	≤70
3-5 years	<65 or >120	<20 or >28	≤80
6-12 years	<58 or >118	<18 or >25	≤85
12+ years	<50 or >100	<12 or >20	≤90

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Effective: 30/August/2024

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Hemorrhagic Shock

Hemorrhagic Shock and Resuscitation

- What's the Same
  - ATLS priorities
    - Control exsanguinating hemorrhage first
      - Tourniquet, pressure, staples
  - Damage control principles apply
    - Keep warm
    - Limit crystalloid volume
    - Early (warmed) balanced blood products (MTP)
    - Hemostatic agents (TXA)

- What's Different
  - Less penetrating trauma
  - Excellent compensatory mechanisms
    - Increased SVR with blood loss maintains BP
    - Tachycardia is best sign of shock until collapse of BP as pre-terminal event
    - Permissive hypotension does not apply to children

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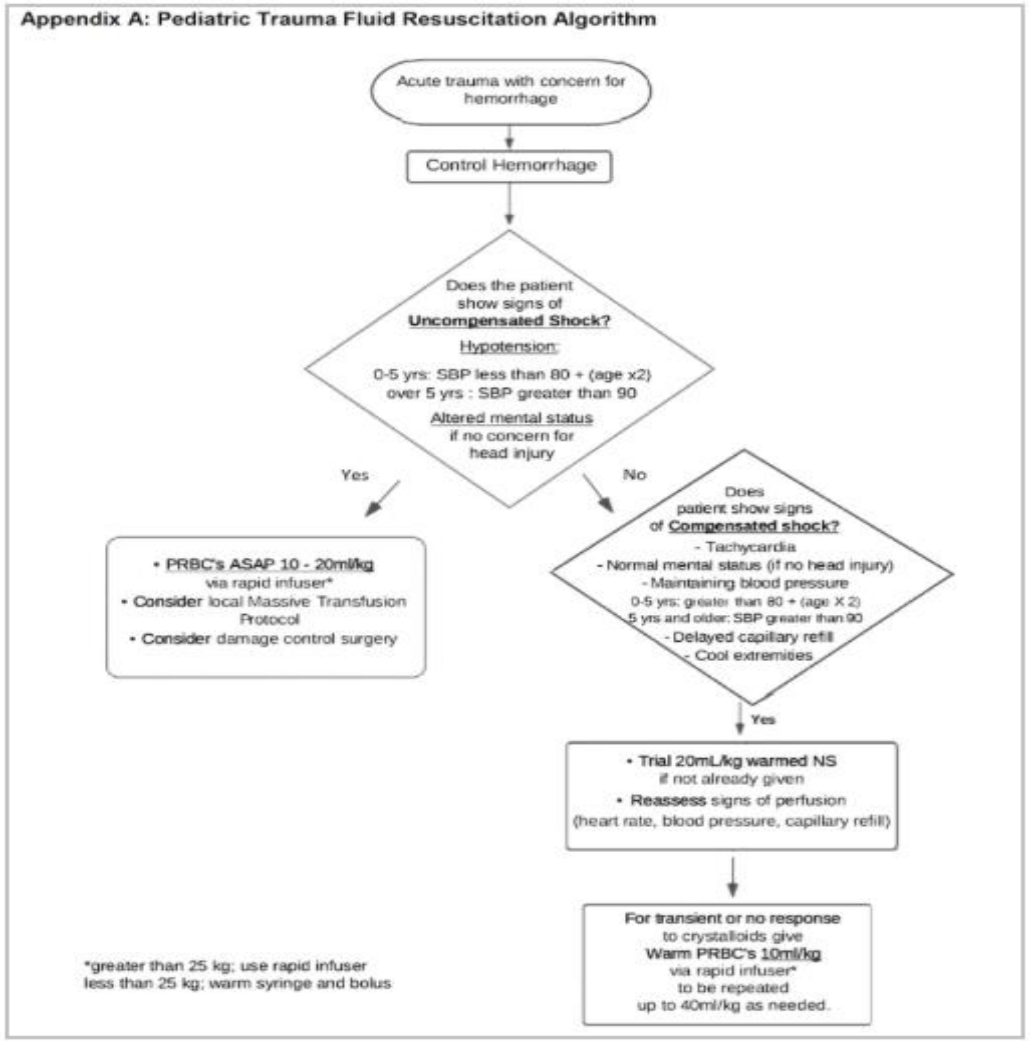
Blood Loss and Clinical Manifestations in Children

	Mild (<30% EBV loss)	Moderate (30%-45% EBV loss)	Severe (>45% EBV loss)
Level of consciousness	Irritable, anxious	Irritable or lethargic	Comatose
Heart rate and respiratory rate	Mildly increased	Moderately increased	Severely increased or decreased
Pulses	Weak peripheral	Weak peripheral and central	No peripheral, weak central
Capillary refill	Mildly delayed	Moderately delayed	Severely delayed
Skin	Cool	Cool, mottled	Cold, cyanotic/pale
Blood pressure	Normal	Normal or mildly decreased	Decreased
Urine output	Mildly decreased	Decreased	Absent

EBV, estimated blood volume

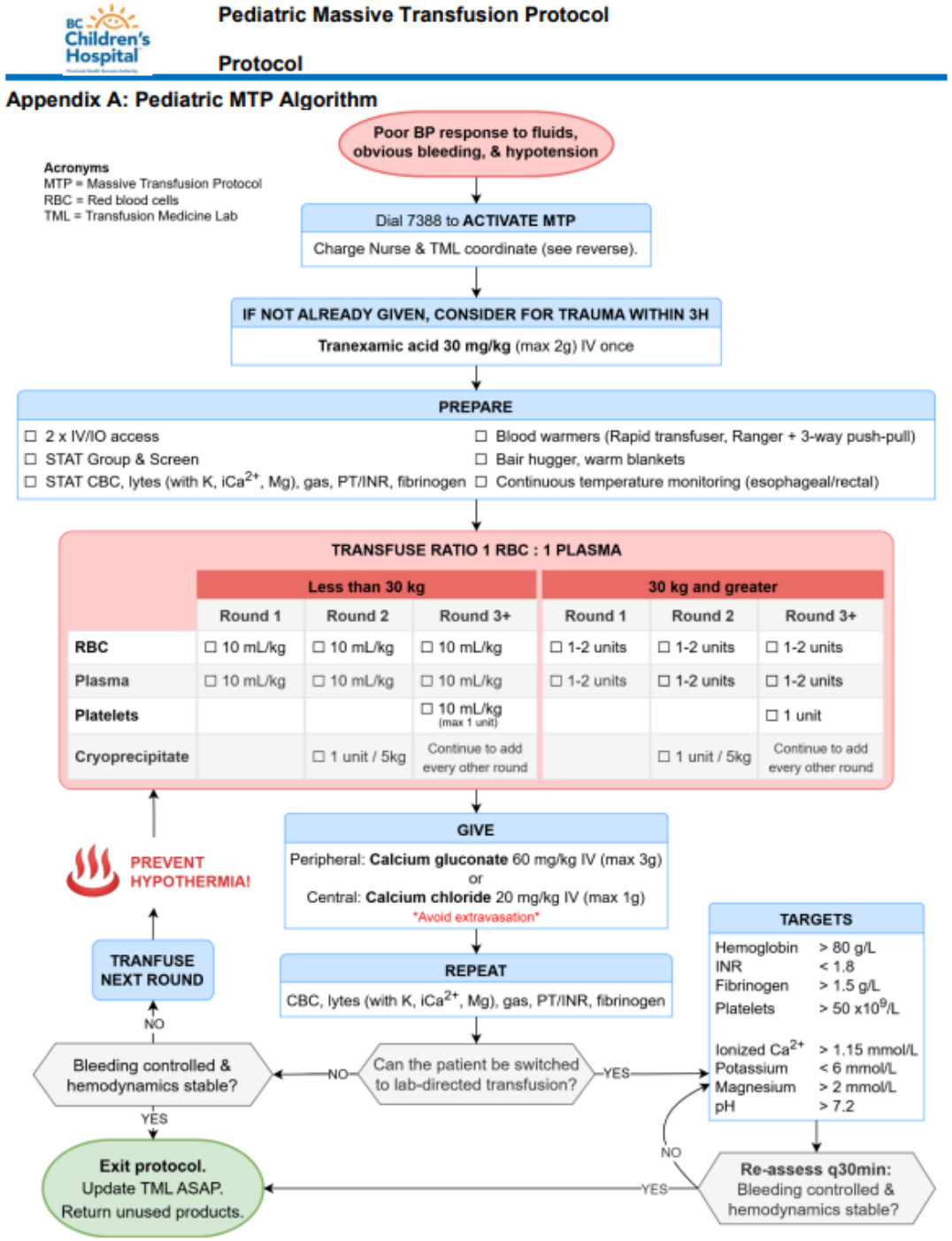
Fluid Resuscitation in Hemorrhagic Shock



