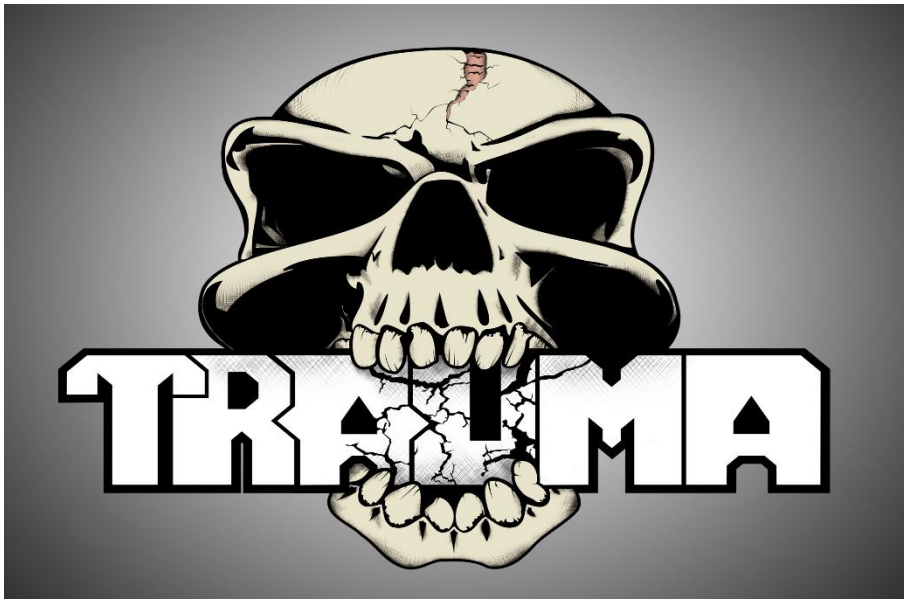
DEDER GENERAL HOSPITAL

TRAUMA AND INJURY PROTOCOL



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PROTOCOL APPROVAL SHEET

NAME OF PROTOCOL: TRAUMA AND INJURY PROTOCOL

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THIS PROTOCOL IS EFFECTIVE FROM JULY 2016 E.C TO JUNE 2018 E.C

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GENERAL APPROACH TO TRAUMA PATIENTS

The treatment of seriously injured patients requires the rapid assessment of injuries and institution of life-preserving therapy.

Because timing is crucial, a systematic approach that can be rapidly and accurately applied is essential.

This approach is termed the "initial assessment" and includes the following elements:

- Triage
- Primary survey (ABCDEs)
- Resuscitation
- Adjuncts to primary survey and resuscitation
- Consideration of the need for patient transfer
- Secondary survey (head-to-toe evaluation and patient history)
- Adjuncts to the secondary survey
- Continued post resuscitation monitoring and reevaluation

Definitive care

- The primary and secondary surveys should be repeated frequently to identify any change in the patient's status that indicates the need for additional intervention.
- Patients are assessed, and their treatment priorities are established, based on their injuries, vital signs, and the injury mechanisms.
- In severely injured patients, logical and sequential treatment priorities must be established based on overall patient assessment.
- The patient's vital functions must be assessed quickly and efficiently.
- Management consists of a rapid primary survey, resuscitation of vital functions, a more detailed secondary survey, and, finally, the initiation of definitive care.
- This process constitutes the **ABCDEs** of trauma care and identifies life-threatening conditions by adhering to the following sequence:
- Airway maintenance with cervical spine protection
  - ✓ Breathing and ventilation
  - ✓ Circulation with hemorrhage control

- ✓ Disability: Neurologic status
- ✓ Exposure/Environmental control: Completely undress the patient, but prevent hypothermia
- ✓ FAST (Focused Assessment of Sonography in Trauma)

This prioritized sequence is based on the degree of life threat so that the abnormality that poses the greatest threat to life is addressed first.

A quick assessment of the A, B, C, and D in a trauma patient can be conducted by asking the patient for his or her name, and asking what happened. Appropriate response indicates that there is no major compromise in A, B and D.

