



*It's raining it's pouring
The old man is snoring
He bumped his head and went to bed
and couldn't get up in the morning*

Mother Goose

It's Raining it's Pouring

SOME PEARLS ON PEDIATRIC MINOR HEAD INJURIES

You are working in your clinic one day

- ▶ 2 patients left in the waiting room
- ▶ Coincidentally, both have hit their heads in one way or another
- ▶ They look OK when you glance out at them
- ▶ You decide to see the youngest patient first

Things that go Bump in the Night

- ▶ 15 month baby fell out of crib
- ▶ Cried right away
- ▶ Fussy since then
- ▶ Crying more than usual
- ▶ Vomited after breakfast
- ▶ Generally well child meeting all milestones

Things that go Bump in the Night

- ▶ Questions:
- ▶ GCS
- ▶ Are You Worried About the Mechanism?
- ▶ What are Important Physical Exam findings?
- ▶ Need for imaging?

Things that go Bump in the Night

- ▶ GCS for tots 2 yrs or less = E+V+M

4. Eyes opening spontaneously
3. Eye opening to speech
2. Eye opening to pain
1. No eye opening or response

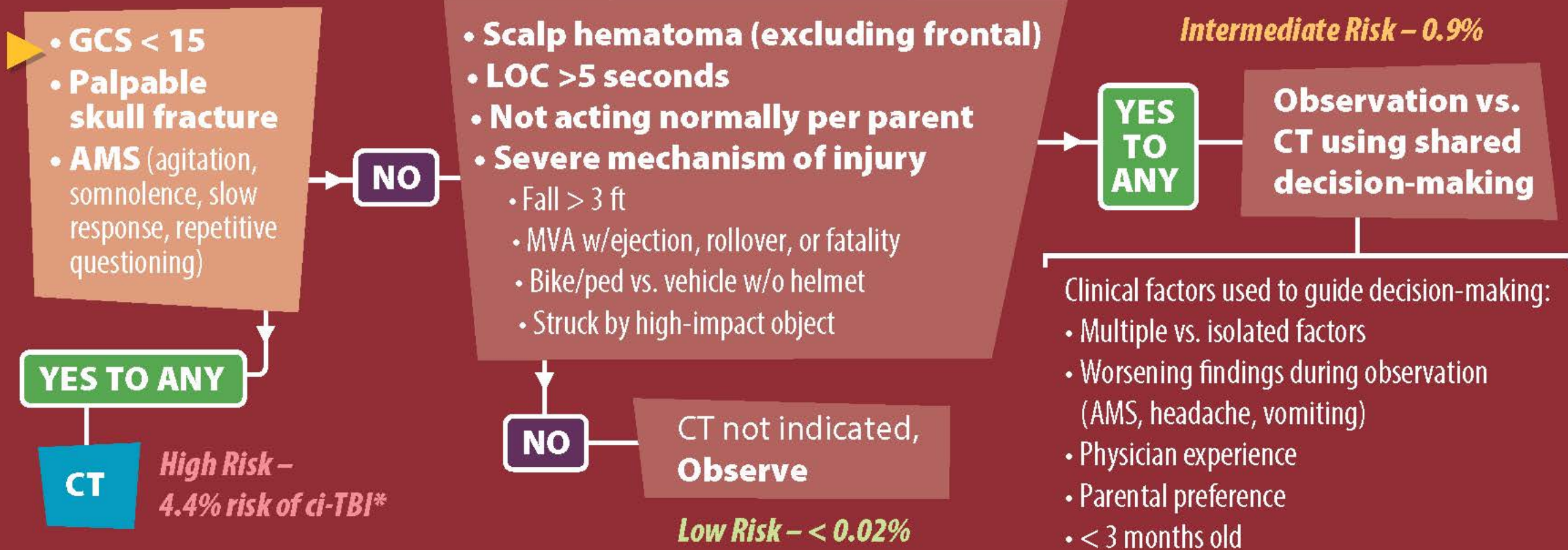
5. Smiles, babbling, coos.
4. Cries but consolable, inappropriate interactions.
3. Inconsistently inconsolable, moaning.
2. Inconsolable, agitated.
1. No verbal response.