- Additional consideration
  - Early IO if large bore IV not readily available
    - At least 20G (18G if possible)
  - Warm all fluids (incl. blood)
  - Rapid infusion preferred (> 25 kg)
    - Pull-push or multiple syringe method for infants
  - LR/Plasmalyte vs NS*

Massive Transfusion Protocol in Pediatrics

- Provincial Pediatric MTP – work in progress
- Ideal ratio not defined, but close to 1:1:1 = avoid acute coagulopathy
- No consensus on trigger tool
- Future directions
  - Low titer group 0 whole blood resuscitation
  - Cryoprecipitate
  - PCC



TXA

- Evidence
  - Despite strong adult evidence (e.g., CRASH-2), very limited pediatric data
  - Widely used in pediatric surgery and for common bleeding issues (e.g., epistaxis / menorrhagia)

Current Recommendation

- Consider for trauma-related hemorrhagic shock within 3 hours of injury
- Dose unclear
  - BC Children's: 30 mg/kg to 2g

Key Reference

Pediatric traumatic hemorrhagic shock consensus conference recommendations

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ABSTRACT: Hemorrhagic shock in pediatric trauma patients remains a challenging yet preventable cause of death. There is little high-quality evidence available to guide specific aspects of hemorrhage control and specific resuscitation practices in this population. We sought to generate clinical recommendations, expert consensus, and good practice statements to aid providers in care for these difficult patients. The Pediatric Traumatic Hemorrhagic Shock Consensus Conference process included systematic reviews related to six subtopics and one consensus meeting. A panel of 16 consensus multidisciplinary committee members evaluated the literature related to 6 specific topics: (1) blood products and fluid resuscitation for hemostatic resuscitation, (2) utilization of prehospital blood products, (3) use of hemostatic adjuncts, (4) tourniquet use, (5) prehospital airway and blood pressure management, and (6) conventional coagulation tests or thromboelastography-guided resuscitation. A total of 21 recommendations are detailed in this article: 2 clinical recommendations, 14 expert consensus statements, and 5 good practice statements. The statement, the panel's voting outcome, and the rationale for each statement intend to give pediatric trauma providers the latest evidence and guidance to care for pediatric trauma patients experiencing hemorrhagic shock. With a broad multidisciplinary representation, the Pediatric Traumatic Hemorrhagic Shock Consensus Conference systematically evaluated the literature and developed clinical recommendations, expert consensus, and good practice statements concerning topics in traumatically injured pediatric patients with hemorrhagic shock. (*J Trauma Acute Care Surg* 2023;94: S2–S10. Copyright © 2022 Wolters Kluwer Health, Inc. All rights reserved.)

KEY WORDS: Trauma; pediatrics; hemorrhage; consensus.

Trauma is the leading cause of pediatric mortality, potential years of life lost, and a significant medical cost in the developed world.[1,2] Thirty-day mortality in children with traumatic hemorrhagic shock is 36% to 50% compared with 20% to 25% reported in adults.[3,4] An stimated 1,000 to 2,000 preventable traumatic deaths in children per year after injury occur in the United States because of inadequate or delayed care.[5] Recent retrospective and prospective observational studies indicate that transfusion strategies (limiting crystalloid, appropriate transfusion ratios, and use of whole blood [WB]) and intravenous hemostatic adjunct therapies can reduce morbidity and mortality in children with traumatic hemorrhagic shock.[6–9] For this

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This study was presented at the Pediatric Hemorrhagic Shock Consensus Conference, April 22–24, 2022, in Birmingham, Alabama.

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Trauma

Multisystem Trauma

- Summary
- Trauma Fluid Resuscitation
- Cardiac Arrest in Trauma

In-a-Hurry Summary

Trauma Resuscitation Record

Website

Intubation in Trauma

- Before Intubation in Trauma
- Assessment
- Positioning
- Equipment
- Airway Equipment
- Checklist
- Pre-Oxygenation
- Fluids
- Medication

In-a-Hurry Summary

Videos on Trauma Assessment

- Initial Trauma Assessment
- Basics of Pediatric Trauma Assessment and Management

In-a-Hurry Summary

Traumatic Brain Injury (TBI)

Traumatic Brain Injury

- First cause of death in pediatric victims of trauma
  - Poor prognosis: GCS, NAI, thoracic injuries, hypotension, hypoxia

- Increased risk of severe TBI (GCS 3-8) in children
  - Large heads, weak neck muscles = increased rotational and acceleration-deceleration
  - Immature myelination = increased axonal injury
  - Thin pliable skull + rich vascular supply = increased risk of skull fracture AND of intra-cranial hemorrhage (with or without skull fracture)

- Presents with decreased level of consciousness (not localizing signs)