AIRWAY MAINTENANCE WITH CERVICAL SPINE PROTECTION

- Upon initial evaluation of a trauma patient, the airway should be assessed first to ascertain patency (the easiest way of assessing airway patency is asking the patient his name or get him to talk).
- This rapid assessment for signs of airway obstruction should include suctioning and inspection for foreign bodies and facial, mandibular, or tracheal/laryngeal fractures that can result in airway obstruction.
- Measures to establish a patent airway should be instituted while protecting the cervical spine (Inline stabilization). Initially, the chin-lift or jaw-thrust maneuver is recommended to achieve airway patency. In addition, patients with severe head injuries who have an altered level of consciousness or a Glasgow Coma Scale (GCS) score of 8 or less usually require the placement of a definitive airway.
- While assessing and managing a patient's airway, great care should be taken to prevent excessive movement of the cervical spine.
- The patient's head and neck should not be hyperextended, hyper flexed, or rotated to establish and maintain the airway.
- Based on the history of a traumatic incident, loss of stability of the cervical spine should be assumed.
- Neurologic examination alone does not exclude a diagnosis of cervical spine injury. Initially, protection of the patient's spinal cord with appropriate immobilization devices

should be accomplished and maintained (Cervical Collar should be applied until cervical injury is ruled out). Assume a cervical spine injury in patients with blunt multisystem trauma, especially those with an altered level of consciousness or a blunt injury above the clavicle.

BREATHING AND VENTILATION

- Airway patency alone does not ensure adequate ventilation. Respiratory rate, saturation and air entry should be checked.
- Adequate gas exchange is required to maximize oxygenation and carbon dioxide elimination.
- Ventilation requires adequate function of the lungs, chest wall, and diaphragm. Each component must be rapidly examined and evaluated.
- The patient's neck and chest should be exposed to adequately assess jugular venous distention, position of the trachea, and chest wall excursion.
- Auscultation should be performed to ensure gas flow in the lungs.
- Visual inspection and palpation can detect injuries to the chest wall that may compromise ventilation.
- Injuries that severely impair ventilation in the short term include tension pneumothorax, flail chest with pulmonary contusion, massive hemothorax, and open pneumothorax.
- Appropriate measures including putting the patient on oxygen to maintain saturation, chest decompression for tension pneumothorax should be done while assessing breathing and ventilation.

CIRCULATION WITH HEMORRHAGE CONTROL

Circulatory compromise in trauma patients can result from many different injuries.

Hemorrhage is the predominant cause of preventable deaths after injury. Identifying and stopping hemorrhage are therefore crucial steps in the assessment and management of such patients. Once tension pneumothorax has been eliminated as a cause of shock, hypotension following injury must be considered to be hypovolemic in origin until proven otherwise.

The elements of clinical observation that yield important information about the patient's hemodynamic status within seconds are level of consciousness, skin color, and pulse.
The source of bleeding should be identified as either external or internal.

External hemorrhage is identified and controlled during the primary survey. Rapid, external blood loss is managed by direct manual pressure on the wound. The major areas of internal hemorrhage are the chest, abdomen, retroperitoneum, pelvis, and long bones.
The source of the bleeding is usually identified by physical examination and imaging (e.g., chest x-ray, pelvic x-ray, or focused assessment sonography in trauma [FAST]).
Management may include:

- ✓ chest decompression, pelvic binders, splint application, and surgical intervention.
- ✓ Definitive bleeding control is essential along with appropriate replacement of intravascular volume.
- ✓ A minimum of two large-caliber intravenous (IV) catheters should be introduced.
- ✓ Blood samples taken for cross match as well.
- ✓ IV fluid therapy with crystalloids should be initiated. A bolus of 1 to 2 L of an isotonic solution may be required to achieve an appropriate response in the adult patient.
- ✓ If the patient is unresponsive to initial crystalloid therapy, blood transfusion should be given.

DISABILITY (NEUROLOGIC EVALUATION)

A rapid neurologic evaluation is performed at the end of the primary survey.

This neurologic evaluation establishes the patient's level of consciousness, pupillary size and reaction, lateralizing signs, and spinal cord injury level.

The GCS is a quick, simple method for determining the level of consciousness that is predictive of patient outcome, particularly the best motor response

A decrease in the level of consciousness may indicate decreased cerebral oxygenation and/or perfusion, or it may be caused by direct cerebral injury.

An altered level of consciousness indicates the need for immediate reevaluation of the patient's oxygenation, ventilation, and perfusion status.

Hypoglycemia and alcohol, narcotics, and other drugs also can alter the patient's level of consciousness. However, if these factors are excluded, changes in the level of consciousness should be considered to be of traumatic central nervous system origin until proven otherwise.

Primary brain injury results from the structural effect of the injury to the brain.

Prevention of secondary brain injury by maintaining adequate oxygenation and perfusion are the main goals of initial management.

EXPOSURE AND ENVIRONMENTAL CONTROL

Undress: The patient should be completely undressed, usually by cutting off his or her garments to facilitate a thorough examination and assessment.

