

HEAD INJURY (Closed)

SESLHDPR/389

Aim:

- Early identification and treatment of life threatening causes of closed head injury i.e. intracranial haemorrhage.
- Early initiation of treatment / clinical care and symptom management within benchmark time.
- Consistent use of [NSW ITIM Guidelines for Closed Head Injury in Adults](#).¹

Assessment Criteria: On assessment the patient should have a history of a closed head injury plus one or more of the following signs / symptoms:

- | | |
|--|--|
| <input type="checkbox"/> History of minor head trauma / injury | <input type="checkbox"/> Headache - mild |
| <input type="checkbox"/> GCS 14-15 (mild head injury) | <input type="checkbox"/> Brief loss of consciousness (< 5 minutes) |
| <input type="checkbox"/> Amnesic to events | |

Escalation Criteria: Immediate life-threatening presentations that require escalation and referral to a Senior Medical Officer (SMO).¹⁻³

- | | | |
|--|--|--|
| <input type="checkbox"/> Patient meets trauma call criteria² | <input type="checkbox"/> CSF leakage | <input type="checkbox"/> Confusion or delirium |
| <input type="checkbox"/> Open/depressed skull fracture | <input type="checkbox"/> Stroke/TIA symptoms | <input type="checkbox"/> Altered behavior |
| <input type="checkbox"/> Raccoon eye(s) / Battle signs | <input type="checkbox"/> Photophobia | <input type="checkbox"/> Unequal pupils |
| <input type="checkbox"/> Bleeding disorder / anticoagulation | <input type="checkbox"/> Neck stiffness / headache | <input type="checkbox"/> Elderly > 65 years |

Primary Survey:

- | | |
|--|---|
| • Airway / C-Spine: patency / immobilise | • Breathing: resp rate, accessory muscle use, air entry, SpO ₂ . |
| • Circulation: perfusion, BP, heart rate | • Disability: GCS, pupils, limb strength |

Notify CNUM and SMO if any of following red flags is identified from Primary Survey.^{2,3}

- | | | |
|---|---|--|
| <input type="checkbox"/> Airway – at risk | <input type="checkbox"/> Breathing – respiratory distress | <input type="checkbox"/> Circulation – shock / altered perfusion |
| • <i>Partial / full obstruction</i> | • <i>RR < 5 or >30 /min</i> | • <i>HR < 40bpm or > 140bpm</i> |
| • <i>Immobilise c-spine [as indicated]</i> | • <i>SpO₂ < 90%</i> | • <i>BP < 90mmHg or > 200 mmHg</i> |
| <input type="checkbox"/> Disability – decreased LOC | <input type="checkbox"/> Exposure | • <i>Postural drop > 20mmHg</i> |
| • <i>GCS ≤ 14 or any fall in GCS by 2 points</i> | • <i>Temperature < 35.5°C or > 38.5°C</i> | • <i>Capillary return > 2 sec</i> |
| | • <i>BGL < 4mmol/L or > 20mmol/L</i> | |

History:

- Presenting complaint
- Allergies
- Medications: Anticoagulant Therapy, Anti-hypertensives, Diabetic meds, Analgesics, Inhalers, Chemotherapy, Non-prescription meds, any recent change to meds
- Past medical past surgical history: Epilepsy, cranial surgery / injuries
- Last ate/drank and last menstrual period (LMP) / bowel motion
- Events and environment leading to presentation
- Pain Assessment / Score: **PQRST** (Palliating / provoking factors, Quality, Region / radiation, Severity, Time onset)
- Associated signs/symptoms: nature of pain / radiation, headache, loss of consciousness, nausea, vomiting, ataxia, seizure, rashes
- History: family, social, trauma i.e. non-prescribed drug use, ETOH, smoking.

Systems Assessment:

Focused neurological assessment: : *Inspection / Palpation / Auscultation [as indicated]*

Identify location of pain i.e. look for any signs of injury or illness.

- *Inspection:* scars, masses, bruising, discolouration, scalp haematoma or laceration, rashes, movement of patient
- *Palpation:* tenderness, location of pain, trauma to head / neck, open wounds / fractures
- Presence of sensory, motor, speech, and vision deficits suggests an underlying neurological problem.