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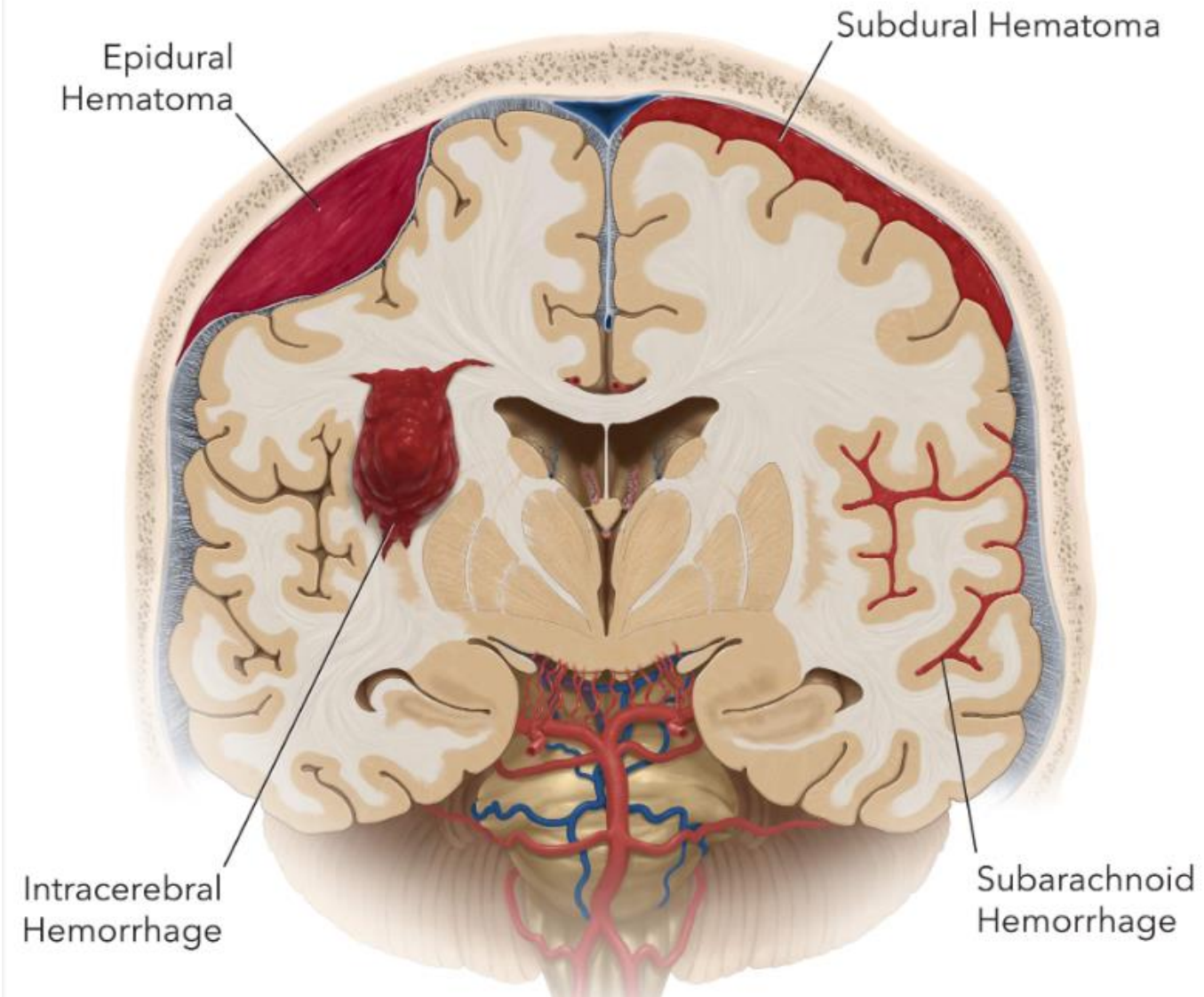

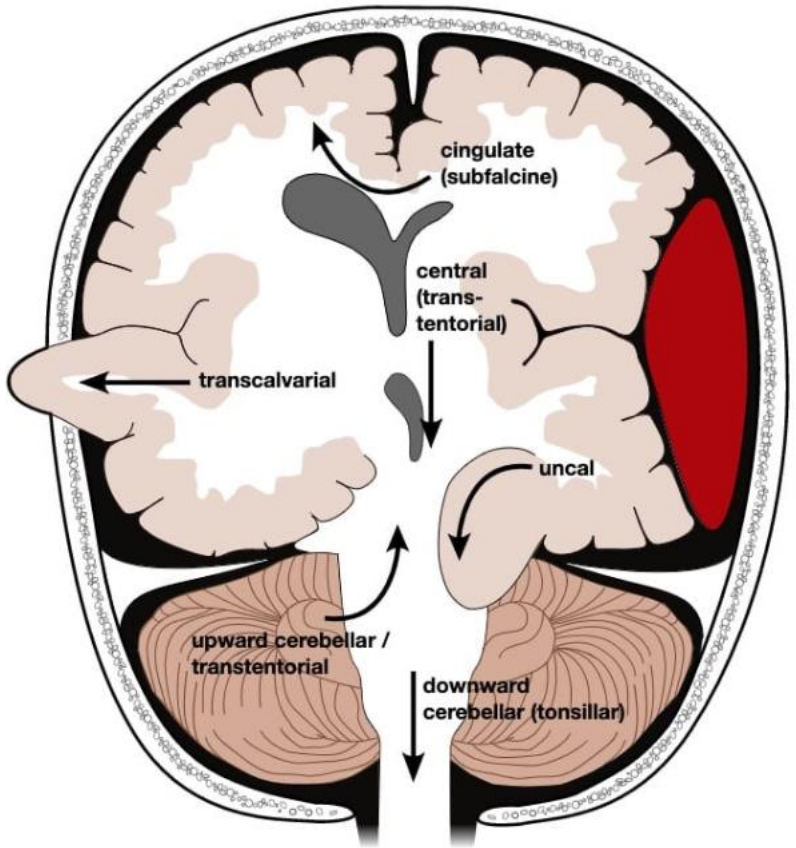

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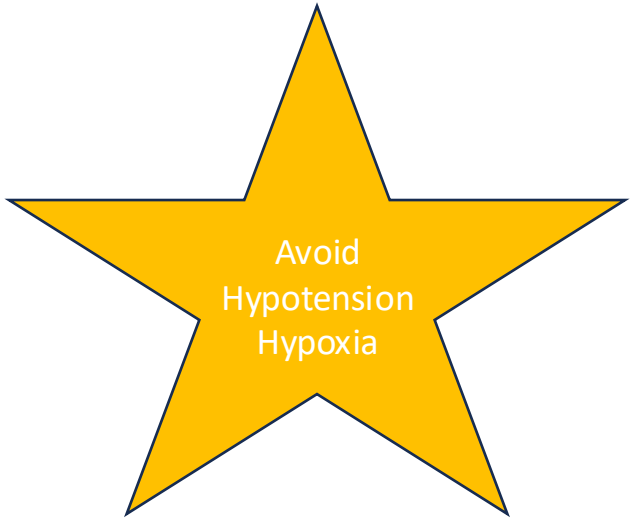
https://en.wikipedia.org/wiki/File:Brain_herniation_types-2.svg

