Acute transfer is most often required if a patient meets at least 1 clinical and 1 imaging criteria from the lists below:

**Clinical criteria**
- Penetrating head injury
- Altered LOC not attributable to intoxicants
- High ICP (nausea, vomiting, headache) with altered LOC

**Imaging criteria**
- Traumatic intracerebral, acute subdural, or epidural hematoma
- Brain contusion
- Non traumatic brainstem or cerebellar intracerebral hemorrhage (ICH) (Non traumatic cortical ICH if a vascular malformation is suspected)

**Unique circumstances that might mandate transfer in absence of access to imaging**
- Lateralizing signs & GCS ≤8 in institution without access to CT scan
- LP proven subarachnoid hemorrhage (presence of xanthochromia)

If criteria in first step are satisfied, there should be a reasonable expectation of discussion regarding patient transfer.

### 1 Identify patients eligible for acute transfer

Acute transfer is most often required if a patient meets at least 1 clinical and 1 imaging criteria from the lists below:

**Clinical criteria**
- Penetrating head injury
- Altered LOC not attributable to intoxicants
- High ICP (nausea, vomiting, headache) with altered LOC

**Imaging criteria**
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- Brain contusion
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### 2 Stabilization and management

For all pathology, in preparation for transfer:
- Attend to ABC’s
- Reverse coagulopathy (INR <1.5)
- Perform neurovitals frequently (q1h)
- Treat hypotension & hypoxia
- Consider medical therapy for elevated ICP
- Judicious use of sedation (short acting drugs preferred)
- Intubate if GCS ≤8 or for transport if GCS ≤10

### 3 Consultation

At this stage contact CritiCall at 1-800-668-4357 for all patients where physician requires a neurosurgical opinion.

### 4 Disease specific management

**Traumatic brain injury**
- Give Dilantin 15-20mg/kg if documented seizure or GCS ≤8
- Give Mannitol 1.5g/kg for suspected raised ICP
- Do not use steroids for raised ICP
- Assume C-Spine injury and maintain spine precautions
- If penetrating object, stabilize but do not remove

**Subarachnoid hemorrhage**
- Keep patient normotensive, avoid 120 ≤ SBP ≥180 (use pressors or antihypertensives as necessary)*
- Consult neurosurgeon prior to giving Mannitol

**Brain tumors**
- Dilantin 20mg/kg for documented seizures
- Decadron 10mg IV† followed by 4mg IV q6h

**Intracerebral hemorrhage**
- Dilantin 20mg/kg for documented seizures
- Manage and set target BP in consultation with neurosurgeon
- Discuss with neurosurgeon the appropriateness of transfer using CT and clinical criteria

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* Age-specific blood pressure values apply to paediatric patients.
† Adjust dosage for paediatric patients.
In all cases, ABC’s should be evaluated and treated prior to the application of these guidelines.

1 Stabilization and management
For all pathology, in preparation for transfer:
- Attend to ABC’s
- Be mindful of FVC and ventilation in C-Spine injury
- MAP > 85
- For neurogenic shock use Dopamine 5-10mcg/kg/min
- Avoid hypotension
- Aggressive pain control
- Perform neurovitals frequently (q1h)
- Judicious use of sedation (short acting drugs preferred)
- Reverse coagulopathy (INR < 1.5)

2 Imaging red flags
If no CT scanner but clinical/radiographic suspicion arises, arrange urgent transfer for proper imaging to closest facility. If significant neurological deficit and abnormalities on plain x-rays, consultation with neurosurgeon recommended prior to CT scan.

CT scan demonstrating at least 1 of the following
- Spinal column fracture
- Subluxation/dislocation of facet joints in cervical spine
- Collapse of vertebral body
- Lumbar disc herniation with significant canal compromise
- Spinal cord compression secondary to new mass

Special considerations
- Patients with new deficit and history of malignant disease should be evaluated by gadolinium enhanced MRI emergently
- If history of trauma and new deficit, patient requires urgent MRI despite negative CT

3 Disease specific management
For all pathologies, images should be reviewed with an available radiologist prior to CritiCall referral.

Spinal Cord Injury (SCI)
CT scan is first line imaging modality.

Cervical
- Be vigilant in patients with new deficit and/or significant neck pain after trauma with normal CT scan. These patients require MRI to rule out spinal cord injury without radiographic abnormality.
- Immobilize in hard collar
- Assess bowel and bladder function
- Keep on bedrest with head of bed flat

Thoracolumbar
- Investigate for associated spinal and systemic injuries (e.g. bowel injury, occult spinal injury)

Acute (<48hrs) spinal cord compression (metastatic)

Early symptoms and signs
- Neurologic dysfunction
- Localized tenderness
- Severe unremitting spinal pain
- Nocturnal pain

Management
- Delineate primary lesion if applicable
- Dexamethasone 16mg IV x 1
- Look for lesions, the whole spine must be imaged with MRI + gadolinium

Cauda equina syndrome

Keys to diagnosis
- Post void residual > 150cc
- Decreased rectal tone
- Bilateral motor weakness

Next steps
- Once clinical diagnosis established, must be corroborated by MRI to establish diagnosis prompting referral.
- Optimize laboratory values (i.e. coagulation) for operative intervention.

Once all steps have been completed, urgently contact CritiCall at 1-800-668-4357

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† Adjust dosage for paediatric patients.