Notify CNUM and SMO if any of following red flags is identified from History or Systems Assessment.

- | | | |
|---|--|---|
| <input type="checkbox"/> Altered mental status - drowsiness | <input type="checkbox"/> Confusion / agitation | <input type="checkbox"/> Persistent amnesia |
| <input type="checkbox"/> GCS <14 from 2hrs post incident | <input type="checkbox"/> Nausea Vomiting >1 | <input type="checkbox"/> Non-blanching rash |
| <input type="checkbox"/> Severe headache (worse ever) | <input type="checkbox"/> Seizure | <input type="checkbox"/> Acute withdrawal |
| <input type="checkbox"/> Collapse | <input type="checkbox"/> Ataxia | <input type="checkbox"/> Elderly > 65 years |
| <input type="checkbox"/> Open wounds / fracture | <input type="checkbox"/> Neck stiffness / soreness | <input type="checkbox"/> Dilated pupils |

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<p>Investigations / Diagnostics:</p> <p>Bedside:</p> <ul style="list-style-type: none"> BGL: If < 3mmol/L or > 20mmol/L notify SMO 🚫 ECG: [as indicated] look for Arrhythmia , AMI 🚫 Urinalysis / MSU (if urinary symptoms present) Wound assessment 	<p>Laboratory / Radiology:</p> <ul style="list-style-type: none"> Pathology: <i>Not generally indicated</i> Refer to local nurse initiated STOP Group and Hold (if bleeding suspected) Blood Cultures (if Temp >38.5 or < 35°C) INR (if taking Anticoagulant Therapy) Radiology: Refer to SMO 	
<p>Nursing Interventions / Management Plan:</p> <p>Resuscitation / Stabilisation:</p> <ul style="list-style-type: none"> Oxygen Therapy and cardiac monitoring [as indicated] IV Cannulation (16-18gauge if unstable) IV Fluids: Sodium Chloride 0.9% 1 L IV stat versus over 8 hours (discuss with SMO) 	<p>Symptomatic Treatment:</p> <p>Antiemetic: as per district standing order</p> <p>Analgesia: as per district standing order</p> <p>IV Fluids: as per district standing order</p>	
<p>Supportive Treatment:</p> <ul style="list-style-type: none"> Nil by Mouth (NBM) Monitor vital signs as clinically indicated (BP, HR, T, RR, SpO₂) Monitor neurological status - GCS hourly (or as clinically indicated) 	<ul style="list-style-type: none"> Fluid Balance Chart (FBC) Monitor pain assessment / score A-WPTAS ~ Abbreviated Westmead PTA Scale⁵ 	
<p>Practice Tips / Hints:</p> <ul style="list-style-type: none"> Provide a written discharge advice sheet for Mild Head Injuries available from the Emergency Care Institute Fact Sheets: https://www.aci.health.nsw.gov.au/networks/eci/clinical/ed-factsheets Opiates may alter neurological assessment, use with caution Deterioration of mild head injury patients following a normal CT scan is rare. Caution is advised for patients with known coagulopathy, and elderly patients where the risk of a delayed subdural haemorrhage is increased. All patients should be advised to follow-up with their GP if they are not feeling back to normal within two (2) days. 		
<p>Further Reading / References:</p> <ol style="list-style-type: none"> Institute of Trauma & Injury Management, <i>Closed Head Injury in Adults - Initial Management</i>, NSW Health, 2nd Edition. (2011) Sydney. Available Online: https://aci.health.nsw.gov.au/get-involved/institute-of-trauma-and-injury-management/clinical/trauma-guidelines/Guidelines/head_injury_cpg NSW Ministry of Health Policy - PD2012_013 Closed Head Injury in Adults - Initial Management. Available online: https://www1.health.nsw.gov.au/pds/Pages/doc.aspx?dn=PD2012_013 New South Wales Health, <i>NSW Critical Care Tertiary Referral Networks and Transfer of Care (ADULTS)</i>: Available Online: https://www1.health.nsw.gov.au/pds/ActivePDSDocuments/PD2018_011.pdf Recognition and management of patients who are deteriorating (PD2020_015). Available from https://www1.health.nsw.gov.au/pds/ActivePDSDocuments/PD2020_018.pdf Abbreviated Westmead Post Traumatic Amnesia Scale (A-WPTAS). Available from https://www.aci.health.nsw.gov.au/networks/eci/clinical/clinical-resources/forms/awptas 		
<p>Acknowledgements: <i>SESLHD Adult Emergency Nurse Protocols were developed and adapted from:</i></p> <ul style="list-style-type: none"> Murphy, M (2007) Emergency Department Toolkits Westmead Hospital , SWAHS Hodge, A (2011) Emergency Department, Clinical Pathways. Prince of Wales Hospital SESLHD. 		
<p>Revision and Approval History</p>		
<p>Date</p>	<p>Revision No.</p>	<p>Author and Approval</p>
<p>September 2013</p>	<p>0</p>	<p>Developed by Wayne Varndell – Clinical Nurse Consultant, Prince of Wales Emergency Department.</p>
<p>February 2014</p>	<p>1</p>	<p>Edited by Leanne Horvat, Clinical Stream Nurse Manager Emergency / Critical Care & Emergency Stream CNC/NE Working Group SESLHD.</p>
<p>August 2014</p>	<p>2</p>	<p>Endorsed by: SESLHD Emergency Clinical Stream Committee on 28 August 2014</p>
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Adult Emergency Nurse Protocol