Management of Severe TBI

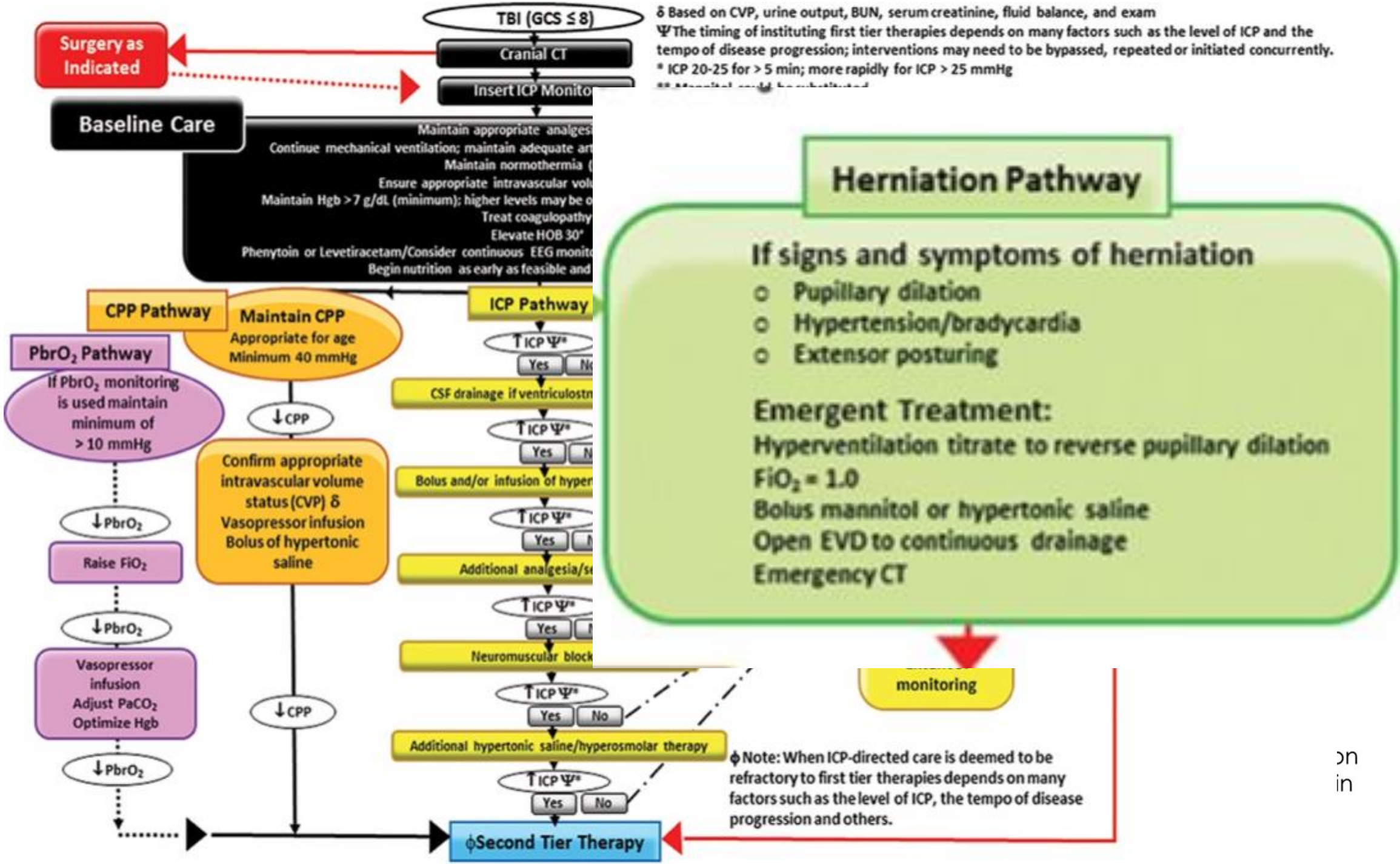
- Aim = prevent secondary injury by optimizing tissue oxygenation
- "Neuro-protective measures"
  - Optimize oxygen delivery
    - Venous drainage: HOB 30 degrees, head midline, c-spine collar not too snug
    - Cerebral perfusion: normocapnia (35-40), normoxemia
    - Minimize swelling: keep Na>140
  - Decrease cerebral metabolic demand
    - Sedation/analgesia +/- paralysis
    - Normothermia
    - Seizure prophylaxis + treatment



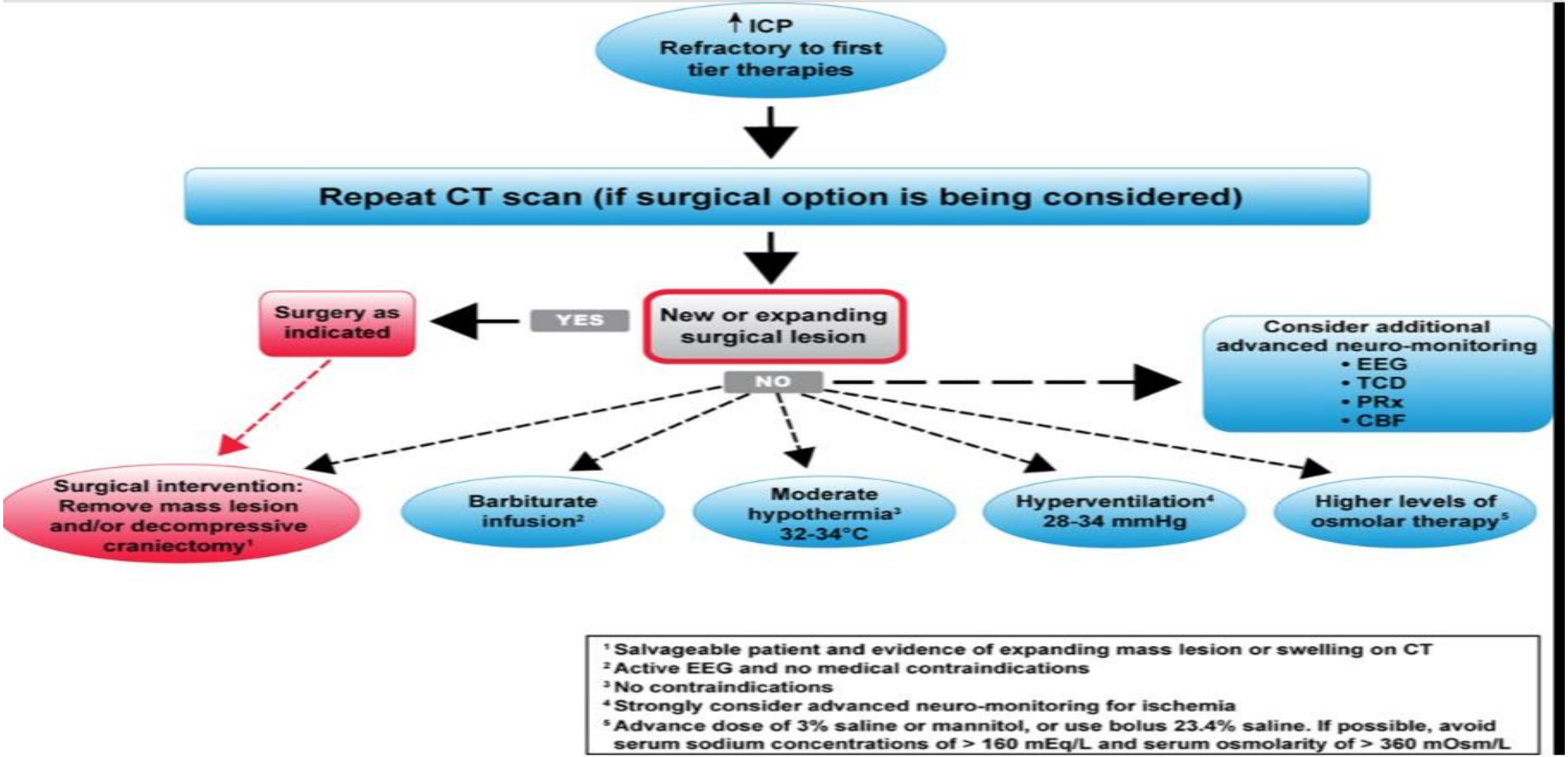
Management of Intracranial Hypertension

- Guided by: CPP/ICP or clinical symptoms
- **Hyperosmolar therapy**
- 3%NaCl bolus: 2-5ml/kg over 10-20 minutes
  - 3% NaCl infusion: 0.1-1ml/kg/h (keep Na 140-160)
- *Mannitol: 0.5=1g/kg*
- **CSF drainage / EVD**
- **Additional sedation/analgesia, paralysis**
- **Vasopressors**

