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 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.

Legend:

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

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

CCSO Critical Care Services Ontario
www.criticalcareontario.ca

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

- 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.

Legend:

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

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Intracerebral Hemorrhage

Neurosurgery Consultation Referral Guidelines

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	Emergent/Urgent	Life or Limb
CONSULT WITH NEUROSURGEON NEXT MORNING (7 AM)**	CALL CRITICALL ONTARIO 1-800-668-4357	

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

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

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.

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

CCSO Critical Care Services Ontario
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Spine

Neurosurgery Consultation Referral Guidelines

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

CONSULT WITH NEUROSURGEON NEXT MORNING (7 AM)**

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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.

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

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