Isolated Head Trauma
Neurosurgery Consultation Referral Guidelines

Clinical Presentation

- **GCS = 15**
  - AND evidence of:
    - No visible skull fracture
    - No neurological deficit

- **GCS = 14-15**
  - AND evidence of one or more of:
    - Open skull fracture
    - Mild focal neurological deficit
      - With/without headache

- **GCS ≤ 13**
  - AND evidence of one or more of:
    - Penetrating head injury
    - Rapid onset, progressive neurological deterioration

  If no CT/MR scan services available but significant neurological deficit (GCS <12), seek consultation through CritiCall Ontario prior to arranging for transfer for CT/MR imaging.

Imaging: Abnormal CT/MRI Findings

CT/MRI images should be interpreted by the local radiologist prior to seeking neurosurgical consultation via CritiCall Ontario, unless the hospital does not have CT/MRI services.

AND evidence of one or more of:

- Chronic subdural hematoma
- Closed, linear skull fracture

AND evidence of one or more of:

- Intracerebral hemorrhage
- Acute subdural hematoma
- Epidural hematoma
- Brain contusion
- Chronic subdural hematoma
- Confirmation of skull fracture
- Diffuse brain injury (i.e., brain swelling, cisternal or sulcal obliteration)

AND evidence of one or more of:

- Intracerebral hematoma
- Acute subdural hematoma
- Epidural hematoma
- Brain contusion
- Diffuse brain injury (i.e., brain swelling, cisternal or sulcal obliteration)

Referral Directive

**CONSULT WITH NEUROSURGEON NEXT MORNING (7 AM)**

Next Morning Referral

Emergent/Urgent

Life or Limb

CALL CRITICALL ONTARIO 1-800-668-4357

Disease Specific Management

**ISOLATED HEAD TRAUMA:**

- Give Dilantin 15-20 mg/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.

SCAN THIS QR CODE using your mobile device to access an interactive web-based version of these guidelines.

The criteria are intended as guidelines. Providers are to rely on their clinical judgement for each individual patient encounter. Version 2.0 (December 2018)
**Brain Tumours**
Neurosurgery Consultation Referral Guidelines

### Clinical Presentation

- **GCS = 15**
  - AND evidence of one or more of:
    - With/without headache
    - Medically controlled seizures
    - Mild or no focal neurological deficit

- **GCS = 14*-15**
  - AND evidence of one or more of:
    - With/without headache
    - Progressive focal neurological deficit (cranial nerve or motor deficit)
    - Multiple and/or uncontrolled seizures
    - Not fully recovering, postictal
    - Indications of raised intracranial pressure (nausea, vomiting, and headache)
    - *With the exception of mild confusion due to existing dementia or a focal deficit related to the lesion (e.g., dysphasia)*

- **GCS ≤13**
  - AND evidence of one or more of:
    - With/without headache
    - Uncontrolled seizures
    - Severe and/or progressive focal neurological deficit (e.g., motor weakness that is stable or very slowly progressive)
    - Signs of raised ICP (e.g., headache with nausea and vomiting and/or bradycardia)
    - Clinical evidence of herniation
      - Consider patient for transfer if clinical evidence of herniation

### Imaging: Abnormal CT/MRI Findings

CT/MRI images should be interpreted by the local radiologist prior to seeking neurosurgical consultation via CritiCall Ontario, unless the hospital does not have CT/MRI services.

- **Evidence of tumor/neoplasm**
  - NB: May be incidental findings for other investigations

### Referral Directive

- **Next Morning Referral**
- **Emergent/Urgent**
- **Life or Limb**

**CONSULT WITH NEUROSURGEON NEXT MORNING (7 AM)**

** Local arrangements can be made to determine the preferred time to consult with a neurosurgeon for Next Morning Referrals.

**CALL CRITICALL ONTARIO**
1-800-668-4357

**Disease Specific Management**

**BRAIN TUMOURS:**
- Give Dilantin 15-20 mg/kg for documented seizures.
- Give Decadron 10 mg loading dose followed by 4 mg IV q6H.
**Clinical Presentation**

- **GCS = 15**
  - AND evidence of:
    - Neurologically stable
    - With/without headache

- **GCS = 14*-15**
  - AND evidence of one or more of:
    - Mild focal neurological deficit with no/slow progression
    - With/without headache
    - *With the exception of mild confusion due to existing dementia or a focal deficit related to the lesion (e.g., dysphasia)*

- **GCS ≤ 13**
  - AND evidence of one or more of:
    - Progressive neurological deterioration

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**Imaging: Abnormal CT/MRI Findings**

CT/MRI images should be interpreted by the local radiologist prior to seeking neurosurgical consultation via CritiCall Ontario, unless the hospital does not have CT/MRI services.