Log roll: Log roll should be done here by at least 3 health care workers two for rolling the patient and one examining. So, examiner should:

- ✓ palpate vertebra from cervical till lumbosacral area for any tenderness or deformity,
- ✓ check for any open wound at the back and
- ✓ do Per Rectum examination to asses for tone and any blood on examining finger.

Warming: After patient's clothing has been removed and the assessment is completed,

- ✓ Cover patient with warm blankets or an external warming device to prevent hypothermia in the trauma receiving area.
- ✓ Intravenous fluids should be warmed before being infused, and
- ✓ A warm environment (i.e., room temperature) should be maintained.

ADJUNCTS TO PRIMARY SURVEY

Adjuncts that are used during the primary survey include electrocardiographic monitoring; urinary and gastric catheters; other monitoring, such as ventilatory rate, arterial blood gas (ABG) levels, pulse oximetry, blood pressure, and x-ray examinations (e.g., chest and pelvis).

Secondary survey

The secondary survey does not begin until the primary survey (ABCDEs) is completed, resuscitative efforts are underway, and the normalization of vital functions has been demonstrated**.**

When additional personnel are available, part of the secondary survey may be conducted while the other personnel attend to the primary survey.

In this setting the conduction of the secondary survey should not interfere with the primary survey, which takes first priority.

The secondary survey is a head-to-toe evaluation of the trauma patient, that is, a complete history including mechanism of injury and **AMPLE** history and physical examination, including reassessment of all vital signs.

AMPLE history stands for:

- ✓ **A-**Allergies,
- ✓ **M-**Medications currently used,
- ✓ **P-**Past illnesses/**P**regnancy,
- ✓ **L-**Last meal,
- ✓ **E-**Events/**E**nvironment related to the injury.

☞ Each region of the body is completely examined.

NB. All trauma patients should have repeated evaluations of both the primary survey and secondary survey to monitor response to interventions and to detect new abnormalities. Whenever there is a need, trauma patients should be transferred to trauma treating hospitals

TRAUMATIC BRAIN INJURIES (TBI)

It is any episode of trauma to the head (brain). Mortality is high.

Diagnostic criteria

- ✓ Head injury may be associated with ophthalmic, ENT and dental injuries which are discussed separately.
- ✓ It is classified into two:
  - Involving scalp only
  - Traumatic brain injury

Table 1: Illustration of Traumatic Brain Injuries

Mild Traumatic Brain injury	□ □ □	Glasgow coma scale 13–14 Involves a "brief" period of loss of consciousness Good progress with minimal or no long term sequel
Moderate Traumatic Brain Injury	□ □ □	Glasgow coma scale 9–12 Confused patient with focal neurological deficits but able to follow simple commands Some mild long-term sequel
	□	Good prognosis
Severe Traumatic Brain injury	□ □ □	Glasgow coma scale <8 (This is the definition of coma) Unable to follow commands initially Significant long-term disability

Treatment

Hospital Level Interventions

History as above, follow the **ABCDE trauma protocol**

Examine patient thoroughly, note the level of consciousness, pupils' asymmetry and any lateralizing signs

Treat seizures by:

A: Diazepam inj. 10mg 8 hourly

B: Phenobarbitone inj. 100mg 8 hourly

C: Phenytoin inj 100mg 8 hourly

- ✓ Brain CT scan if GCS score is 9 or below (absolute indication), GCS 10–14 relative indication for CT scan
- ✓ Admit to ICU if GCS score is 8 and below, or refer if required
- ✓ Craniotomy is indicated for specialist cases e.g. intracranial hematomas, depressed skull fractures based on pupil asymmetry, lateralizing signs and brain CT scan
- ✓ Refer or consult the specialist if indicated especially moderate and severe traumatic brain injury, pupil asymmetry is noted or evidence in brain CT scan

Table 2: ***Use GLASGOW Coma Scale***

SCORE	MOTOR RESPONSE	SCORE	VERBAL	SCORE	EYE
6	obeys verbal command	5	Oriented and Converses	4	Eye open spontaneously command
5	Localises painful stimulus	4	Disoriented and converses	3	Eye open to verbal command
4	Flexes limb to painful stimulars	3	Inappraite words	3	Eye open to pain
3	Abnormal flexion painful stimulare	2	Inappropriate sound	2	Eye open to pain
2	. Extension to painful stimulus	1	No response		
1	No response				

Severe Traumatic Brain Injury

It is the most disabling condition that is associated with great mortality if not treated optimally. It is invariably followed by permanent disabilities. Multidisciplinary approach is of paramount importance. Long-term hospitalization followed by rehabilitation is advised. Comorbidity is very often observed.

