

D

DISABILITY

Priorities

Calculate GCS

Pupil Exam

Avoid Secondary Hits

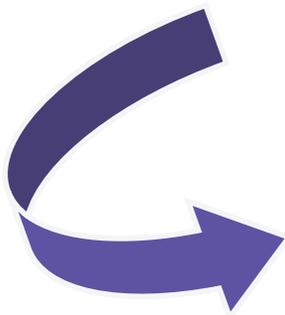
Identify and manage medical anticoagulation

Decide if CT scan is appropriate

GLASGOW COMA SCORE

Activity	Score	≤ 4 Years Of Age	≥5 Years Of Age
Eye Opening	4	Spontaneous	Spontaneous
	3	To speech or sound	To speech
	2	To painful stimuli	To pain
	1	None	None
Verbal	5	Appropriate words, sounds, and social smile	Oriented to person, place, month, year
	4	Cries but consolable	Confused
	3	Persistently irritable	Inappropriate words
	2	Restless / agitated	Incomprehensible
	1	None	None
Motor	6	Spontaneous movement	Obeys commands
	5	Localizes pain	Localizes pain
	4	Withdraws to pain	Withdraws to pain
	3	Abnormal extremity flexion	Abnormal extremity flexion
	2	Abnormal extremity extension	Abnormal extremity extension
	1	None	None

- Record GCS with vital signs
- GCS < 13 has elevated risk of Traumatic Brain Injury (TBI) and need for neurosurgical intervention.



Transfer Early!

Pupils

Unequal pupils is cause for concern:

1. May represent high intra-cranial pressure
2. May represent impending herniation

In the setting of Trauma and GCS < 8:

Intubate if not already

Consult with a Trauma Center before treatment

Mannitol 1 g/kg IV

Or

3% NS 250 ml IV bolus

**Transfer to a Level I or II
Trauma Center**

Avoid "Secondary Hits" to the Injured Brain

Hypoxia

O₂ Sats <93% puts injured brain at risk!



1. Secure airway: intubation preferred
2. 100% FiO₂

Hypotension

MAP <65 mmHg and/or SBP <90 mmHg puts injured brain at risk!



1. Stopping bleeding
2. Transfusing blood products
3. **EARLY TRANSFER!**

Medical Anticoagulation



Check Home Meds for:

- Coumadin (Warfarin)
- Plavix (Clopidogrel)
- ASA
- Effient (Prasugrel)
- Xarelto (Rivaroxaban)
- Pradaxa (Dabigatran)
- Pleral (Cilostazol)
- Brilinta (Ticagrelor)
- Ticlopidine
- Eliquis (Apixaban)

Anticoagulation and Trauma = TROUBLE!

On Plavix and ASA?

- Transfer to a Level I or II Trauma Center
- Transfuse Platelets if available

On Coumadin?

