Isolated Head Trauma

Neurosurgery Consultation Referral Guidelines

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

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 sulcul 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 sulcul obliteration)

Referral Directive

Next Morning Referral

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.*

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.

The criteria are intended as guidelines. Providers are to rely on their clinical judgement for each individual patient encounter.

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Brain Tumours

Neurosurgery Consultation Referral Guidelines

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

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

- Evidence of tumor/neoplasm

- Evidence of tumor/neoplasm

AND evidence of one or more of:
- ❑ Obstructive hydrocephalus
- ❑ Intratumoural hemorrhage

Referral Directive

Next Morning Referral

CONSULT WITH NEUROSURGEON NEXT MORNING (7 AM)**

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Emergent/Urgent

Life or Limb

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.

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Intracerebral Hemorrhage

Neurosurgery Consultation Referral Guidelines

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

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

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 ore more of:
- ❑ Infratentorial intracranial hemorrhage without obstructive hydrocephalus
- ❑ Intraventricular hemorrhage
- ❑ Supratentorial hemorrhage: 2-5 cm
- ❑ *Non-traumatic* subarachnoid hemorrhage

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

If no CT/MR scan services available but significant neurological deficit (e.g., lateralizing signs, GCS <12, presence of xanthochromia in lumbar puncture), seek consultation through CritiCall Ontario prior to arranging for transfer for CT/MR imaging.

Referral Directive

Next Morning Referral

CONSULT WITH NEUROSURGEON NEXT MORNING (7 AM)**

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Emergent/Urgent

Life or Limb

CALL CRITICALL ONTARIO
1-800-668-4357

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.

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Spine

Neurosurgery Consultation Referral Guidelines

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

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

- Quadriplegia
- Paraplegia
- Rapidly progressive quadriparesis
- Rapidly progressive paraparesis

OR

- Cauda Equina Syndrome

AND one or more of:
- ❑ Decreased rectal tone
- ❑ Saddle anesthesia
- ❑ Bilateral motor weakness

If history of trauma and new, severe deficit, arrange for urgent MRI and/or CT.

Imaging: Abnormal X-Ray/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:
- ❑ 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

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.

Referral Directive

Next Morning Referral

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Emergent/Urgent

Life or Limb

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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.
- Optimize laboratory values (i.e., coagulation) for operative intervention.

SPINAL CORD INJURY

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 rigid cervical collar.

Thoracolumbar
- Assess bowel and bladder function.
- Keep on bedrest with head of bed flat.
- Investigate for associated spinal and systemic injuries (e.g., bowel injury, occult spinal injury).

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.

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