Call Neurosurgery
Time = brain cells


TBI (GCS ≤ 8)
Cranial CT
Surgery as Indicated
Insert ICP Monito
Baseline Care
Maintain appropriate analges
Continue mechanical ventilation; maintain adequate art
Maintain normothermia
Ensure appropriate intravascular volu
Maintain Hgb >7 g/dL (minimum); higher levels may be o
Treat coagulopathy
Elevate HOB 30°
Phenytoin or Levetiracetam/Consider continuous EEG monito
Begin nutrition as early as feasible and
CPP Pathway
Maintain CPP
Appropriate for age
Minimum 40 mmHg
PbrO2 Pathway
If PbrO2 monitoring is used maintain minimum of >10 mmHg
↓CPP
Confirm appropriate intravascular volume status (CVP) δ
Vasopressor infusion
Bolus of hypertonic saline
↓PbrO2
Raise FiO2
↓PbrO2
Vasopressor infusion
Adjust PaCO2
Optimize Hgb
↓PbrO2
↓CPP
ICP Pathway
↑ICP Ψ*
Yes
CSF drainage if ventriculostn
↑ICP Ψ*
Yes
Bolus and/or infusion of hyper
↑ICP Ψ*
Yes
Additional analgesia/se
↑ICP Ψ*
Yes
Neuromuscular block
↑ICP Ψ*
Yes
No
Additional hypertonic saline/hyperosmolar therapy
↑ICP Ψ*
Yes
No
ϕSecond Tier Therapy
δ Based on CVP, urine output, BUN, serum creatinine, fluid balance, and exam
Ψ The timing of instituting first tier therapies depends on many factors such as the level of ICP and the tempo of disease progression; interventions may need to be bypassed, repeated or initiated concurrently.
* ICP 20-25 for > 5 min; more rapidly for ICP > 25 mmHg
Herniation Pathway
If signs and symptoms of herniation
Pupillary dilation
Hypertension/bradycardia
Extensor posturing
Emergent Treatment:
Hyperventilation titrate to reverse pupillary dilation
FiO2 = 1.0
Bolus mannitol or hypertonic saline
Open EVD to continuous drainage
Emergency CT
monitoring
ϕ Note: When ICP-directed care is deemed to be refractory to first tier therapies depends on many factors such as the level of ICP, the tempo of disease progression and others.

Management of refractory intracranial hypertension



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Pediatric Cervical Spine Injury (PCSI)

PSCI Epidemiology

- Pediatric C-spine Injury is rare
  - 873/84,554 = 1.03%
  - Age <4 less common (0.68%)
- Age-dependent patterns
  - <2: 74% axial with AOD most common
  - 2-7: 78% axial with AARS and AOD most common
  - 8-15: 53% subaxial (body fx) + 16% SCIWORA

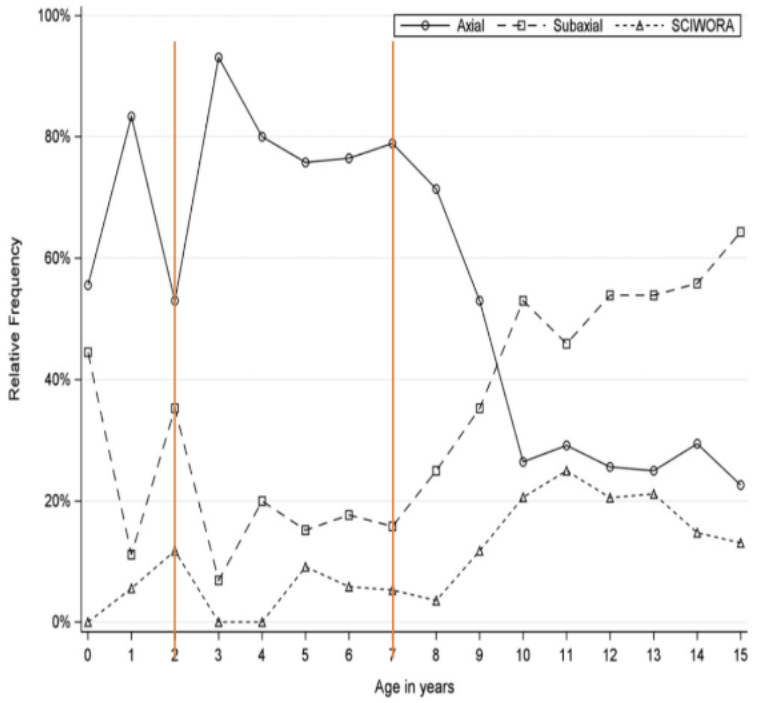


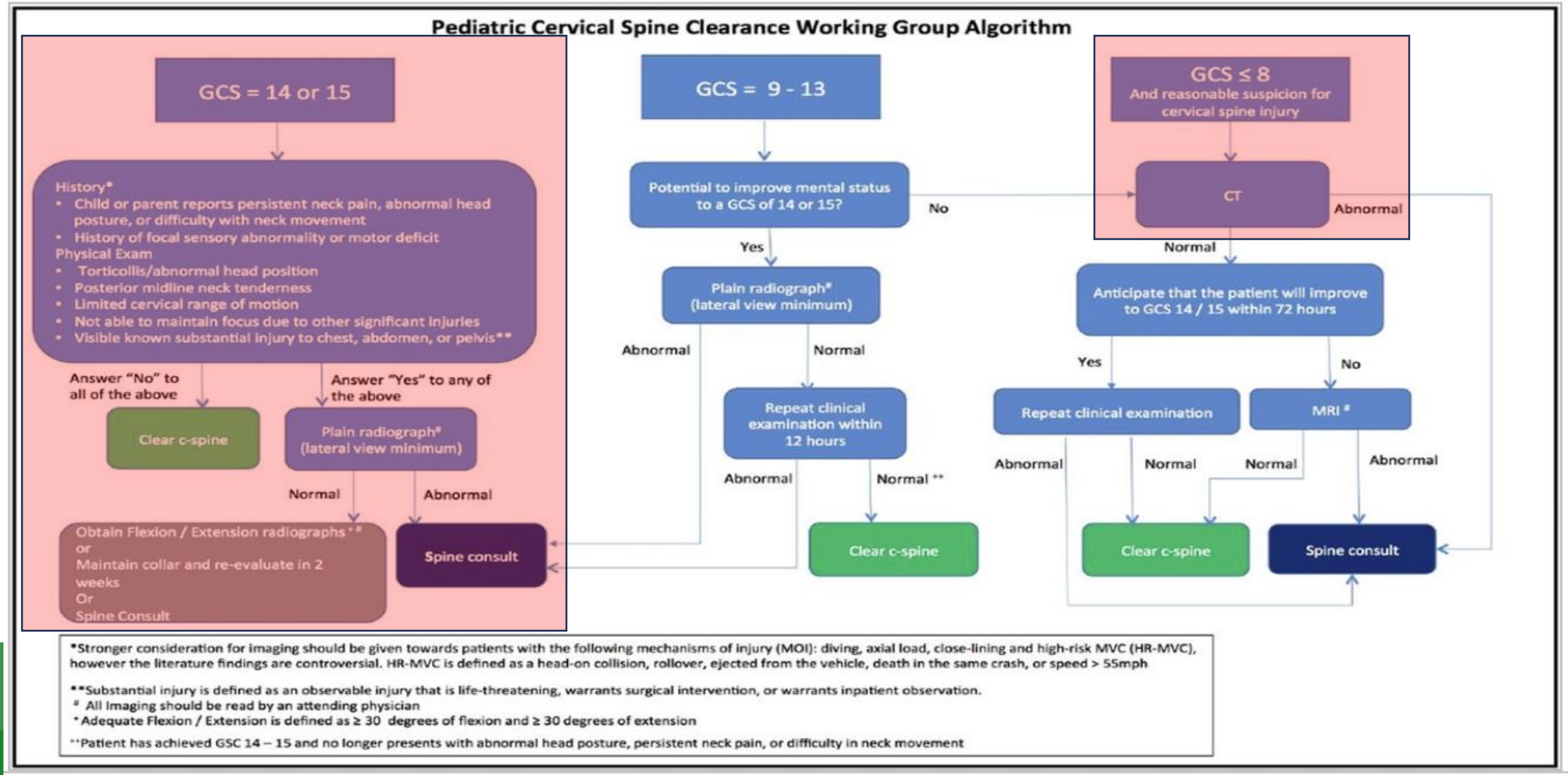
FIGURE 1
Relative frequency of CSI level by age.