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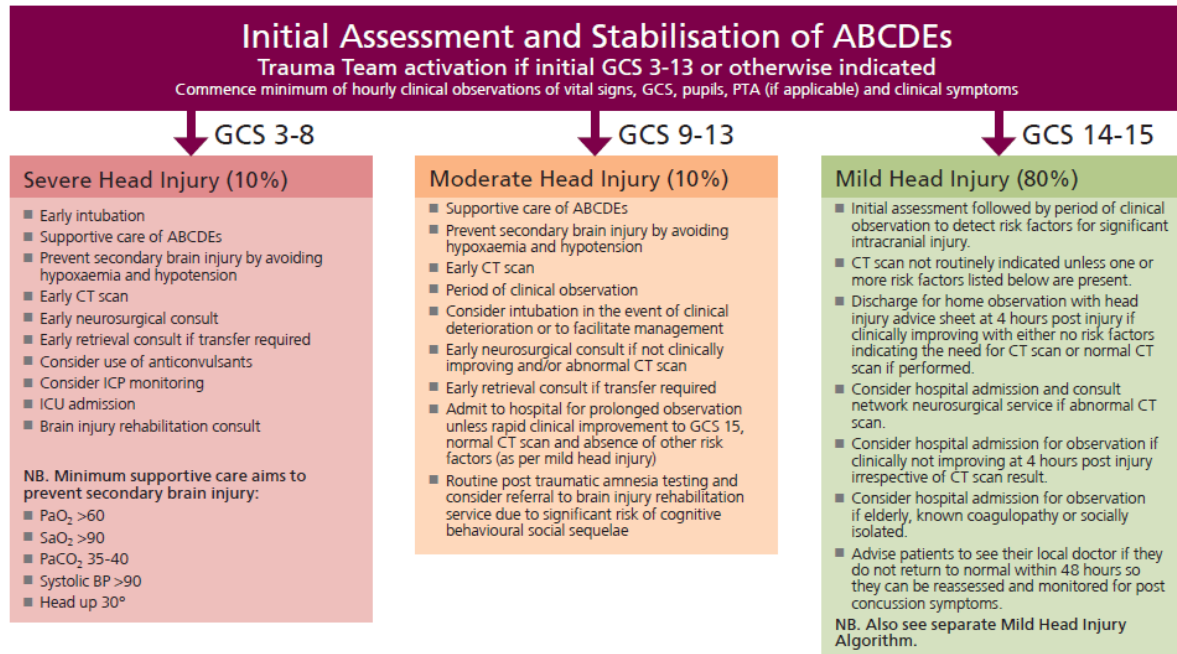
January 2018	5	Processed by Executive Services prior to submission to DQUM.
February 2018	5	Endorsed by: SESLHD Drug & Quality Use of Medicine Committee
April 2021	6	Updated by: Wayne Varndell, Clinical Nurse Consultant, Prince of Wales Hospital Emergency Department
May 2021	6	Approved by Executive Sponsor.
June 2021	6	Endorsed by: SESLHD Quality Use of Medicine Committee