Treatment

- ✓ ICU admission observing the neurocritical care and ABCDE protocol
- ✓ Craniotomy if indicated based on brain CT scan findings

- ✓ Rehabilitation upon discharge from hospital

INJURIES

Injury is an insult to the body with the resultant adverse effect. This can be brought up by physical insult, chemical/toxic injury or thermal injury. Usually the patient presents with symptoms upon arrival to the health facility which includes pain, bleeding, swelling or loss of function of the affected organ.

Soft Tissue injuries

Diagnostic criteria

Pain only, traumatic swelling, bruises with intact skin, cuts, abrasions, puncture wounds or open wounds of varying size and severity

Injury to internal organs must be recognized and referred, including subtle signs of organ damage, e.g.:

- ✓ Blood in the urine – kidney or bladder damage
- ✓ Shock – internal bleeding
- ✓ Blood or serous drainage from the ear or nose – skull base fracture

An injury causing a sprain or strain may be initially overlooked. Exclude fractures by performing appropriate X-rays

Note

Closed injuries and fractures of long bones may be serious and damage blood vessels

Contamination with dirt and soil complicates the outcome of treatment

Emergency management

- ✓ Immobilize injured limb after reduction by POP cast or splint
- ✓ Monitor vital signs
- ✓ Monitor the arterial pulse and capillary refill below an injury on the limb with swelling.

Wound care

- ✓ Surgical debridement of the wound
- ✓ Suture or splint when needed
- ✓ Avoid primary suture if the wound is infected:
  - ☞ Dirty or contaminated

- ☞ Crushed
- ☞ In need of debridement
- ☞ Projectile inflicted Caused by bites

Pharmacological Treatment

A: Paracetamol 15 mg/kg PO 6 hourly per 24 hours **AND**

A: Diclofenac 75 mg IM 6hourly if can't tolerate oral medication

AND

B: Cloxacillin 500mg IV 6 hourly for 7 days

A: Ceftriaxone 1gm IV 8 hourly

B: Metronidazole 500mg IV 8 hourly **AND**

A: Tetanus prophylaxis**:** 0.5 mL Tetanus toxoid and 1 mL Tetanus immunoglobulin for all except under 10 years old with documented evidence of full immunization.

Sprains and Strains

It is a type of soft tissue injury where the muscle and tendons are affected. Exclude fracture by performing x-ray

Diagnostic Criteria

- ☞ History of trauma
- ☞ Pain, especially on movement
- ☞ unable to use the limb
- ☞ Tenderness on touch
- ☞ Limited movement

These may be caused by:

- ☞ Sport injuries
- ☞ Slips and twists
- ☞ Overuse of muscles
- ☞ Abnormal posture

Note: In children always bear non-accidental injuries (assault) in mind.

Emergency Treatment

- ☞ Immobilize with firm bandage and/or temporary splinting e.g. triangular sling, back slab etc
- ☞ Children over 12 years and adults:

- ☞ Ibuprofen200–400 mg PO 8 hourly

AND

- ☞ Paracetamol 15 mg/kg PO 6 hourly per 24 hours.

Perform X-ray to rule out dislocations or sublaxations

Referral

- If Severe progressive pain. Do X-ray to exclude bone fractures or joint dislocation.
- Progressive swelling
- Extensive bruising
- Deformity
- Joint tenderness on bone
- No response to treatment Severe limitation of movement

Extremity Fractures

Fractures of long bones of upper and lower limbs are quite common. If not properly treated they often lead to long-term deformities. Osteomyelitis is always the complication of open fractures. Hemorrhagic shock may occur in situations involving multiple fractures or pelvic ring fractures.

Diagnostic Criteria

- Pain, swelling
- Loss of limb function
- Deformity and abnormal movement

Investigation

- X-ray

Non–Pharmacological Treatment

Hospital level

- Immobilize injured limb by POP cast or splint
- Monitor vital signs
- Monitor the arterial pulse and capillary refill below an injury on the limb with swelling
- Treat open fractures by proper surgical debridement and ORIF as per specialist guideline.

Spine fractures

Motor traffic injuries and falls constitute the burden of most spine injuries. Paralysis may be associated, often been brought by improper transfer of the patient to the hospital. Cspine injury is always accompanied by traumatic brain injury.

Diagnostic Criteria

- History of trauma
- Pain
- Neurological deficit

Investigation

- X-ray,

Non–Pharmacological Treatment

- Immobilize the neck by collar or pillows/sand bags
- Patient should lie flat in bed, preferably the flat bed or air mattress
- Treat shock as per the guideline
- Catheterize if urine retention
- Immediate transfer to the hospital that handles specialized spine surgeries
- Referral

Note: Examine cervical spine in all traumatic brain injury patients