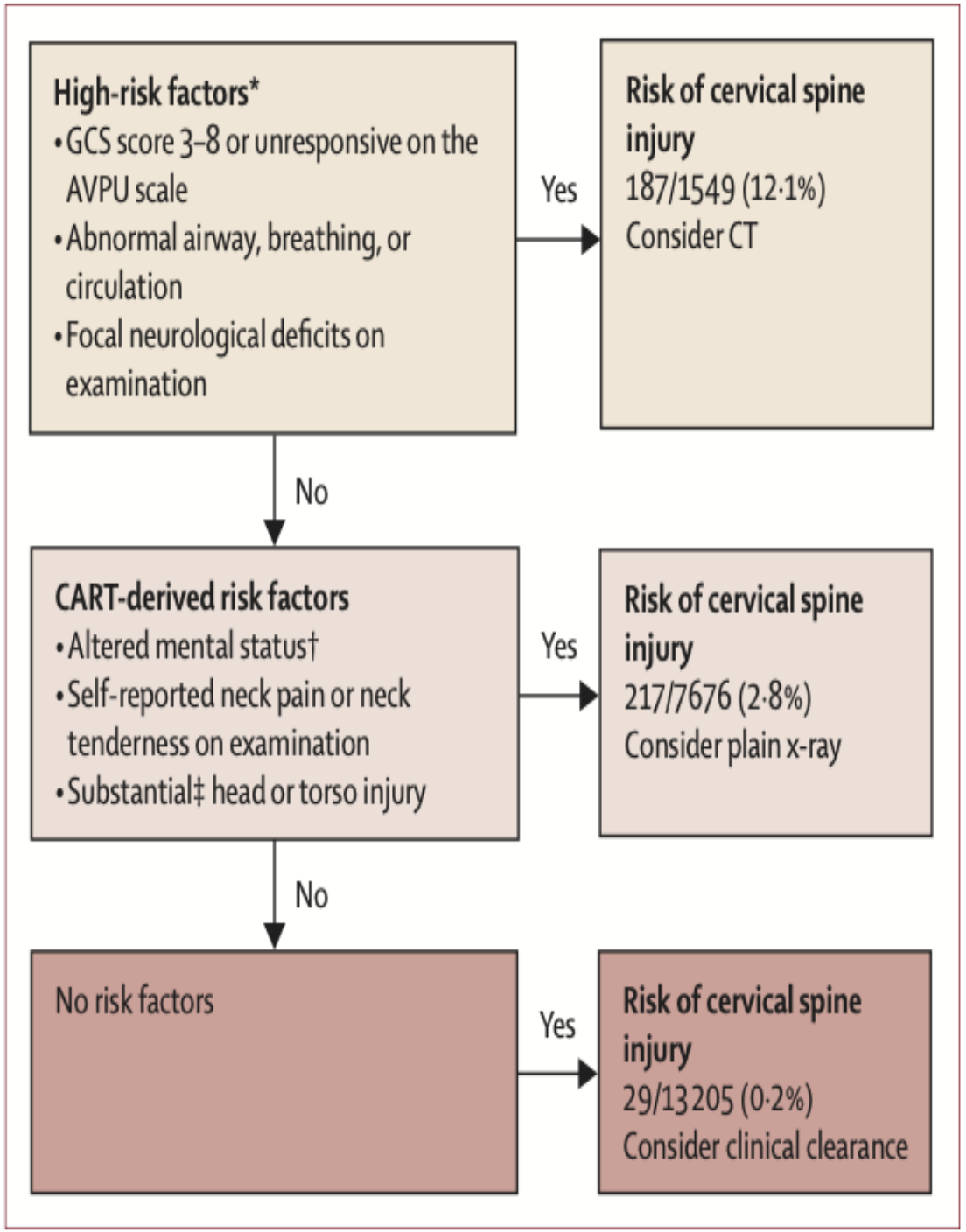
Cervical Spine Immobilization

- Rationale
  - Prevent secondary injury from movement
- Assumption
  - Spinal immobilization prevents motion and secondary injury
    - FALSE!

- Adverse Effects of C-Collars
  - Airway[2]
    - Intubation difficulty
    - Aspiration risk
  - Breathing
    - Restrictive lung function[1,3]
  - Neurologic
    - Increased ICP[4]
    - Pain[5]
    - Increased mortality in penetrating trauma[6]
    - Increased morbidity in blunt spine trauma[7]
  - Increased imaging and admissions[8]

Pediatric Cervical Spine Clearance





ABC: required to halt trauma survey and intervene

Focal deficits: in ED only
(strength, sensation, paresthesia)

AMS: GCS 9-14

Neck pain: without prompting

Substantial injury: requiring surgery or admission

29 missed CSI
No surgical interventions

Pediatric C-spine Summary and Tips

- Pediatric CSI is rare, with age-dependent patterns of injury
- C-collars and imaging are reasonable for children with GCS <14
- Clinical clearance for children with GCS 14-15 meeting low-risk criteria
  - http://shop.healthcarebc.ca/phsa/BCWH_2/BC%20Children's%20Hospital/C-05-07-60737.pdf
- Young children with GCS 14-15 spontaneously moving their neck without life-threatening torso injuries can be clinically cleared

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Thoracic Injuries

Thoracic Injuries

- Less than 1/10th of pediatric trauma related injuries
- BUT 2nd leading cause of pediatric trauma death (14%)
- Blunt thoracic trauma is usually associated with multisystem trauma (92%)

Common Injuries

- Pulmonary contusion, PTX, HTX

Less Common Injuries

- Rib fractures * / flail chest
- Great vessel
- Tracheo-bronchial
- Esophageal

Thoracic Injuries

Imaging recommendations

- NICE (2016): consider CXR/ultrasound as 1st line imaging (<16 yo)
- RCR Paediatric Trauma Protocols (2017): primary investigation is CXR
  - CT chest : penetrating chest trauma, clinical condition (HD stability, LOC), CXR findings

CT Chest

- Penetrating chest trauma
- Hemodynamic instability / unconscious
- Concerning CXR findings, clinical condition (HD stability, LOC), CXR findings

Thoracic Injuries - Management

Pulmonary contusions

- May be delayed
- Respiratory support including NIPPV or MV

Pneumo-hemothorax

- Chest tube insertion
  - Pigtail or surgical thoracostomy
  - 4 x ETT size
- OR for >25% EBV OR >4ml/kg/h in hemothorax

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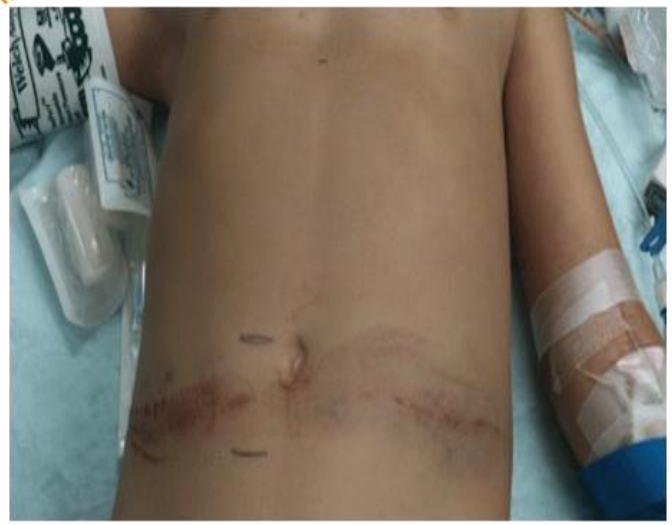
Abdominal Injuries

