Treatment Protocol: TRAUMATIC INJURY — Ref. No. 1244

Base Hospital Contact: Required for patients who meet Trauma Center criteria or guidelines. ❶ Notify the receiving Trauma Center as soon as possible for all patient transports.

1. Immediately control major bleeding *(MCG 1370)*
   Apply tourniquet prn

2. Assess airway and initiate basic and/or advanced airway maneuvers prn *(MCG 1302)*

3. For traumatic arrest, treat per *TP 1243, Traumatic Arrest*

4. Provide spinal motion restriction (SMR) if indicated *(MCG 1360)*
   For alert patients, logroll off the backboard (if used during extrication) and onto gurney prior to transport ❷

5. Administer **Oxygen** prn *(MCG 1302)*
   High flow Oxygen 15 L/min for all patients with shock or with suspected traumatic brain injury

6. If patient has an Unmanageable Airway *(MCG 1302)***:**
   Initiate immediate transport to MAR and **CONTACT BASE** en route

7. For anticipated prolonged extrication (> 30 minutes)
   Consider activating the Hospital Emergency Response Team (HERT), *Ref. 817*

8. For crush injury, treat in conjunction with *TP 1242, Crush Injury/Syndrome*

9. Initiate cardiac monitoring prn *(MCG 1308)*

10. Establish vascular access prn *(MCG 1375)*

11. Apply blanket to keep patient warm

12. Consider medical condition preceding accident and refer to appropriate treatment protocol prn ❸

MULTI-SYSTEM TRAUMA

13. Perform needle thoracostomy for suspected tension pneumothorax *(MCG 1335)*

14. For an open or sucking chest wound, cover with a commercially available vented chest seal or vented (3-sided) occlusive dressing ❹

15. For poor perfusion with hypotension:
    Normal Saline 250mL IV/IO rapid infusion ❺
    CONTACT BASE to discuss further fluid resuscitation

16. Cover eviscerated organs with a moist non-adhering dressing

17. For pain management prn *(MCG 1345)*

Fentanyl 50mcg (1mL) slow IV/IO push or IM/IN
Morphine 4mg (1mL) slow IV/IO push or IM

CONTACT BASE for additional pain management:
May repeat as above up to maximum total dose Fentanyl 250mcg or Morphine 20mg

18. For nausea or vomiting: ❻
    Ondansetron 4mg ODT/IV/IM, may repeat x1 in 15 min prn

ISOLATED HEAD INJURY

19. Administer **high flow Oxygen 15 L/min** for all patients with suspected traumatic brain injury ❼
    Continually assess patient's airway and ventilation status, assist prn ❽

20. For SBP ≤ 90mmHg:
    Normal Saline 1L IV/IO rapid infusion ❾
    Reassess after each 250 mL increment for evidence of volume overload (pulmonary edema); stop infusion if pulmonary edema develops
    CONTACT BASE for persistent poor perfusion after **Normal Saline 1L**

21. For nausea or vomiting: ❺
    Ondansetron 4mg ODT/IV/IM, may repeat x1 in 15 min prn

22. Transport with head of gurney elevated to 30 degrees when possible ❿

23. If patient develops seizure activity, treat in conjunction with *TP 1231, Seizure*

24. For pain management prn *(MCG 1345)*

    For an alert and oriented patient with GCS 15:
    Fentanyl 50mcg (1mL) slow IV/IO push or IM/IN
    Morphine 4mg (1mL) slow IV/IO push or IM

    CONTACT BASE for additional pain management or for initial orders if patient not alert and oriented with GCS 15
    May provide or repeat as above up to maximum total dose Fentanyl 250mcg or Morphine 20mg

ISOLATED EXTREMITY INJURY

25. For pain management prn *(MCG 1345)*

26. For poor perfusion:
    Normal Saline 1L IV/IO rapid infusion
    Reassess after each 250 mL increment for evidence of volume overload (pulmonary edema); stop infusion if pulmonary edema develops
    CONTACT BASE for persistent poor perfusion to obtain order for additional **Normal Saline 1L IV/IO**

27. Splint and dress injuries prn

For distal extremity fractures with poor neurovascular status distal to injury – realign and stabilize extremity
Mid-shaft femur – apply traction splint per manufacturer guidelines ⓫
All other fractures/dislocations – splint in position of comfort

SPECIAL CONSIDERATIONS

❶ For patients requiring transport to a Trauma Center per *Ref. 506*, contact the receiving Trauma Center for Base Medical Direction and notification. If the Base Hospital is contacted and the Base redirects transport to a Trauma Center, Base personnel will notify the Trauma Center.

❷ A backboard is not required for spinal motion restriction (SMR) and may cause harm as well as increased pain. Patients should not be transported on a backboard for the purpose of SMR. If a backboard is used for extrication, patients who are alert should then be logrolled onto the gurney prior to transport. The backboard may be used during patient transport for splinting of multiple simultaneous extremity fractures or to assist in maneuvering the unconscious patient. In all cases, the backboard should be removed immediately if causing respiratory compromise.

❸ Traumatic events may be due to a medical emergency, particularly single-vehicle accidents and unexplained falls.

❹ Placement of a vented dressing can prevent conversion of an open pneumothorax to a tension pneumothorax. However, tension pneumothorax may still develop in the presence of a vented dressing and should be treated with needle thoracostomy. Furthermore, needle thoracostomy in a patient with evidence of tension pneumothorax should not be delayed for placement of dressing.

❺ Fluid resuscitation increases vascular pressure and dilutes clotting factors, which may increase internal bleeding. For patients at risk of internal hemorrhage, fluids should only be administered for SBP < 90mmHg **and** other signs of poor perfusion, titrated to maintain SBP ≥ 90mmHg. In patients with penetrating trauma, permissive hypotension (withholding fluids for SBP ≥ 70mmHg if patient has normal mental status) is preferred to reduce ongoing blood loss. Patients with ALOC or SBP < 70mmHg should receive fluids until their mental status and SBP improve. Permissive hypotension is contraindicated in patients with possible traumatic brain injury.

❻ Vomiting should be prevented and/or immediately treated in patients with head injury, since it increases intra-cranial pressure and can compromise the patient's airway.

❼ Traumatic brain injury presents with altered mental status after head injury. Any hypoxic episode, even brief, is associated with worse patient outcome for patients with traumatic brain injury.

❽ Hyperventilation reduces blood flow to the brain by reducing CO_2 and is associated with worse outcomes in severe head injuries. The exception to this is presence of elevated intra-cranial pressure (ICP) with signs of impending herniation (severe ALOC without motor response or with posturing and a unilateral 'blown pupil'). In this case, **mild** hyperventilation of approximately 20 breaths per minute should be used to maintain an $ETCO_2$ of 30-35mmHg. This mild hyperventilation reduces blood flow to the brain to decrease ICP until the patient receives definitive surgical care. For patients without elevated ICP, hyperventilation is harmful.

❾ Any hypotension increases mortality in patients with traumatic brain injury. Normal Saline should be initiated to maintain SBP ≥ 90mmHg at all times but can be withheld if the blood pressure is normal.

❿ A head-elevated position at about 30 degrees reduces intra-cranial pressure and improves

respiratory status. Patients in a cervical collar may have their head elevated if there is no concern for thoracic or lumbar spine injury. Reverse Trendelenburg is another option for patients that cannot be seated. Patients who are hypotensive should be maintained supine unless airway compromise requires repositioning.

⓫ Open femur fracture is not a contraindication to apply the traction splint. If the bone is protruding and there is gross contamination, wash with saline prior to applying the splint.