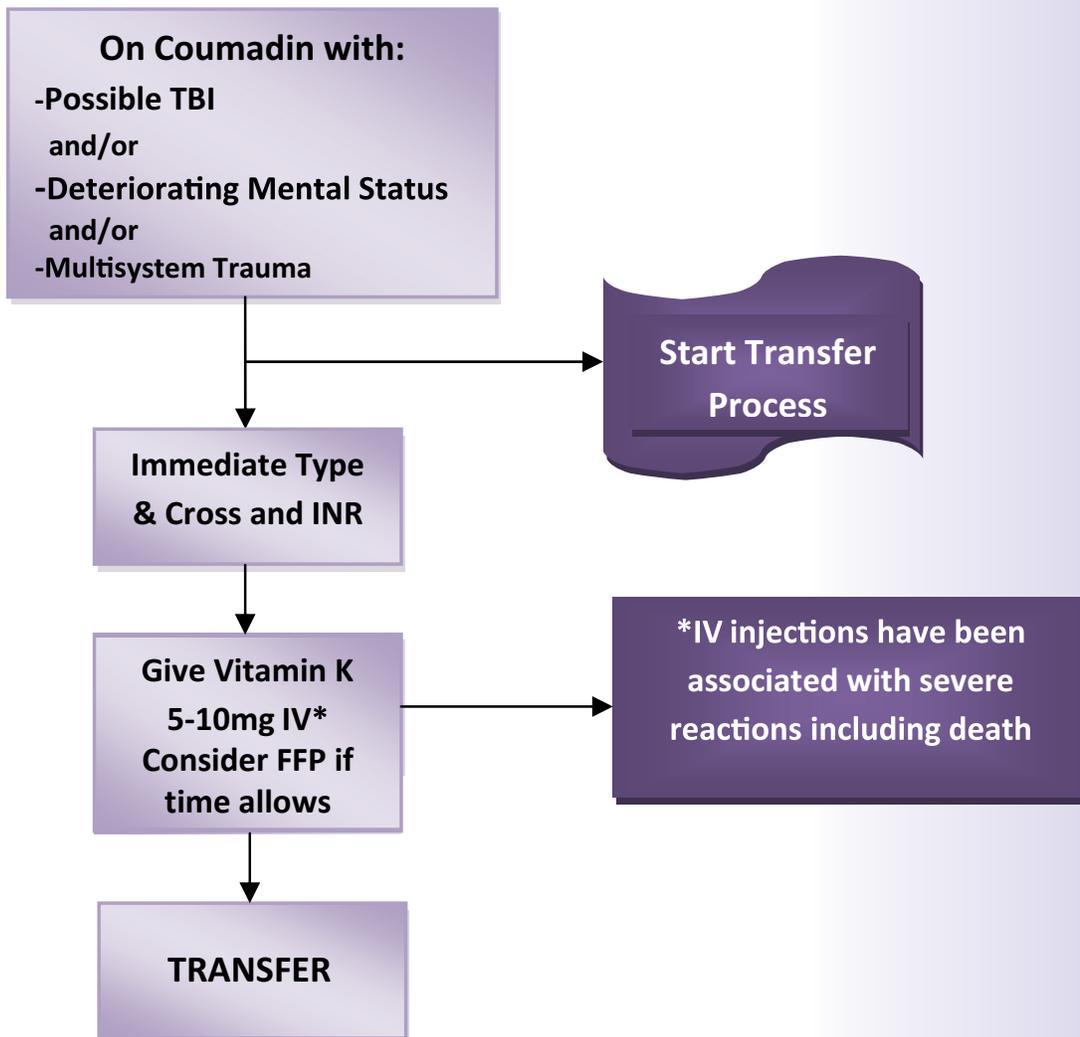
- Initiate Transfer
- Initiate Coumadin Reversal Algorithm (see next page)

On Other Anticoagulants?

- Consult with Level II Trauma Center

When in doubt = Consult

Coumadin Reversal Algorithm



C- Spine Clearance

If patient already meets criteria for transfer - defer CT of the c-spine, and maintain C-Spine immobilization. CT of the c-spine with coronal and sagittal reconstructions has become the standard of care **if** the NEXUS criteria are not met.

NEXUS CRITERIA

Bedside clearance of C-Spine is appropriate when:

- Patient is **NOT** intoxicated.
- Patient has normal mentation (GCS = 15).
- Patient has **NO** neurologic deficits.
- Patient has **NO** midline neck pain.
- Patient has **NO** distracting injuries.