- **AND evidence of one or more of:**
  - Any hemorrhage ≤ 2.0 cm
  - Vascular malformation with resolved intracranial hemorrhage
  - NB: Patients with hypertensive hemorrhagic stroke (≤ 3.0cm) are medically managed by neurology and do not require urgent consultation.

- **AND evidence of one or more of:**
  - Infratentorial intracranial hemorrhage without obstructive hydrocephalus
  - Intraventricular hemorrhage
  - Supratentorial hemorrhage: 2-5 cm
  - Non-traumatic subarachnoid hemorrhage

- **AND evidence of one or more of:**
  - Obstructive hydrocephalus
  - Infratentorial intracranial hemorrhage ≥ 3 cm
  - Lobar hemorrhage ≥ 5 cm
  - Non-traumatic subarachnoid hemorrhage

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**Referral Directive**

- Next Morning Referral
- Emergent/Urgent
- Life or Limb

**CONSULT WITH NEUROSURGEON NEXT MORNING (7 AM)**

**Disease Specific Management**

**NON-TRAUMATIC SUBARACHNOID HEMORRHAGE:**
- Keep systolic blood pressure (SBP) between 120mmHg and 180mmHg (use pressors or antihypertensives as necessary).
- Consult neurosurgeon prior to giving Mannitol.

**INTRACEREBRAL HEMORRHAGE:**
- Give Dilantin 15-20 mg/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.

**Legend:**
- Next Morning Referral
- Emergent/Urgent
- Life or Limb

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**Clinical Presentation**

- **Radiculopathy** with mild or no weakness
- **Spine pain**
- **Acute radiculopathy** with significant weakness
- **Stable or slowly progressive quadriparesis**
- **Stable or slowly progressive paraparesis**

**Next Morning Referral**

**Emergent/Urgent**

**Life or Limb**

**CT/MRI images should be interpreted by the local radiologist prior to seeking neurosurgical consultation via CritiCall Ontario, unless the hospital does not have CT/MRI services.**

**Imaging: Abnormal X-Ray/CT/MRI Findings**

- AND evidence of one or more of:
  - Stable compression fracture
  - Evidence of spinal column tumour
  - Cervical or lumbar disc herniation
  - Degenerative and deformity findings should be referred to primary care provider for follow-up management. See Quality-Based Pathway for Clinical Handbook for Non-Emergent Integrated Spine Care

- AND evidence of one or more of:
  - Spinal column fracture
  - Subluxation/dislocation facet joints in cervical spine
  - Collapse of vertebral body
  - Cervical or lumbar disc herniation with significant canal compromise
  - Spinal cord compression due to new mass (tumour or infection)

If no CT scan services available but significant neurological deficit and abnormalities on plain x-rays, seek consultation through CritiCall Ontario prior to arranging for transfer for CT/MR imaging.

- AND evidence of one or more of:
  - Thecal sac compression
  - Severe spinal canal compromise

If no local CT/MRI services available, seek CritiCall Ontario consultation prior to arranging for transfer for CT/MR imaging.

- AND evidence of one or more of:
  - Stable compression fracture
  - Evidence of spinal column tumour
  - Cervical or lumbar disc herniation

NB: Degenerative and deformity findings should be referred to primary care provider for follow-up management. See Quality-Based Pathway for Clinical Handbook for Non-Emergent Integrated Spine Care

**Referral Directive**

- **CONSULT WITH NEUROSURGEON NEXT MORNING (7 AM)**
- **CALL CRITICALL ONTARIO**
  - 1-800-688-4357

**Disease Specific Management**

**CAUDA EQUINA SYNDROME**
- The absence of urinary retention indicates the exclusion of possible Cauda Equina Syndrome.
- Next steps:
  - Once clinical diagnosis established, must be corroborated by MRI to establish diagnosis prompting referral.

**SPINAL CORD INJURY**
- CT scan is first line imaging modality.
- **Thoracolumbar**:
  - 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 rigid cervical collar.

**ACUTE (<48 hours) SPINAL CORD COMPRESSION (METASTATIC)**
- Management:
  - Delineate primary lesion, if applicable.
  - Avoid hypotension (SBP <100).
  - Give Dexamethasone 16 mg IV x1.
  - Look for lesions; the whole spine must be imaged with MRI + Gadolinium.

**Legend:**
- Next Morning Referral
- Emergent/Urgent
- Life or Limb

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