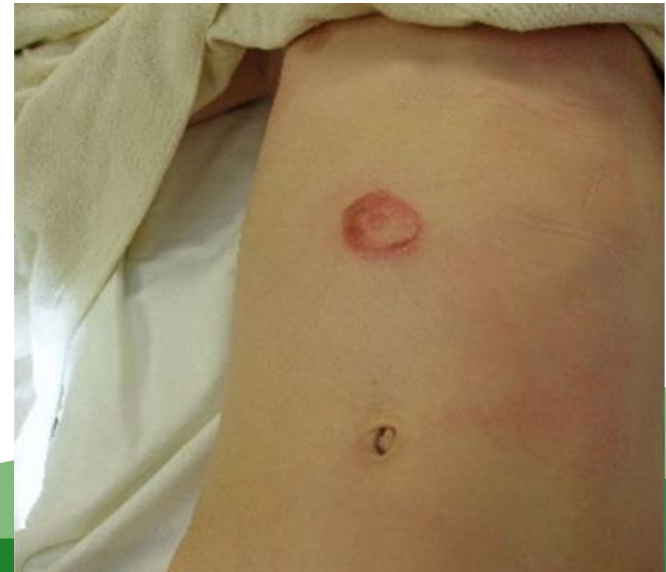
Abdominal Trauma

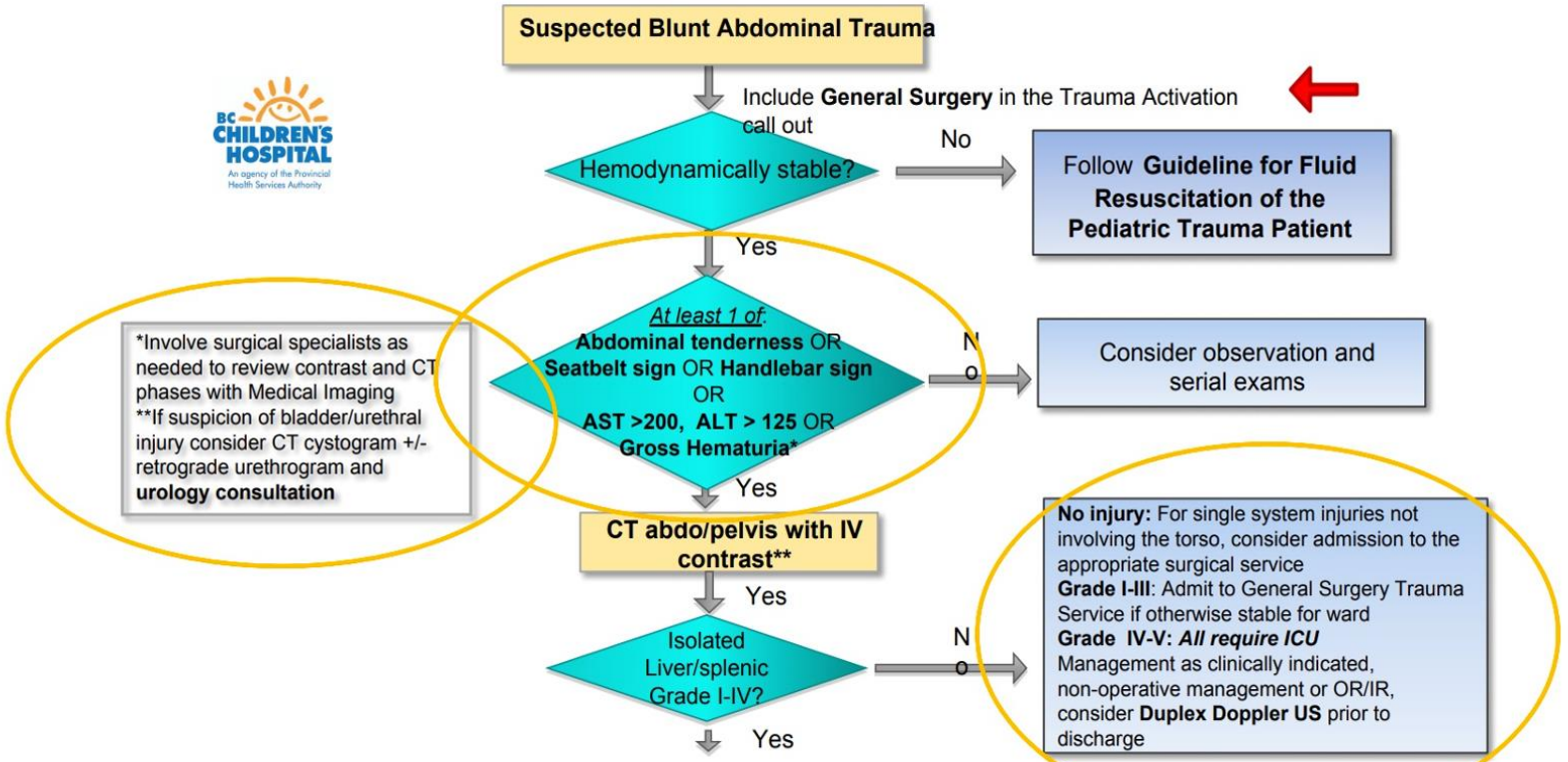
- 3rd cause of pediatric trauma death
- Increased risk of severe injury and multiple injuries
- Common IAI
  - Spleen / liver
  - Kidneys
  - GI tract

Red Flags

- Seatbelt sign
- Focal abdominal bruising
- Lower rib fractures
- Vertebral fractures
- Inflicted injuries







CT Grade	I	II	III	IV & V
ICU LOS	none	none	none	24 hrs
Hospital LOS	1-2 days	2-3 days	3-4 days	4-5 days
Pre-discharge imaging	none	none	Consider	Consider
Post discharge imaging	none	none	Consider	Consider
Activity restriction/follow-up	3 weeks	4 weeks	5 weeks	6 weeks

Abdominal Injuries – Imaging & Management

- Imaging
  - CT: solid organ injury identification and grading
    - Poor sensitivity / specificity for hollow viscous injury
  - eFAST: not sensitive enough to affect decision-making, better specificity
    - US: cannot grade solid organ injury
- Medical Management of IAI
  - Analgesia, IVF, blood products, rest
- Surgical/IR Management
    - Hemodynamically unstable patients (despite initial resuscitation)
    - Penetrating injury
    - +/- Perforation to hollow viscus

Special Considerations: NAI & Burns

Inflicted Injuries

- Assess + manage using same ATLS principles (higher risk of multi-system trauma)
  - CT head (<6 months or abnormal neurologic exam) +/- c-spine imaging
  - CXR
  - Trauma labs + NAT labs
  - +/- abdominal and extremity imaging

Inflicted Injuries

- 10% of admitted trauma < 5 yo
- Higher risk of multiple injuries (>50%), severe injury and mortality
- Most common injuries:
  - Head
  - Extremities
  - Trunk
  - Abdomen (<1yo)

Assessment & Management

- Follow ATLS principles
- Evaluation
  - CT head (<6 months or abnormal neurologic exam) +/- c-spine imaging
    - CXR
  - Trauma labs
    - abdominal CT for elevated LFTs
- CPS Consult / MoH Report

Burns

Classification	Involvement	Clinical
Superficial	Epidermis	Dry. Red + blanches. Painful
Partial Thickness	Superficial dermis	Blisters. Moist. Red + blanches. Pain
	Deep dermis	Blisters. Wet/waxy, mottled pink/white, does not blanch, no pain
Full Thickness	Subcutaneous tissue Fascia, muscle, bone	Avascular. Waxy white to charred. Dry. No blanching. No pain.