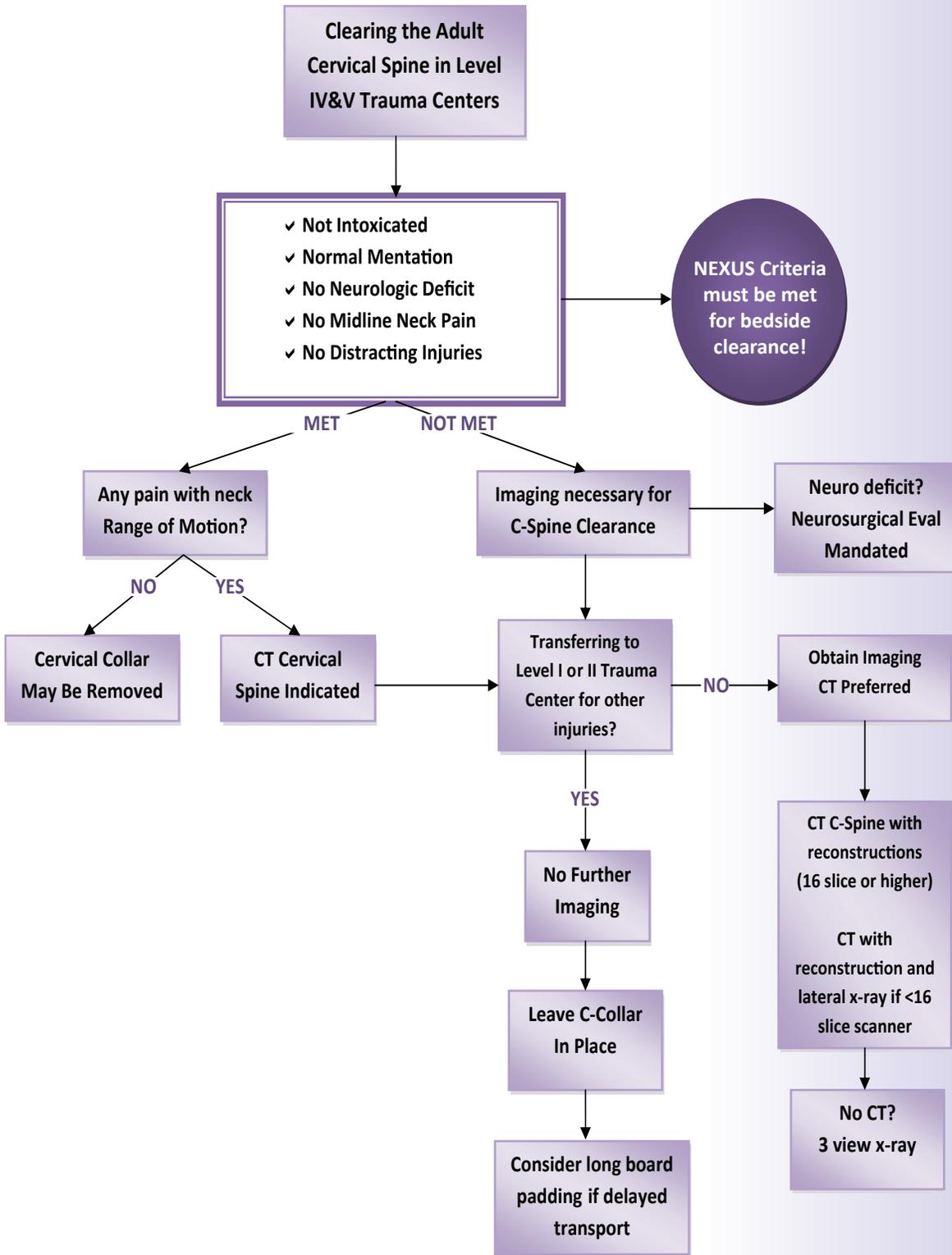
CT can still miss injuries that are ligamentous in nature.

If midline neck pain and/or a neurologic deficit is present with a normal appearing CT scan, further imaging with MRI and evaluation by a neurosurgeon may be indicated. The cervical collar should be left in place, c-spine precautions maintained, and consultation with a higher level trauma center obtained.

***Helpful Hint:** If your CT scanner is < 16 slice, obtain a lateral c-spine x-ray in addition to the CT to assist the radiologist in obtaining an accurate read.*

**Consider removing patient from back board
after initial EMS transport.**

Adult C-Spine Clearance Algorithm



Pediatric C-Spine Clearance

Age < 3:

➡ C-Spine injury in children < 3 years is extremely rare, occurring in < 1% of injuries in this age group.

➡ Nearly all injuries in this age group occur above C3

➡ Factors associated with C-Spine injury in children < 3 are:

- GCS <14
- GCS eye score = 1
- MVC mechanism
- Maybe higher incidents of injury between 2 and 3 years of age.

Reference: Pieretti-Vanmarcke, et al. J Trauma. 2009;67: 543-550.

Should Level IV and V Trauma Centers clear C-Spines in children < 3 years?



**The vast majority of time
the answer is NO!
TRANSFER IS INDICATED**

Age 3-16 Years

See Next Page

Pediatric C-Spine Clearance (Age 3-16 Years of Age)



NEXUS Criteria Applies to Kids!

NEXUS CRITERIA

Bedside clearance of C-Spine is appropriate when:

- *Patient is NOT intoxicated.*
- *Patient has normal mentation.*
- *Patient has NO neurologic deficits.*
- *Patient has NO midline neck pain.*
- *Patient has NO distracting injuries.*

Clinically Clearing the Pediatric C-Spine:



Mental status should be AGE APPROPRIATE

- Ask the parents to help you assess this!
- If mental status is altered, **DO NOT CLINICALLY CLEAR**
 - Obtain Imaging (**SEE ALGORITHM NEXT PAGE**)



A child does NOT need imaging when:

- ✓ Normal Alertness/Mental Status
- ✓ No Midline Neck Pain
- ✓ No Neurologic Impairment
- ✓ No Distracting Injuries

See Algorithm Next Page

Pediatric C-Spine Clearance Algorithm (3-16 Years of Age)