6. Infant moves spontaneously or purposefully
5. Infant withdraws from touch
4. Infant withdraws from pain
3. Abnormal flexion to pain (decorticate)
2. Extension to pain (decerebrate)
1. No motor response

Pediatric Head Trauma CT Decision Guide

Children younger than 2 years

**UNDER
2 YEARS**



*ci-TBI: risk of clinically important TBI needing acute intervention, based on PECARN validated prediction rules

Counsel Parents

It is very unlikely, but if your child develops new or worsening symptoms* such as these, bring him/her back to the Emergency Department as soon as possible.



Lack of alertness
(if they are becoming less and less alert within the next day)



Severely worsening headache
(despite resting)



Vomiting
(enough episodes to interfere with eating)



Unsteady or cannot walk



Difficulty talking or recognizing people

Your child can maintain regular activities such as sleep.

* Some symptoms may not apply to young children who are not yet able to walk or talk.

When Two Heads Aren't Better than One

- ▶ 15 year old soccer player takes a double header



When Two Heads Aren't Better than One

- ▶ **Are You Worried About The Mechanism?**
- ▶ **What is the GCS?**
- ▶ **Physical Exam findings**
- ▶ **Need for imaging**
- ▶ What next?

Things that go Bump in the Night

▶ GCS : E+V+M

4. Eyes opening spontaneously
3. Eye opening to speech
2. Eye opening to pain
1. No eye opening or response

5. Normal Conversation
4. Confused / Disoriented.
3. Inappropriate Words
2. Incomprehensible Sounds.
1. No verbal response.

6. Obeys Commands
5. Localizes to Pain
4. Withdraws from pain
3. Abnormal flexion to pain (decorticate)
2. Extension to pain (decerebrate)
1. No motor response

Pediatric Head Trauma CT Decision Guide

Children 2 years and older

**2 YEARS
& OLDER**



*ci-TBI: risk of clinically important TBI needing acute intervention, based on PECARN validated prediction rules

Canadian CT Head Rule for Minor TBI

CT Head only indicated if any one of the following present:

High Risk (for Neurological Intervention)

1. GCS score < 15 at 2 hrs after injury
2. Suspected open or depressed skull fracture
3. Any sign of basal skull fracture*
4. Vomiting \geq 2 episodes
5. Age \geq 65 years

*Signs of Basal Skull Fracture

- hemotympanum, 'raccoon' eyes, CSF otorrhea/ rhinorrhea, Battle's sign

** Dangerous Mechanism

- pedestrian struck by vehicle
- occupant ejected from motor vehicle
- fall from elevation \geq 3 feet or 5 stairs

Medium Risk (for Brain Injury on CT)

6. Amnesia before impact \geq 30 min
7. Dangerous mechanism ** (*pedestrian, occupant ejected, fall from elevation*)

Rule Not Applicable If:

- Non-trauma cases
- GCS < 13
- Age < 16 years
- Coumadin or bleeding disorder
- Obvious open skull fracture

When Two Heads Aren't Better than One

- ▶ Are You Worried About The Mechanism?
- ▶ What is the GCS?
- ▶ Physical Exam findings
- ▶ Need for imaging
- ▶ **What next?**

Concussion Basics



Concussion Basics

1. How to Diagnose a Concussion
2. How to Treat it

How to Diagnose a Concussion

1. How Do You Get Better?

How to Treat a Concussion

Step Wise Return To Normal Activity

- ▶ Step 1: No activity — rest
- ▶ Step 2: Light activity, such as very easy mental and physical games
- ▶ Step 3: Mild activity, like short and simple games and play
- ▶ Step 4: Easy games and schoolwork
- ▶ Step 5: Shortened regular games and schoolwork
- ▶ Step 6: Return to normal

Concussion

Warning signs to watch for


Concussed patient must be advised that problems could arise over the first 24 – 48 hours. The athlete should not be left alone and must go to a hospital at once if they:

- Have a headache that gets worse
- Are very drowsy or can't be awakened
- Can't recognize people or places
- Have repeated vomiting
- Behave unusually or seem confused; are very irritable
- Have seizures (arms and legs jerk uncontrollably)
- Have weak or numb arms or legs
- Are unsteady on their feet
- Have slurred speech

Resources

▶ <http://parachute.ca>

- ▶ Health Professional Resources
- ▶ Resources for Patients & Parents
- ▶ RETURN TO SCHOOL, SPORT, WORK GUIDELINES



**Strategy for
RETURN TO SCHOOL
after a Concussion**


AT HOME

1. Each stage is at least 24 hours. Move to the next stage only when activities are tolerated without new or worsening symptoms.

2. If symptoms re-appear, return to the previous stage for at least 24 hours.

3. If symptoms don't improve, but continue to get worse, contact your doctor or get medical help immediately.

Cognitive & physical rest (24-48 hours)




<p>OK if tolerated</p> <ul style="list-style-type: none"> ✓ Short board games ✓ Short phone calls ✓ Camera photography ✓ Crafts 	<p>Not OK</p> <ul style="list-style-type: none"> ✗ School ✗ Physical exertion/ stair climbing ✗ Organized sports
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If tolerated, limited amounts of

- TV
- Computer/cell phone use
- Reading

Stage 1 Light cognitive activity




<p>OK if tolerated</p> <ul style="list-style-type: none"> ✓ Easy reading ✓ Limited TV ✓ Drawing/LEGO/board games ✓ Some peer contact 	<p>Not OK</p> <ul style="list-style-type: none"> ✗ School ✗ Work ✗ Physical exertion/ stair climbing ✗ Organized sports
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If tolerated, limited amounts of

- Computer/cell phone use

Stage 2 School-type work/ Light physical activity



<p>OK if tolerated</p> <ul style="list-style-type: none"> ✓ School-type work in 30 min. chunks ✓ Light physical activity ✓ Some peer contact 	<p>Not OK</p> <ul style="list-style-type: none"> ✗ School attendance ✗ Work ✗ Physical exertion/ stair climbing ✗ Organized sports
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READY FOR NEXT STAGE? **Symptoms start to improve OR after resting for 48 hours max.**

READY FOR NEXT STAGE? **Tolerate 30 mins. of cognitive activity at home**

READY FOR NEXT STAGE? **Tolerate up to 60 mins. of cognitive activity in 2-3 chunks**


AT SCHOOL

Stage 3a Part-time school Light load




<p>OK if tolerated</p> <ul style="list-style-type: none"> ✓ Up to 120 mins. of cognitive activity in chunks ✓ Half-days at school, 1-2 times a week ✓ Some light physical activity 	<p>Not OK</p> <ul style="list-style-type: none"> ✗ Music/Phys. Ed class ✗ Tests/exams ✗ Homework ✗ Heavy physical loads (e.g. backpack) ✗ Organized sports
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Stage 3b Part-time school Moderate load




<p>OK if tolerated</p> <ul style="list-style-type: none"> ✓ Limited testing ✓ School work for 4-5 hours/day in chunks ✓ Homework up to 30 mins./day ✓ 3-5 days of school/week ✓ Decrease learning accommodations 	<p>Not OK</p> <ul style="list-style-type: none"> ✗ Phys. Ed class/ physical exertion ✗ Standardized tests/exams ✗ Organized sports
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Stage 4a Nearly normal workload



<p>OK if tolerated</p> <ul style="list-style-type: none"> ✓ Nearly normal cognitive activities ✓ Routine school work as tolerated ✓ Homework up to 60 mins./day ✓ Minimal learning accommodations 	<p>Not OK</p> <ul style="list-style-type: none"> ✗ Phys. Ed class ✗ Standardized tests/exams ✗ Full participation in organized sports
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Stage 4b Full time



<p>OK if tolerated</p> <ul style="list-style-type: none"> ✓ Normal cognitive activities ✓ Routine school work ✓ Full curriculum load ✓ No learning accommodations 	<p>Not OK</p> <ul style="list-style-type: none"> ✗ Full participation in sports until medically cleared. (See Return-to-Sport Strategy)
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