Estimate BSA (partial and full thickness)

- Lund-Browder charts
- 1% BSA = child's palm

BCCH Burns Diagram (1 to 14 years)

BURN DIAGRAM
AGES 1-14 yrs

BC CHILDREN'S HOSPITAL

PATIENT LABEL

Date of Burn ___/___20___

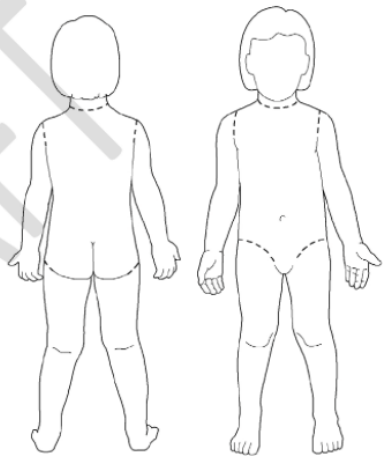
Date of Admission ___/___20___

Date of TBSA Estimation ___/___20___ (Preliminary) by Dr _____

Date of TBSA Estimation ___/___20___ (Final) by Dr _____

Area	Age 1–4 yr	Age 5–9 yr	Age 10-14 yr	Preliminary TBSA (0.0%) 2° SD	2° MD	2° DD	3° FT	Final TBSA (0.0%) 2° SD	2° MD	2° DD	3° FT
Head	17	13	11								
Neck	2	2	2								
Ant. Trunk	13	13	13								
Post. Trunk	13	13	13								
R. Buttock	2.5	2.5	2.5								
L. Buttock	2.5	2.5	2.5								
Genitalia	1	1	1								
R.U. Arm	4	4	4								
L.U. Arm	4	4	4								
R.L. Arm	3	3	3								
L.L. Arm	3	3	3								
R. Hand	2.5	2.5	2.5								
L. Hand	2.5	2.5	2.5								
R. Thigh	6.5	8	8.5								
L. Thigh	6.5	8	8.5								
R. Leg	5	5.5	6								
L. Leg	5	5.5	6								
R. Foot	3.5	3.5	3.5								
L. Foot	3.5	3.5	3.5								
Total											

Preliminary TBSA ____ Final TBSA ____



SD (Superficial Dermal) DD (Deep Dermal) MD (Mid Dermal) FT (Full Thickness)

To Health Records: This form is implemented as DRAFT from November 2015 to April 2016. Please file this form in patient's chart.

Source: https://www.ubcplastics.ca/_files/ugd/ce5ba8_aed12b59f22a4f75be2620aac42f2b30.p...

BURN DIAGRAM - AGES 1-14yrs [Internet]. BCCH and UBC Plastic Surgery; 2015. Available from: https://www.ubcplastics.ca/_files/ugd/ce5ba8_aed12b59f22a4f75be2620aac42f2b30.pdf

BCCH Burns Diagram (0 to 1 year)

BURN DIAGRAM
AGE 0-1 yr

BC CHILDREN'S HOSPITAL

PATIENT LABEL

Date of Burn ___/___20___

Date of Admission ___/___20___

Date of TBSA Estimation ___/___20___ (Preliminary) by Dr _____

Date of TBSA Estimation ___/___20___ (Final) by Dr _____

Area	Age 0 – 1 yr	Preliminary TBSA (0.0%) 2° SD	2° MD	2° DD	3° FT	Final TBSA (0.0%) 2° SD	2° MD	2° DD	3° FT
Head	19								
Neck	2								
Ant. Trunk	13								
Post. Trunk	13								
R. Buttock	2.5								
L. Buttock	2.5								
Genitalia	1								
R.U. Arm	4								
L.U. Arm	4								
R.L. Arm	3								
L.L. Arm	3								
R. Hand	2.5								
L. Hand	2.5								
R. Thigh	5.5								
L. Thigh	5.5								
R. Leg	5								
L. Leg	5								
R. Foot	3.5								
L. Foot	3.5								
Total									

Preliminary TBSA ____ Final TBSA ____

SD (Superficial Dermal) DD (Deep Dermal) MD (Mid Dermal) FT (Full Thickness)

To Health Records: This form is implemented as DRAFT from November 2015 to April 2016. Please file this form in patient's chart.

Source: https://www.ubcplastics.ca/_files/ugd/ce5ba8_d8e0a6a6c1004b209eb22ce9b73531c2.p...

BURN DIAGRAM - AGE 0-1 yr [Internet]. BCCH and UBC Plastic Surgery; 2015. Available from: https://www.ubcplastics.ca/_files/ugd/ce5ba8_d8e0a6a6c1004b209eb22ce9b73531c2.pdf

Burn Resuscitation

A: Indications for intubation

- signs of inhalation injury (singed nasal hair, sooth in mouth, facial burns)
- Impending respiratory failure (hoarseness, stridor, respiratory distress, drooling)
- SA>50%

B: oxygen, arterial gas (PaO2, carboxyHgb)

C: IV/IO x2, foley catheter, initial fluid resuscitation

E: remove clothing, temperature-controlled environment

History: Enclosed space (**CO/cyanide**), trauma, **tetanus**

Initial investigations: CBC, lytes 7, gas, CK, UA, gas+/- imaging

Management – Initial 24h

- Replace losses: parkland formula, LR
  - 3-4 mL x %BSA x wt (kg) = first 24 hours (1/2 in first 8 hours)
  - Adjust with urine output (see BCCH burn protocol)
- Maintenance with dextrose
- Pain control
- Wound care (consult with plastics early) + monitor closely for infections
- Management of inhalation injury: I+V with aggressive pulmonary toilet
  - CO: 100% oxygen +/- hyperbaric chamber
  - Cyanide: hydroxycobalamin

Burns

Burns

Burns Summary

- Pediatric Considerations
- Criteria for Referral to a Burn Centre (BCCH)

In-a-Hurry Summary

Burns Management

- Fluid Management
- Burn Resuscitation Protocol (First 48 Hours)
- Management of Hypotension

In-a-Hurry Summary

Burn Diagrams (Printable)

- Measuring Total Body Surface Area of the Burn
- BCCH Burns Diagram (0 to 1 year)
- BCCH Burns Diagram (1 to 14 years)
- BCCH Burns Diagram (15 years to Adult)

In-a-Hurry Summary

BURNS MANAGEMENT

Fluid Management

Burn Resuscitation Protocol (First 48 Hours)

Management of Hypotension

Psychosocial Considerations

- Children are at higher risk of developing psychological sequelae following severe trauma
  - Immature cognitive/emotional abilities
  - Dependence on caregivers who may have also been injured
  - Increased risk: mass casualty event, injury to loved-one, secondary stressors, separation from caregiver etc.
  - Minimize secondary stressors
    - Ensure present of parents/family whenever possible
    - Provide support person (child-life specialist, volunteer)
    - Minimize painful/invasive procedures
    - Provide age-appropriate care

Provincial Health Services Authority
Province-wide solutions. Better health.

BC Children's Hospital
Provincial Health Services Authority

CHILD HEALTH BC
LEAD BENEFACTOR save on foods

Outreach Education Follow-up Initiative
Pediatric Critical Care

StEP Stabilization Essentials in Pediatrics

Thank you for your attention

When on the fence, call the trauma team