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Algorithm 1:

Initial Management of Adult Closed Head Injury



Risk factors indicating potentially significant mild head injury		
<ul style="list-style-type: none"> ■ GCS <15 at 2 hours post injury ■ Deterioration in GCS ■ Focal neurological deficit ■ Clinical suspicion of skull fracture ■ Vomiting (especially if recurrent) ■ Known coagulopathy / bleeding disorder 	<ul style="list-style-type: none"> ■ Age >65 years ■ Post traumatic seizure ■ Prolonged loss of consciousness (>5 min). ■ Persistent post traumatic amnesia (AWPTAS <18/18)* ■ Persistent abnormal alertness / behaviour / cognition* ■ Persistent severe headache* 	<ul style="list-style-type: none"> ■ Large scalp haematoma or laceration.** ■ Multi-system trauma** ■ Dangerous mechanism** ■ Known neurosurgery / neurological deficit.** ■ Delayed presentation or representation**
<p>* particularly if persists at 4 hours post time of injury **clinical judgement required</p>		

What should be done when patients with closed head injury acutely deteriorate?	
<p>Early signs of deterioration</p> <ul style="list-style-type: none"> ■ Confusion ■ Agitation ■ Drowsiness ■ Vomiting ■ Severe headache <p>Late signs of deterioration</p> <ul style="list-style-type: none"> ■ Decrease in GCS by two or more points ■ Dilated pupil(s) ■ Focal neurological deficit ■ Seizure ■ Cushing's response – bradycardia and hypertension 	<p>Clinical approach</p> <ul style="list-style-type: none"> ■ Resuscitate ABCDEs and exclude non head injury cause ■ Supportive care of ABCDEs ■ Early intubation if indicated ■ Immediate CT scan ■ If clinical or CT evidence of raised ICP/mass effect consult with network neurosurgical and retrieval services re; <ul style="list-style-type: none"> - short term hyperventilation to PaCO₂ 30-35 - bolus of mannitol (1g/kg) - local burr holes/craniectomy when more than 2 hours from neurosurgical care - prophylactic anti-convulsants

When should patients with closed head injury be transferred to hospitals with neurosurgical facilities?	
<p>Potential indications</p> <p>Patient with severe head injury</p> <ul style="list-style-type: none"> ■ clinical deterioration ■ abnormal CT scan ■ normal CT scan but not clinically improving ■ CT scan unavailable. <p>Patient with moderate head injury if:</p> <ul style="list-style-type: none"> ■ clinical deterioration ■ abnormal CT scan ■ normal CT scan but not clinically improving within 4-6 hours post injury <p>Patient with mild head injury if:</p> <ul style="list-style-type: none"> ■ mild head injury with CT scan unavailable, particularly if: <ul style="list-style-type: none"> - Persistent GCS<15 - Deterioration in GCS - Focal neurological deficit - Clinical suspicion of skull fracture - Persistent abnormal mental status - Persistent vomiting - Persistent severe headache - Known coagulopathy (particularly if age >65 or INR >4) 	<p>Clinical approach</p> <ul style="list-style-type: none"> ■ When in doubt consult you network neurosurgical service. ■ Patients with closed head injuries should be observed in facilities that can manage any complications that are likely to arise. Clinical judgment regarding risk of deterioration is required and neurosurgical consultation may be appropriate. ■ Patients with closed head injuries should be transferred to the nearest appropriate hospital with neurosurgical facilities if there is significant risk of intracranial injury. The transfer of patients to hospitals with CT scan facilities but without neurosurgical services should be avoided.

AMRS (adult)	1800 650 004
'formerly the MRU'	
NETS (children)	1300 362 500
Network neurosurgical service	